



The National Climate Change Adaptation Strategy for Saint Christopher and Nevis



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Foreword

St. Kitts and Nevis, like any other Small Island Developing State is most vulnerable to the projected impacts of climate change. Extreme weather events such as flooding and droughts, changes in temperature and precipitation patterns continue to significantly affect our economy.

Climate change is a reality and as such, climate change adaptation can no longer be viewed as an option but a necessity. The National Climate Change Adaptation Strategy for St. Kitts and Nevis will operationalize the policy directives and objectives outlined in the National Climate Change Policy of 2017. It recognizes the challenges the sectors face as a result of climate change and will provide

guidance on priorities and appropriate measures for adaptation to reduce vulnerability to the impacts from climate change and build resilience over the long term in St. Kitts and Nevis.

The National Climate Change Adaptation Strategy was prepared through a consultative and participatory process and highlights various sectors that are extremely vulnerable to climate change. These sectors include agriculture, water, tourism, fisheries, coastal and marine ecosystems, forest and terrestrial ecosystems, finance and banking, human health and infrastructure and physical development.

I would like to express sincere thanks to the various stakeholders in St. Kitts and Nevis who willingly shared their knowledge, experiences and input into the development of the Strategy. Special thanks is also extended to Caribbean Natural Resources Institute (CANARI) and the European Union (EU) for providing technical and financial assistance respectively in making this possible. Lastly, I must commend the staff of the Department of Environment for their efforts in coordinating and spearheading this process and ensuring that this strategy was successfully completed.



Honourable Eugene Hamilton
Minister of Environment

Acronyms and abbreviations

CANARI	Caribbean Natural Resources Institute
CARDI	Caribbean Agricultural Research and Development Institute
CARICOM	Caribbean Community
CCCCC	Caribbean Community Climate Change Centre
CCRIF	Caribbean Catastrophe Risk Insurance Facility
CDB	Caribbean Development Bank
CFBC	Clarence Fitzroy Bryant College
CSO	Civil Society Organisation
ENSO	El Niño Southern Oscillation
FAO	Food and Agriculture Organisation
GCF	Green Climate Fund
GDP	Gross domestic product
GoSKN	Government of Saint Kitts and Nevis
HadCM2	Hadley Centre coupled model
ICT	information and communication technologies
IICA	Inter-American Institute for Cooperation on Agriculture
M&E	Monitoring and Evaluation
NCCC	National Climate Change Committee
NDA	National Designated Authority
NDC	National Determined Contribution
NEMA	National Emergency Management Agency
OECS	Organisation for Eastern Caribbean States
PA	Protected Area
PSIP	Public Sector Investment Programme

R&D	Research and Development
SCASPA	Saint Christopher Air and Sea Ports Authority
SDG	Sustainable Development Goal
SIDS	Small Island Developing State
SST	Sea Surface Temperature
UNFCCC	United Nations Framework Convention on Climate Change
UWI	University of the West Indies

Executive Summary

The Federation of Saint Christopher and Nevis (St. Kitts and Nevis) is highly vulnerable to the impacts of climate change as a small island developing state (SIDS). Observed and potential changes include increases in average air and sea surface temperatures, reductions in average rainfall, more intense tropical storms and hurricanes, sea level rise and ocean acidification. Climate change is likely to impact adversely on biodiversity, food, energy and water security, human health, physical infrastructure as well as economic development centred on tourism.

This National Climate Change Adaptation Strategy provides guidance on priorities and appropriate measures for adaptation to reduce vulnerability to the impacts from climate change and build resilience over the long term in St. Kitts and Nevis. Recognising the need for an integrated approach that addresses the economic, environmental and social dimensions of climate change, it identifies specific adaptation objectives and measures to address sectoral and cross-sectoral vulnerabilities at the macro level. It also seeks to provide mitigation co-benefits where possible, through prioritising adaptation measures that minimise greenhouse gas emissions and enhance natural ecosystems functioning as carbon sinks. The strategy covers the period 2018-2030.

The Strategy aims to operationalise the policy directives and objectives outlined in the National Climate Change Policy of 2017. This Policy provides overarching guidance for the development of an institutional framework for low carbon and climate resilient development, in harmony with other sectoral policies, and the identification and implementation of appropriate adaptation and mitigation measures. The Policy clearly articulates the need for adaptation and focuses on addressing the current and potential impacts of climate change across sectors and mainstreaming of climate change considerations into the national development agenda, including, budgeting and implementation.

The Strategy is also aligned with St. Kitts and Nevis' National Determined Contribution (NDC) under the Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC), the Caribbean Community (CARICOM) Regional Framework for Achieving Development Resilient to Climate Change and the Implementation Plan (2011-2021) and the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs) to enable St. Kitts and Nevis to meet its international and regional commitments in ensuring climate resilient development.

It was designed using a participatory approach to gain input and recommendations from diverse stakeholders, including government agencies, civil society organisations, local communities and resource user groups such as farmers and fisherfolk, and the private sector. This input was facilitated via two rounds of national consultations. The Strategy also draws on adaptation priorities and strategies identified in existing sectoral policies and plans developed through wider consultation processes. As such, it serves as an umbrella document

that builds on existing information, institutions and capacities built in implementing adaptation and climate resilient development and seeks to maximise impact given resource constraints.

The Strategy includes an overview of the national circumstances and context, including observed and future climate change trends and the policy framework to be taken into account in adaptation planning and decision-making. It proposes specific objectives and measures for adaptation across eight thematic areas and five cross-cutting areas as outlined in the framework below. For the seven areas identified as priorities for the period 2018-2030, the Strategy includes programmes for action and an implementation budget. It also recognises the institutional arrangements for coordination and implementation of adaptation measures as stipulated in the National Climate Change Policy, and outlines mechanisms for resource mobilisation and monitoring and evaluation (M&E).

Table 1. Summary Framework for the National Climate Change Adaptation Strategy

Vision: A resilient St. Kitts and Nevis that is capable of adapting to the long-term impacts of climate change to ensure the well being and prosperity of its population and the health of its natural resources	
Goals:	
<ul style="list-style-type: none"> • To reduce the vulnerability of St. Kitts and Nevis to the adverse impacts of climate variability and climate change through cross-sectoral and multi-faceted measures that build adaptive capacity and resilience over the long-term. • To mainstream climate change adaptation into the national development agenda, including the planning, budgeting and implementation of new and existing policies, programmes and projects • Ensuring mitigation co-benefits, where possible, through prioritising adaptation measures that minimise greenhouse gas emissions and enhance natural ecosystems functioning as carbon sinks • Mobilising external climate finance to support effective adaptation planning and implementation. 	
Key areas for adaptation	
1. Agriculture	<i>Objective:</i> To ensure food and nutrition security and resilient livelihoods through integration of climate smart technologies and ecosystem based management into agricultural development
2. Fisheries and coastal and marine ecosystems	<i>Objective:</i> To ensure conservation and sustainable use and management of fisheries and coastal and marine ecosystems and build their resilience through ecosystem-based adaptation and disaster risk reduction
3. Forest and terrestrial ecosystems	<i>Objective:</i> To ensure conservation and sustainable use and management of forest and terrestrial ecosystems and build their resilience through ecosystem-based adaptation and disaster risk reduction
4. Finance and banking	<i>Objective:</i> To ensure financial sustainability and build resilience through integrated adaptation and disaster risk reduction

5. Human health		<i>Objective:</i> To reduce vulnerability to the adverse impacts of climate variability and change on human health and well-being through improved preparedness and response		
6. Infrastructure and physical development		<i>Objective:</i> To promote sustainable physical development and climate proof existing and planned infrastructure to build resilience		
7. Tourism		<i>Objective:</i> To promote a sustainable and competitive tourism product and build resilience to climate variability and change through integrated adaptation and disaster risk reduction		
8. Water		<i>Objective:</i> To provide a safe and reliable water supply for St. Kitts and Nevis and ensure efficient water use to build resilience to climate variability and change		
Cross-cutting issues				
1. Capacity building and engagement of stakeholders	2. Information management, research and M&E	3. Integrated adaptation and disaster risk reduction	4. Investment and economic planning	5. Inter-sectoral coordination
<i>Objective:</i> To engage and build the capacity of stakeholders from government, civil society and the private sector to effectively plan for and adapt to climate change	<i>Objective:</i> To establish a comprehensive system of information management, research and M&E to inform climate change adaptation planning and decision-making	<i>Objective:</i> To save lives and protect property from the impacts of climate change and natural disasters through integrated adaptation and disaster risk reduction across all sectors	<i>Objective:</i> To reduce the economic impacts of climate change, enhance recovery from impacts and leverage opportunities through effective planning and investment	<i>Objective:</i> To establish linkages between sectors to enable information sharing and effective coordination and implementation of climate change adaptation

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1. Introduction

This National Climate Change Adaptation Strategy for Saint Christopher and Nevis (St. Kitts and Nevis) provides guidance on priorities and appropriate measures for adaptation to reduce vulnerability to the impacts from climate change and build resilience over the long term. Climate change is likely to impact adversely on biodiversity, food, energy and water security, human health, physical infrastructure as well as economic development centred on tourism due to increases in average air and sea surface temperatures, reductions in average rainfall, more intense tropical storms and hurricanes, sea level rise and ocean acidification. Recognising the need for an integrated approach that addresses the economic, environmental and social dimensions of climate change, it identifies specific adaptation objectives and measures to address sectoral and cross-sectoral vulnerabilities at the macro level. It also seeks to provide mitigation co-benefits where possible, through prioritising adaptation measures that minimise greenhouse gas emissions and enhance natural ecosystems functioning as carbon sinks. The Strategy covers the period 2018-2030.

The Strategy aims to operationalise the policy directives and objectives outlined in the National Climate Change Policy of 2017. This Policy provides overarching guidance for the development of an institutional framework for low carbon and climate resilient development, in harmony with other sectoral policies, and the identification and implementation of appropriate adaptation and mitigation measures. The Policy clearly articulates the need for adaptation and focuses on addressing the current and potential impacts of climate change across sectors and mainstreaming of climate change considerations into the national development agenda, including planning, budgeting and implementation.

The Strategy was designed using a participatory approach to gain input and recommendations from diverse stakeholders, including government agencies, civil society organisations, local communities and resource user groups such as farmers and fisherfolk, and the private sector. This input was facilitated via two rounds of national consultations. The Strategy also draws on adaptation priorities and strategies identified in existing sectoral policies and plans developed through wider consultation processes. As such, it serves as an umbrella document that builds on existing information, institutions and capacities built in implementing adaptation and climate resilient development and seeks to maximise impact given resource constraints.

It includes an overview of the national circumstances and context, including observed and future climate change trends and the policy framework to be taken into account in adaptation planning and decision-making. It proposes specific objectives and measures for adaptation across eight thematic areas (agriculture, coastal and marine ecosystems, forests and terrestrial ecosystems, finance and banking, human health, infrastructure and physical

development, tourism and water) and five cross-cutting areas (stakeholder capacity building and engagement, information management, research and monitoring, integrated adaptation and disaster risk reduction, investment and economic planning and inter-sectoral coordination). For the seven areas identified as priorities for the period 2018-2030, the Strategy includes programmes for action and an implementation budget. It also outlines the institutional arrangements for coordination and implementation of adaptation as stipulated in the National Climate Change Policy, and mechanisms for funding and M&E.

2. Overview of Observed and Projected Impacts of Climate Change for St. Kitts and Nevis

2.1 Context

St. Kitts and Nevis is a sovereign, democratic federal state comprised of two islands of the Lesser Antilles in the Eastern Caribbean Sea (see Figure 1). Saint Kitts, the larger island, is 37 km long with an area of 176 km². Nevis is almost circular in shape with an area of 93 km². The combined area of the islands is approximately 269 km². The islands are volcanic in origin, each with centrally located mountain peaks covered with secondary tropical forest. Coastal and marine ecosystems include mangroves, freshwater and salt ponds, seagrass beds and fringing and deep submerged coral reefs along the north and south west and east coasts. The ocean shelf of the islands is small at approximately 742 km² but the exclusive economic zone of the country is extensive economic zone of the country is extensive at 10,206 km².



Fig. 1: Map of St. Kitts and Nevis (Source: World Atlas)

According to the 2011 census the total population of St. Kitts and Nevis is 46,398 (34,983 in St. Kitts and 11,415 in Nevis)¹. In both islands, the population is concentrated in the capital and surrounding suburban areas that are located in flat coastal areas. The capital of St. Kitts is Basseterre and the capital of Nevis is Charlestown. The remaining population resides in villages generally located along the main coastal roads of each island.

¹ Government of St. Kitts and Nevis. 2014. Report of the 2011 Population and Housing Census. Basseterre, St. Kitts.

While the economy of St. Kitts and Nevis was based on the sugar industry until 2005, the main economic activity is now centred on tourism. Construction, banking and export-oriented manufacturing are also significant and growing sectors. The direct contribution of tourism to gross domestic product (GDP) in St. Kitts and Nevis was XCD152.1 million or 7.2% of total GDP in 2016². This contribution is forecast to rise by 7.8% on average per annum from 2017-2023 to XCD257.1 million, representing 8.5% of total GDP in 2023³. Tourism is also a major employer in St. Kitts and Nevis, generating 1,500 jobs directly in 2013 (6.1% of total employment)⁴. This includes employment by hotels, travel agents, airlines, cruise ships and other passenger transportation services (excluding commuter services).

2.2 Observed and Projected Impacts of Climate Change For St. Kitts And Nevis

St. Kitts and Nevis has a tropical maritime climate with an average annual temperature of 28°C and small seasonal and diurnal variations (typically 3-5°C). Rainfall ranges from around 800 mm to 1600 mm annually. The wet season lasts from May to December, with rainfall peaks in May, October and November with about 180 mm per month. The drier months occur between January and April. Rainfall is strongly related to altitude. In St. Kitts, the central mountain range receives an annual average of 2,500 to 4,000 mm while coastal areas receive a more modest annual average of 1,016 mm and the south-eastern peninsula only receives on average 920 mm. In Nevis, annual average rainfall is about 1170 mm. St. Kitts and Nevis is considered water scarce, and relies heavily on spring-fed aquifers.

Inter-annual climate variability is strongly influenced by the El Niño Southern Oscillation (ENSO), with warmer and drier than average conditions during El Niño events and colder and wetter conditions during La Niña events. Hurricane frequency and intensity is also influenced by ENSO. There is less frequent hurricane activity during El Niño events and more activity during La Nina events.

Given the location of St. Kitts and Nevis at the southern edge of the Atlantic hurricane belt, it typically experiences tropical cyclones and hurricanes from June to November. Heavy rainfall events are related to the passage of these tropical disturbances. A number of cyclones and hurricanes have affected St. Kitts and Nevis, including Hurricane Hugo (1989), Hurricanes Luis and Marilyn (1995), Hurricane Georges (1998), Hurricane Lenny (1999), Hurricane Omar (2008), Hurricane Earl (2010), Tropical Storm Emily (2011), Tropical Storm Rafael (2012), Tropical Storm Gonzalo (2014) and Hurricanes Irma and Maria (2017).

² Adapted from Government of St. Kitts and Nevis. 2015. Second National Communication to the United Nations Framework Convention on Climate Change (UNFCCC). Basseterre, St. Kitts.

³ Ibid

⁴ Ibid

Climate change is expected to compound the effects of natural climate variability, and create new challenges for SIDS like St. Kitts and Nevis due to:

- an increase in average air temperatures;
- an increase in average sea surface temperatures;
- a decrease in average annual rainfall;
- sea level rise across the insular Caribbean;
- an increase in the intensity of tropical storms and hurricanes; and
- ocean acidification as carbon dioxide emissions are absorbed by the ocean, reducing pH and the availability of biologically important calcium carbonate minerals.

The National Climate Change Policy and Second National Communication to the UNFCCC describe the specific observed and projected impacts for St. Kitts and Nevis and provide an analysis of vulnerability. Observational data indicate that the annual average air temperature has been rising steadily at an average rate of 0.11°C, while annual average rainfall has been decreasing since the 1960s at an average rate of 47mm per decade⁵. The projections for temperature, precipitation, sea surface temperatures, sea level rise and tropical storms and hurricanes for St. Kitts and Nevis are given in **Box 1**.

Based on these projections⁶, climate change is likely to impact adversely on biodiversity, food, energy and water security, human health, physical infrastructure as well as economic development centred on tourism. In particular, sea level rise is expected to pose a major challenge as St. Kitts and Nevis is particularly vulnerable to erosion and changes in the coastline, which would have direct adverse impacts on coastal amenities such as built infrastructure and roads and indirect adverse impacts on economically important activities such as tourism.

⁵ Government of St. Kitts and Nevis. 2015. Second National Communication to the United Nations Framework Convention on Climate Change (UNFCCC). Basseterre, St. Kitts.

⁶ Projections for the analysis in Box 1 are based on the Direct Area Climate Model (Charlery & Nurse 2010) which was used to perform downscaling of rainfall and temperature in St. Kitts and Nevis up to 2100. The HadCM3 global climate model (GCM) was used as the primary SRES climate model for simulating the atmospheric climate change processes. The HadGem2-ES model was used to provide the sea level rise data for St. Kitts and Nevis for the emissions scenarios based on three of the Representative Concentration Pathways (RCPs), RCP2.6, RCP4.5 and RCP8.5. Further details are provided in St. Kitts and Nevis' Second National Communication to the UNFCCC.

Box 1: Climate Modelling Projections for St. Kitts and Nevis

Air Temperatures: Annual mean air temperatures are expected to increase for St. Kitts and Nevis under all model scenarios ranging from an increase of 0.66°C by 2020 to 2.99°C by 2100, relative to the 1983-1999 mean.

Rainfall: Model projections indicate an overall decrease in annual rainfall in St. Kitts and Nevis, ranging from 3% and 48% during the 21st Century, with significant reductions in the wet season from May to November under all scenarios.

Sea Surface Temperatures (SST): Model projections indicate a steady increase of 0.02°C annually during the period 2000-2030, followed by a sharp increase of about 0.05°C annually from 2030 to 2100.

Sea Level Rise: Sea level in the vicinity of St. Kitts and Nevis is projected to rise steadily by about 0.3m to 1.2m by 2100 under various emission scenarios.

Tropical Storms and Hurricanes: North Atlantic tropical storms and hurricanes appear to have increased in intensity over the last 30 years. Observed and projected increases in SSTs indicate potential for continuing increases in hurricane activity and model projections indicate that this may occur through increases in intensity of events but not necessarily through increases in frequency of storms.

3. Policy Context

The National Climate Change Policy 2017 provides the legal mandate and policy framework for development of the National Climate Change Adaptation Strategy for St. Kitts and Nevis. It provides overarching guidance for the creation of institutional mechanisms to enable low carbon and climate resilient development, in harmony with other sectoral policies, and for the identification and implementation of adaptation and mitigation measures. Articulating the need for adaptation, the policy focuses on mainstreaming of climate change considerations into the national development agenda through:

- strengthening existing institutional arrangements for systematic observations, research and climate change modelling including through cooperation with academia, NGOs and the private sector;
- assessing sectoral vulnerability to climate change by conducting vulnerability analyses and formulating adaptation options, including technological application, in biophysical and socio-economic systems;

- revising sectoral policies to include consideration of climate change impacts derived from vulnerability analyses;
- revising national development plans to incorporate climate change vulnerability, impacts and adaptation options with a view to climate proofing new developments and retrofitting existing infrastructure, and strengthening climate resilience, particularly to extreme weather events and slow-onset adverse climate impacts; and
- enhancing the resilience of natural biophysical systems to maximize ecosystem services such as the natural coastal defence.

The Strategy complements the National Disaster Plan 2013, which promotes integrated adaptation and disaster risk management to build resilience to multiple hazards. A comprehensive risk management approach is critical given scenarios of increasing extreme climate events. The Strategy also builds on key sectoral policies and plans, including the National Adaptation Strategy and Plan for the Water Sector 2014, National Biodiversity Strategy and Action Plan 2014-2020, National Energy Policy and Action Plan 2011, St. Kitts Agricultural Development Strategy 2013-2016 and St. Kitts Tourism Sector Strategy and Action Plan 2014-2019.

The Strategy is aligned with St. Kitts and Nevis' NDC under the UNFCCC Paris Agreement, with an ambitious target for mitigation to reduce greenhouse gas emissions and key areas for adaptation, including in the agriculture, coastal zone and water sectors, identified for the period 2020-2030. It further enables St. Kitts and Nevis to meet regional and international commitments in ensuring climate resilient development under the CARICOM Regional Framework for Achieving Development Resilient to Climate Change and the Implementation Plan 2011-2021, Sendai Framework for Disaster Risk Reduction 2015-2030 and the 2030 Agenda for Sustainable Development and its 17 SDGs (including SDG 13 on Climate Action).

4. National Climate Change Adaptation Strategy

This National Climate Change Adaptation Strategy provides guidance on appropriate measures for adaptation through identification of key priorities and actions that reduce vulnerability to specific impacts from climate change and build resilience over the long term. It seeks to operationalise the vision and policy directives outlined in the National Climate Change Policy, and enable a coordinated, cross-sectoral approach to adaptation that takes advantage of emerging opportunities and minimises losses and damage to ensure climate resilient development. The Strategy is intended to guide planning, budgeting and implementation by the Government of St. Kitts and Nevis (GoSKN) and its agencies as well as civil society and the private sector at local and national levels. It is also intended to help development partners and donors to identify adaptation measures to support and mobilise climate finance from a range of sources. The Strategy covers the period 2018-2030.

4.1 Vision and Goals

The vision for the National Climate Change Adaptation Strategy is a resilient St. Kitts and Nevis that is capable of effectively adapting to the long-term impacts of climate change to ensure the well being and prosperity of its population and the health of its natural resources.

The goals of the Strategy are to:

1. To reduce the vulnerability of St. Kitts and Nevis to the adverse impacts of climate variability and climate change through cross-sectoral and multi-faceted measures that build adaptive capacity and resilience over the long term.
2. To mainstream climate change adaptation into the national development agenda, including the planning, budgeting and implementation of new and existing policies, programmes and projects.
3. Ensuring mitigation co-benefits, where possible, through prioritising adaptation measures that minimise greenhouse gas emissions and enhance natural ecosystems functioning as carbon sinks; and
4. Mobilising external climate finance to support effective adaptation planning and implementation.

4.2 Guiding Principles

The National Climate Change Adaptation Strategy is guided by principles established in the Constitution of St. Kitts and Nevis, the CARICOM Liliendaal Declaration on Climate Change and Development and the UNFCCC's technical guidelines on national adaptation planning to ensure the achievement of its goals. These principles include:

- **Enhanced stakeholder participation** – The full participation of government, civil society and private sector stakeholders should be enabled in all decision-making processes from policy development through to implementation, including via engagement with the most vulnerable and disadvantaged persons in society.
- **Building capacity to address climate change impacts** – Recognising human and financial capacity constraints, actions that strengthen the ability of stakeholders from local to national levels to take ownership and lead efforts to minimise and adapt to the effects of climate change in St. Kitts and Nevis should be prioritised.
- **Decision-making based on scientific and local knowledge** – Policy, planning, and action should be guided by the findings of the Intergovernmental Panel on Climate Change, the CCCCC as well as other regional and local scientific research and by local knowledge.
- **Sustainable use and management of the environment and natural resources** - Recognising the value of the natural environment and balancing economic, social and environmental concerns, ecosystem-based management should be promoted to ensure conservation and sustainable use of natural resources and support economic development, livelihoods and human well-being.

- **Preservation of St. Kitts and Nevis’ cultural heritage** – The culture of the people of St. Kitts and Nevis should be respected and considered in the planning and implementation of strategies for climate-resilient development.
- **Gender equity** – Equal consideration should be given to the rights of both men and women, and girls and boys.
- **Enhanced inter-sectoral coordination** – Recognising that climate change impacts will cut across all sectors, adaptation actions should draw together multi-disciplinary stakeholder groups to facilitate an integrated and coordinated approach to climate change.
- **The Precautionary Principle** – Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
- **Adoption of a “low regret” approach** – low cost adaptation strategies that provide relatively large benefits, including economic, social and environmental benefits, should be prioritised.
- **Additionality** – Adaptation must be recognised as an additional burden on St. Kitts and Nevis due to unchecked greenhouse gas emissions by large emitters, and the responsibility for financing and mobilizing resources for adaptation therefore has to be borne in large part by these large emitters and not by diverting local resources from core development priorities including education, health, social development and poverty reduction.
- **Integrity and good governance** – Transparency and accountability should be practiced in decision-making including through ensuring public access to information.
- **Promotion of regional cooperation** – Exchanges of knowledge, best practices and innovations in climate change adaptation planning and specific adaptation measures from across the Caribbean region will be utilised by St. Kitts and Nevis, and adaptation responses coordinated to address the transboundary impacts of climate change.

4.3 Strategic Objectives and Actions for Adaptation

To achieve the goals for adaptation and building resilience to climate change, specific objectives and adaptation actions are outlined below for the ten vulnerable areas and sectors identified by the National Climate Change Policy and for cross-cutting areas, including stakeholder capacity building and engagement, research and information management, integrated adaptation and disaster risk reduction, investment and fiscal planning and inter-sectoral coordination.

4.3.1 Key Areas and Sectors

Agriculture

Objective: To ensure food and nutrition security and resilient livelihoods through integration of climate smart technologies and ecosystem-based management into agricultural development.

Current status and vulnerabilities: Agriculture, including crops and livestock, provides a major supply of food and is an important source of income for St. Kitts and Nevis. It represents about 4% of GDP⁷. With the closure of the sugar industry in 2005, the main export crops are now peanuts, peppers, potatoes and vegetables in St. Kitts and sea island cotton and coconuts in Nevis. There is also dairy and meat production based on livestock including cattle, pigs and poultry. The agricultural sector is highly climate-sensitive and climate change could threaten food security and impact on agriculture-based livelihoods in St. Kitts and Nevis. Greater rainfall variability and extremes will impact on water availability for crop and livestock production. Drought conditions will lead to water stress, while flooding will accelerate soil erosion. Rising sea levels will exacerbate soil aridity due to saltwater intrusion into groundwater and exacerbate saltwater damage from sea blast. Increased incidence of invasive species and new pests and diseases also pose a significant threat to the agricultural sector, and could compound damage from existing pests such as monkeys and roaming animals (e.g. cattle, donkeys, sheep, goats and dogs).

Key gaps:

- While the St. Kitts Agricultural Development Strategy (2013-2016) and Draft Nevis Agricultural Strategic Plan (2018-2022) identify climate change as a risk, no comprehensive assessment of key impacts and vulnerabilities has been undertaken for the agricultural sector in St. Kitts and Nevis.
- There is need for improved information exchange among farmers and technical experts, and limited capacity to support agricultural innovation and product development for small-scale farming.
- A lack of early warning systems and access to agricultural insurance to address extreme weather events and related impacts on agriculture.
- Farmers continue to use unsustainable practices that increase vulnerability (e.g. farming on steep hillsides).
- There is a weak farm to market linkage, and growing reliance on imported foods.
- A lack of integrated and coordinated approach for prevention and control of pests, diseases, invasive species, soil erosion and downstream pollution.

⁷ Department of Agriculture. (2013). *St. Kitts 2013-2016 Agriculture Development Strategy*. Department of Agriculture, Ministry of Agriculture, Cooperatives, Fisheries, Lands and Housing.

Adaptation actions: To achieve the objective, St. Kitts and Nevis will:

- Conduct a vulnerability assessment to identify the key climate change impacts and vulnerabilities and specific adaptation measures for the agricultural sector.
- Improve agricultural extension services and response mechanisms for agricultural risk and disaster management in small-scale farming, including early warning systems and insurance.
- Strengthen mechanisms for application of science and technology for climate-smart solutions, including drought-resistant species and use of aquaponics and aquaculture.
- Promote ecosystem-based approaches through investments in research and practices for integrated pest and soil management and integrated crop-livestock-forestry systems that enable conservation and sustainable resource use.
- Mainstream sustainable land, water and waste management into sectoral plans, including updating the St. Kitts Agricultural Development Strategy and draft Nevis Agricultural Strategic Plan.
- Explore synergies with other sectors to develop innovative programmes that support economic diversification and promote enhanced natural resource management, including via agro-forestry and agro-tourism.

Fisheries and Coastal and Marine Ecosystems

Objective: To ensure conservation and sustainable use and management of fisheries and coastal and marine ecosystems and build their resilience through ecosystem-based adaptation and disaster risk reduction.

Current status and vulnerabilities: Coastal and marine ecosystems in St. Kitts and Nevis are key for sustainable development, especially within the tourism and fisheries sectors. Climate change will pose a significant risk to coastal and marine ecosystems due to sea level rise; extreme weather and storm surges; increased sea surface temperatures resulting in coral bleaching; ocean acidification; and sargassum influx. Specific impacts are uncertain but model projections (e.g. the Hadley Centre coupled model [HadCM2]) indicate that there could be decreased productivity of coral reefs, fisheries and wetlands, with adverse impacts on food supply and associated livelihoods due to decreasing nearshore and deep water fish stocks and diminishing benefits associated with fishing activities. These changes will also impact on ecosystem services such as coastal protection. Vulnerable and endangered coastal and marine species, including those endemic to St. Kitts and Nevis, may also be at risk due to impacts on population size and distribution and habitat availability. These climate change impacts will compound existing threats from coastal development, pollution, habitat loss and degradation, overfishing and invasive species such as the Lionfish (*Pterois* spp.).

Key gaps:

- There is a lack of monitoring and enforcement of existing legislation and regulations for conservation and environmental management.
- Coordination and capacity for coastal zone management is limited among government agencies.

- There is limited investment and capacity for development of underutilised fisheries and new and value added products in small-scale fisheries, and increasing reliance on imported fish.
- A lack of awareness of and access to insurance and other disaster risk reduction mechanisms to address the impacts of extreme weather events on small-scale fisheries.
- There is inadequate data to gain a clear understanding of the impacts of climate change and potential adaptation strategies for ocean acidification and recent sargassum influxes.
- A lack of integrated and coordinated approach for prevention and control of invasive species and land-based pollution.

Adaptation actions: To achieve the objective, St. Kitts and Nevis will:

- Strengthen institutions for coastal and marine conservation and management through establishing a Coastal Zone Management Unit and integrating climate change, ecosystem-based adaptation and disaster risk reduction considerations into legislation, regulations and policies, including the National Conservation and Environmental Protection Act and draft National Fisheries Management Plan.
- Conduct a vulnerability assessment to identify the key climate change impacts and vulnerabilities and specific adaptation measures for fisheries and marine resources and related livelihoods.
- Expand research and monitoring of coastal and marine ecosystems to better understand climate change vulnerabilities and potential adaptation options, including for ocean acidification and sargassum influx.
- Improve fisheries extension services and technical support for enterprise and product development and disaster risk reduction mechanisms in small-scale fisheries, including insurance.
- Promote ecosystem-based management of coastal and marine areas through investments in research and practices for integrated coastal zone management, ‘ridge to reef’ and watershed management, ecosystem approach to fisheries and marine spatial planning.
- Manage coastal and marine ecosystems, and relevant species, to reduce non-climate threats that weaken their resilience, including through reducing environmental degradation, unsustainable resource use and the spread of invasive species such as Lionfish (*Pterois* spp.).
- Establish a comprehensive system of coastal and marine management areas based on the Protected Area (PA) System Plan, and a sustainable financing mechanism to support these management areas.
- Build the capacity of resource managers to ensure effective and participatory planning and management of coastal and marine resources, including in PAs and management areas.

Forest and Terrestrial Ecosystems

Objective: To ensure conservation and sustainable use and management of forest and terrestrial ecosystems and build their resilience through ecosystem-based adaptation and disaster risk reduction.

Current status and vulnerabilities: Forests and other terrestrial ecosystems are vital for sustaining water supply, preventing landslides, soil erosion and flooding and providing timber and non-timber forest products, and therefore of importance for the country's overall sustainable development. Climate change will adversely affect forests in a number of ways including heat stress due to increased air temperatures; loss of soil and vegetation due to extreme weather such as high winds, heavy rainfall and storms; water shortages due to rainfall variability and drought; and increased incidence of invasive species, pests and bacterial and fungal diseases. Additionally, coastal forests and mangroves will be threatened by coastal erosion and flooding with sea level rise and storm surge. Model projections (e.g. HadCM2) indicate that there could be decreased productivity of forests and wetlands, with adverse impacts on food supply and associated livelihoods. These changes will also impact on the terrestrial biodiversity including vulnerable and endangered species, particularly those endemic to St. Kitts and Nevis, and the provision of ecosystem services such as watershed protection, flood control and soil stabilisation.

Key gaps:

- Legislation and regulations related to forest management, such as the Forest Ordinance of 1904, are outdated.
- A lack of monitoring and enforcement of existing legislation and regulations for conservation and environmental management.
- Land tenure is insecure and this disincentivises leaseholders and private landowners, who manage about 40% of land in St. Kitts and about 90% of land in Nevis⁸, from investing in sustainable forest and land management.

Adaptation actions: To achieve the objective, St. Kitts and Nevis will:

- Strengthen forest, conservation and environmental management legislation, regulations, policies and plans through integration of climate change, ecosystem-based adaptation and disaster risk reduction considerations.
- Promote integrated watershed management as an ecosystem-based approach to forest and terrestrial resources through investments in research and practices.

⁸ Williams, P. 2013. St. Kitts and Nevis Land Policy Issues Paper. Prepared for the Social and Sustainable Development Division, Organisation of Eastern Caribbean States (OECS) with technical assistance from UN-Habitat and the University of the West Indies. Castries, Saint Lucia: OECS.

- Manage forest and terrestrial ecosystems, and relevant species, to reduce non-climate threats that weaken their resilience, including through reducing deforestation, soil erosion and loss and the spread of invasive species.
- Build the capacity of resource managers to ensure sustainable and participatory planning and management of forest and terrestrial resources, including in the Central Forest Reserve and the proposed Nevis Peak and Camps River National Parks as key PAs.
- Enhance carbon sinks through efficient and effective management of forests and wetlands.

Finance and Banking

Objective: To ensure financial sustainability and build resilience through integrated adaptation and disaster risk reduction.

Current status and vulnerabilities: Financial and banking services are an important and growing sector for St. Kitts and Nevis, representing about 7% of GDP⁹. There are eleven commercial banks and credit unions, an offshore bank and development bank as well as the Eastern Caribbean Home Mortgage Bank, which is the only secondary market institution in the region involved in the mortgage market¹⁰. There is also a Citizenship by Investment Programme, which is the longest established programme of its kind globally. The financial and banking sector is vulnerable to climate change, especially extreme weather events such as hurricanes, storms and storm surges that result in loss and damage of infrastructure and declining productivity of economically important sectors such as tourism, construction, manufacturing and agriculture. The costs associated with disaster recovery would also have an impact on the financial health of insurance companies and lending institutions.

Key gaps:

- There is limited understanding of potential climate related impacts and vulnerabilities within the financial and banking sector.
- There is limited in-country expertise to support the identification and implementation of adaptation actions for the financial and banking sector to reduce vulnerabilities and take advantage of opportunities related to climate change.

Adaptation actions: To achieve the objective, St. Kitts and Nevis will:

- Mainstream climate change adaptation and disaster risk reduction considerations into legislation, regulations, policies and plans for the financial and banking services.
- Develop or adopt existing tools for assessment of the costs and benefits of climate change impacts for financial and banking services and for potential adaptation actions.

⁹ Inter-American Development Bank (IDB). 2013. Private sector assessment of St. Kitts and Nevis. Commissioned by IDB with funding from the Compete Caribbean Programme. <http://www.caribank.org/uploads/2014/11/2014-St.-Kitts-and-Nevis-PSAR.pdf>

¹⁰ Ibid

- Enhance awareness and understanding among shareholders, suppliers, employees and other stakeholders about fiscal vulnerabilities and potential adaptation actions.
- Integrate climate-proofing considerations in the construction of new infrastructure and retrofitting existing infrastructure, especially related to telecommunications and power supply as key supporting services for the financial and banking sector.

Human Health

Objective: To reduce vulnerability to the adverse impacts of climate variability and change on human health and well-being through improved preparedness and response.

Current status and vulnerabilities: Climate change and related disasters could impact significantly on the public health of both residents and visitors to St. Kitts and Nevis, affecting economic productivity, livelihoods and well-being¹¹. Changing rainfall patterns and increases in temperature and humidity are likely to provide favourable conditions for water-borne and vector-borne diseases. The possible re-emergence of malaria¹² and appearance of new mosquito-borne viruses, such as chikungunya and zika, are of considerable concern. Extreme weather patterns also threaten to compromise sanitation systems and freshwater availability, with the potential for outbreaks of communicable diseases. Heat stress and related illnesses are projected to increase, particularly in the elderly and infirm, with increasing air temperatures. Additionally, impacts on the agricultural sector may indirectly affect human health in terms of nutritional requirements and supply.

Key gaps:

- There are gaps in the legislative and regulatory framework for public health, and the need to update the Public Health Act and its regulations of 2002 to incorporate emerging issues related to climate change and disasters.
- A lack of research and monitoring to enhance understanding of the linkages between disease and climate change and potential vulnerabilities, and the effects of newly emerging diseases on the population such as chikungunya and zika.
- There is no central sewage system for St. Kitts and Nevis, and approximately 8% of the St. Kitts and Nevis' population uses pit latrines exacerbating the risk of water contamination and spread of water-borne diseases^{13,14}.

¹¹ Yan, J. 2018. *Natural Hazard Profiles of St. Kitts and Nevis – Output Report*. Technical assistance for the preparation of a disaster vulnerability assessment for the health, education and public infrastructure sectors in St. Kitts and Nevis. AECOM International Development Europe SL.

¹² Rawlins, S.C, Hinds, A., Rawlins, J.M. (2008). Malaria and vectors in the Caribbean: the continuing challenge of the disease forty-five years after eradication from the islands. *West Indian Medical Journal* 57(5): 462-469.

¹³ Simpson, M., Clarke, J.F., Scott, D.J., New, M., Karmalkar, A., Day, O.J., Taylor, M., Gossling, S. Wilson, M., Chadee, D., Stager, H., Waithe, R., Stewart, A., Georges, J., Hutchinson, N., Fields, N., Sim, R., Rutty, M., Matthews, L., Charles, S. (2012). *CARIBSAVE Climate Change Risk Atlas (CCRA) - Profile for St. Kitts*. Summary Document, March 2012. Bridgetown, Barbados: The CARIBSAVE Partnership, Department for International Development and Australian AID.
<http://dms.caribbeanclimate.bz/M-Files/openfile.aspx?objtype=0&docid=5049>

¹⁴ Simpson, M., Clarke, J.F., Scott, D.J., New, M., Karmalkar, A., Day, O.J., Taylor, M., Gossling, S. Wilson, M., Chadee, D., Stager, H., Waithe, R., Stewart, A., Georges, J., Hutchinson, N., Fields, N., Sim, R., Rutty, M., Matthews, L., Charles, S.

- An insufficient number of qualified public health professionals to support disease prevention and treatment.
- A lack of data and understanding of the psychological impacts of more extreme weather events, such as drought, floods and hurricanes, due to climate change.

Adaptation actions: To achieve the objective, St. Kitts and Nevis will:

- Develop and implement an early warning system and health and sanitation education and awareness raising programme targeted at residents and at tourists, which focuses on disease prevention.
- Conduct a vulnerability assessment to identify the key climate change impacts and vulnerabilities and specific adaptation measures for the health sector.
- Mainstream climate change and disaster risk reduction and management considerations into health sector legislation, planning and programmes, with emphasis on vulnerable groups.
- Facilitate the development of integrated waste management systems to improve sanitation and sewerage and solid waste disposal on St. Kitts and Nevis.
- Integrate human health and climate change considerations into poverty reduction strategies and programmes, recognising the link between disease transmission, the environment and living conditions.
- Build the capacity of the GoSKN's Public Health Unit and service providers to support disease prevention and treatment.

Infrastructure and Physical Development

Objective: To promote sustainable physical development and climate proof existing and planned infrastructure to build resilience.

Current status and vulnerabilities: The majority of physical infrastructure in St. Kitts and Nevis, including for communications, energy, transport, water and sanitation as well as commercial and residential buildings, is located within two kilometres of the coast. Climate change poses a particularly high risk for this infrastructure due to sea level rise and more extreme weather, including flooding, hurricanes, storms and storm surge^{15,16}. Further expansion of commercial and residential development inland into steep slopes, which are vulnerable to soil erosion and landslides, is also of concern¹⁷. In addition, climate change could lead to further disruptions in power supply and transport, which are heavily reliant on imported fossil fuels and vulnerable to disruptions from extreme weather, and a greater

(2012). *CARIBSAVE Climate Change Risk Atlas (CCRA) - Profile for Nevis*. Summary Document, March 2012. Bridgetown, Barbados: The CARIBSAVE Partnership, Department for International Development and Australian AID. <http://dms.caribbeanclimate.bz/M-Files/openfile.aspx?objtype=o&docid=5034>

¹⁵ Williams, P.I. (2013). *St. Kitts and Nevis Land Policy Issues Paper*. Prepared for the OECS Social and Sustainable Development Division, Castries, Saint Lucia.

¹⁶ Yan, J. 2018. *Natural Hazard Profiles of St. Kitts and Nevis – Output Report*. Technical assistance for the preparation of a disaster vulnerability assessment for the health, education and public infrastructure sectors in St. Kitts and Nevis. AECOM International Development Europe SL.

¹⁷ *ibid*

demand for energy to cool commercial and residential buildings due to higher temperatures.

Key gaps:

- Limited monitoring and enforcement of legislation and regulations resulting in adhoc, unregulated physical development.
- Land tenure is insecure and this disincentivises leaseholders and private landowners, who manage about 40% of land in St. Kitts and about 90% of land in Nevis¹⁸, from investing in sustainable buildings and sustainable land management.
- Government subsidies have kept utility prices artificially low, especially electricity prices, encouraging unsustainable use and counteracting efforts to promote sustainable building practices.
- A lack of in-country expertise to support research and development into designs and technologies for sustainable building, energy, transport and communications infrastructure.

Adaptation actions: To achieve the objective, St. Kitts and Nevis will:

- Revise legislation, regulations and policies concerning physical development and land use zoning to address conflicts and gaps, insecure land tenure and perverse incentives with regard to climate change.
- Mainstream climate change adaptation and disaster risk reduction considerations into physical development policies, plans and programmes, including the National Physical Development Plan and proposed Nevis Physical Development Plan.
- Establish and enforce building codes and standards to build resilience through reducing exposure to hazards, including via coastal setbacks and restrictions on hillside development, and promoting sustainable resource use, including via energy and water conservation.
- Integrate climate proofing considerations, including ecosystem-based solutions that maintain natural defences against coastal erosion, flooding, drought and heat stress, in the design and construction of new physical infrastructure and encourage the private sector and communities to retrofit existing buildings through tax breaks and other incentives.
- Promote the increased use of renewable energy technologies where appropriate, which are affordable, reliable and environmentally-friendly, to enable a decentralised and secure energy supply for communications, transport and commercial and residential buildings.
- Harmonise physical development planning with strategies for enhanced energy, food and water security and conservation and sustainable use of biodiversity and natural resources for sustainable land management.

¹⁸ Williams, P. 2013. St. Kitts and Nevis Land Policy Issues Paper. Prepared for the Social and Sustainable Development Division, Organisation of Eastern Caribbean States (OECS) with technical assistance from UN-Habitat and the University of the West Indies. Castries, Saint Lucia: OECS.

Tourism

Objective: To promote a sustainable and competitive tourism product and build resilience to climate variability and change through integrated adaptation and disaster risk reduction.

Current status and vulnerabilities: Tourism is an important source of employment and revenue for St. Kitts and Nevis following the closure of the sugar industry in 2005, contributing 25-30% of GDP. This sector is highly vulnerable to climate variability and change. Current and potential climate change impacts include the degradation of natural ecosystems and biodiversity that serve as tourism attractions; reduced water and energy supply due to saltwater intrusion into groundwater and extreme weather such as drought, floods and hurricanes; loss and damage to physical infrastructure due to sea level rise and extreme weather including hurricanes, storms and storm surge; reduced access to high-quality local food due to impacts on agriculture; and threats to human health due to increasing incidence of water-borne and vector-borne diseases.

Key gaps:

- There is rapid growth of the tourism sector, and authorities are unable to effectively monitor and enforce legislation, regulations and policies to prevent unregulated development and unsustainable resource use particularly of energy and water resources.
- Legal authority, roles and responsibilities for coastal development are unclear, and in some cases overlapping, among government agencies and this enables unregulated tourism development along coasts.
- While the Tourism Sector Strategy and Action Plan identifies climate change as a risk, no comprehensive assessment of its key impacts and vulnerabilities has been undertaken for the sector.
- There is a disconnect between strategies and plans for development of tourism sector and other sectors, such as agriculture, energy and water, in St. Kitts and Nevis.

Adaptation actions: To achieve the objective, St. Kitts and Nevis will:

- Revise legislation, regulations and policies concerning tourism development to address conflicts and pursue incentives with regard to climate change.
- Conduct a vulnerability assessment to identify the key climate change impacts and vulnerabilities and specific adaptation measures for the tourism sector.
- Mainstream climate change adaptation and disaster risk reduction considerations into policies, plans and programmes for planning and development of the tourism sector, including the St. Kitts Tourism Sector Strategy and Action Plan and draft Nevis Tourism Strategy.
- Revise and enforce building codes and standards, such as coastal setbacks, to climate proof any new tourism related infrastructure including through ecosystem-based solutions that maintain natural defences against coastal erosion, flooding, drought and heat stress.

- Explore linkages with other sectors to diversify and expand the sustainable tourism product, including agro-tourism, eco-tourism and heritage tourism, and target other source markets beyond the United States and Europe.
- Identify and develop innovative, market-based incentives to promote sustainable tourism.

Water Resources

Objective: To provide a safe and reliable water supply for St. Kitts and Nevis and ensure efficient water use to build resilience to climate variability and change.

Current status and vulnerabilities: Freshwater resources in St. Kitts and Nevis are mainly supplied from groundwater aquifers through the St. Kitts Water Services Department and Nevis Water Department respectively, although surface water from springs and desalination plants also comprises a portion of St. Kitts' supply. In St. Kitts, there is heavy reliance of the Basseterre Valley Aquifer for its piped water supply, which is under pressure from land development and overpumping¹⁹. In Nevis, piped water supply is exclusively from groundwater, which consists of three shallow coastal aquifers and two deep aquifers drilled under a private-public partnership to secure additional supplies²⁰. Climate change will impact on the availability and quality of freshwater resources in several ways^{21,22}. Erratic rainfall and drought could compromise aquifer recharge and reduce the potential for rainwater harvesting as an alternative supply. Nevis already experiences lower levels of rainfall and recharge than St. Kitts due to its geographic location. Sea level rise also poses a risk to aquifers due to saltwater intrusion. Extreme weather, such as floods, hurricanes and storm surge, could also damage water infrastructure, disrupt power supplies for pumping of groundwater and impact on sewerage and solid waste management resulting in water contamination.

Key gaps:

- Legislation, regulations and policies related to water resources management, such as the Water Courses and Water Works Ordinance of 1956, are outdated or lacking.
- Limited coordination between Water Departments and agencies responsible for physical planning in terms of land use and zoning to protect freshwater resources and enable future drilling and development of deep water wells.
- Demand for water is expected to increase significantly, especially in the agricultural and tourism sectors where water use could double over the next ten years, and there is need for greater investment in water conservation and demand side management. There is already a shortfall between water supply and demand in St. Kitts, resulting in

¹⁹ Caribbean Development Bank (CDB). 2018. *St Kitts and Nevis – Task 3 - Investment Plan for Climate Resilient Water Supply Services*. Planning for the Integration of Climate Resilience in the Water Sector in the Caribbean. Prepared by HR Wallingford Ltd.

²⁰ Ibid.

²¹ Ibid.

²² Caribbean Community Climate Change Centre (CCCCC). (2014). *Impact Assessment Report and National Adaptation Strategy and Plan for the Water Sector*. Prepared by Environmental Solutions Limited and Department of Physical Planning and Environment, Ministry of Sustainable Development, Basseterre, St. Kitts.

rationing and the need for new hotel developments to utilise desalination plants which raises their operation costs.

- Pumping operations for groundwater aquifers in St. Kitts and Nevis are heavily reliant on a reliable power supply and highly vulnerable to disruptions due to extreme weather events, such as hurricanes and storms.
- Non-revenue water, which is estimated at 53% in St. Kitts and 30% in Nevis, remains an issue due to leakages, billing and metering errors and unauthorised uses²³.
- There is no central sewage system for St. Kitts and Nevis, and approximately 8% of the population uses pit latrines and has poor access to toilet facilities, exacerbating the risk of water contamination and spread of water-borne diseases^{24,25}.

Adaptation actions: To achieve the objective, St. Kitts and Nevis will:

- Strengthen legislation and institutions to govern the sustainable use of water resources and address possible conflicts and gaps, including revision of the Water Resources Act and establishment of a new Water Resources Agency.
- Promote integrated water resources management²⁶ through policies and programmes for water security, including development of a Watershed Policy and Integrated Water Resources Management Policy that consider climate change adaptation and disaster risk reduction.
- Enable private sector and community participation in integrated water resources management, including enhanced use of water conservation technologies, use of storage tanks, rainwater harvesting and recycling of grey water for demand side management.
- Protect catchments and freshwater resources from pollution, including through suitable watershed, wastewater and solid waste management strategies, in close collaboration with the agricultural and tourism sectors.
- Reduce the vulnerability of the water supply system through climate-proofing water storage, supply and distribution infrastructure.
- Promote increased energy efficiency and use of renewable energy technologies, which are affordable, reliable and environmentally-friendly, to provide a decentralised and secure energy supply for water supply and distribution.

²³ CDB. 2018. *St Kitts and Nevis – Task 3 - Investment Plan for Climate Resilient Water Supply Services*. Planning for the Integration of Climate Resilience in the Water Sector in the Caribbean. Prepared by HR Wallingford Ltd.

²⁴ Simpson, M., Clarke, J.F., Scott, D.J., New, M., Karmalkar, A., Day, O.J., Taylor, M., Gossling, S. Wilson, M., Chadee, D., Stager, H., Waithe, R., Stewart, A., Georges, J., Hutchinson, N., Fields, N., Sim, R., Ruddy, M., Matthews, L., Charles, S. (2012). *CARIBSAVE Climate Change Risk Atlas (CCRA) - Profile for St. Kitts*. Summary Document, March 2012. Bridgetown, Barbados: The CARIBSAVE Partnership, Department for International Development and Australian AID.
<http://dms.caribbeanclimate.bz/M-Files/openfile.aspx?objtype=o&docid=5049>

²⁵ Simpson, M., Clarke, J.F., Scott, D.J., New, M., Karmalkar, A., Day, O.J., Taylor, M., Gossling, S. Wilson, M., Chadee, D., Stager, H., Waithe, R., Stewart, A., Georges, J., Hutchinson, N., Fields, N., Sim, R., Ruddy, M., Matthews, L., Charles, S. (2012). *CARIBSAVE Climate Change Risk Atlas (CCRA) - Profile for Nevis*. Summary Document, March 2012. Bridgetown, Barbados: The CARIBSAVE Partnership, Department for International Development and Australian AID.
<http://dms.caribbeanclimate.bz/M-Files/openfile.aspx?objtype=o&docid=5034>

²⁶ Integrated Water Resources Management (IWRM) is defined as "a process which promotes the coordinated development and management of water, land and related resources in order to maximise economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems." (Global Water Partnership 2010)

4.3.2 Cross-cutting areas

Capacity Building and Engagement of Stakeholders

Objective: To engage and build the capacity of stakeholders from government, civil society and the private sector to effectively plan for and adapt to climate change.

Current status: The National Capacity Self Assessment 2006 and the Stocktaking Report for St. Kitts and Nevis National Preparatory Process for the United Nations Conference on Sustainable Development (Rio+10) 2010²⁷ identify several capacity constraints within the GoSKN ministries and agencies responsible for climate change and environmental management. These constraints include lack of staff with appropriate expertise, high staff turnover, no performance management system and formal training procedures, lack of accountability for delivering annual work plans, and insufficient funds. Engagement of civil society and the private sector in climate change adaptation and building resilience is seen as key given the limited human and financial resources within the public sector. To enable effective stakeholder engagement, capacity building initiatives will also be needed to develop the requisite knowledge and skills for adaptation planning and implementation within civil society and the private sector.

Key gaps:

- Lack of trained professionals with technical skills and experience relevant to climate change adaptation, including vulnerability assessments, ecosystem-based adaptation and disaster risk reduction and climate finance.
- Limited engagement of civil society and the private sector in planning and decision-making for adaptation and climate resilient development.

Adaptation Actions: To achieve the objective, St. Kitts and Nevis will:

- Develop and implement a communication and engagement strategy incorporating innovative and participatory tools for climate change awareness raising and mobilising civil society and private sector stakeholders for adaptation, including information and communication technologies (ICT) such as community radio, participatory three-dimensional modelling and participatory video.
- Integrate climate change adaptation into existing public education and awareness programmes for the key vulnerable areas and sectors.
- Build technical and organisational capacity for vulnerability assessments, adaptation planning and implementation and accessing climate finance among staff at government agencies, CSOs and private enterprises through training, coaching, study exchanges, including at regional and international Centres of Excellence such as the

²⁷ Ministry of Sustainable Development. (2010). *Stocktaking Report for St. Kitts and Nevis National Preparatory Process for the United Nations Conference on Sustainable Development (Rio+10)*. Prepared by Island Planning Services for the Ministry of Sustainable Development. Basseterre, St. Kitts.

Caribbean Community Climate Change Centre, and use of grants such as the Green Climate Fund Readiness and Preparatory Support Programme²⁸

- Enable public-private partnerships to facilitate information sharing, training, financing and deployment of innovative technologies and practices to support climate change adaptation.

Information Management, Research and Monitoring and Evaluation (M&E)

Objective: To establish a comprehensive system of information management, research and M&E to inform climate change adaptation planning and decision-making.

Current status: Relevant data on climate variability and climate change is being collected and housed in various government ministries and agencies. However, this data is not widely accessible to all stakeholders to inform adaptation planning and decision-making. In addition, a lack of human, technical and financial resources has limited the possibility of developing a comprehensive and ongoing system for research and M&E on climate change to provide reliable data for decision-making and to foster experimentation and innovation.

Key gaps:

- Baseline data on the status of key areas and sectors, including biodiversity and ecosystems and resource use and management practices, is lacking and, where data generation is taking place, there is limited dissemination of this information within and between sectors.
- Even though almost all sectoral policies and plans identify climate change as a major risk, the majority have not been informed by systematic assessments and research into climate change impacts, vulnerabilities and potential measures for adaptation and building resilience.
- There is limited capacity for interdisciplinary research to enable in-depth understanding of impacts of climate change that cut across sectors and require integrated approaches for adaptation and building resilience.
- Information management systems for storing and sharing climate change data and information across sectors and various stakeholders are lacking.

Adaptation Actions: To achieve the objective, St. Kitts and Nevis will:

- Strengthen institutional arrangements for systematic observations, research and modelling of climate change through cooperation among academia, CSOs and the public and private sector to inform vulnerability assessments and future adaptation planning and decision-making;
- Undertake baseline surveys and establish an ongoing monitoring programme to assess the status and health of species, habitats and ecosystem services within coastal,

²⁸ See <https://www.greenclimate.fund/gcf101/empowering-countries/readiness-support>

marine and terrestrial ecosystems to support adaptation as well as conservation and sustainable management.

- Conduct research into best practices and innovations in ecosystem-based management, including watershed management, integrated water resources management and integrated coastal zone management, that are relevant to the small island context of St. Kitts and Nevis.
- Develop and implement a research and development (R&D) programme on climate-smart technologies and practices for agriculture, energy efficiency, renewable energy, infrastructure and physical development, and water conservation and management.
- Establish a national information management system for sharing climate change related data and information across sectors and various stakeholders and documenting experiences, lessons and best practices for adaptation to support effective implementation over the long term.

Integrated Adaptation and Disaster Risk Reduction

Objective: To save lives and protect property from the impacts of climate change and natural disasters through integrated adaptation and disaster risk reduction across all sectors.

Current status: Climate change has the potential to exacerbate natural disasters, such as droughts, floods, landslides, hurricanes and storm surges, through changing rainfall patterns, more extreme weather and sea level rise. The impacts on human well being, livelihoods and infrastructure in St. Kitts and Nevis will be significant given the small size of the islands and economic dependence on climate-sensitive sectors like tourism^{29,30}. Increasing resilience to multiple hazards, including extreme climate events, will be critical to ensure the vitality of the people and economy.

Key gaps:

- Data and maps on natural hazards exist for a number of key areas and sectors, but there is no centralised repository for this information and limited information dissemination within and between sectors to guide decision-making for integrated adaptation and disaster risk reduction³¹.
- Limited human and financial resources exist within key government agencies, including the National Emergency Management Agency (NEMA), to effectively coordinate and implement integrated adaptation and disaster risk reduction across key areas and sectors.
- There remains greater attention and investment in disaster response and recovery at the expense of disaster risk reduction and preparedness.

²⁹ GoSKN. 2013. Saint Kitts and Nevis National Disaster Plan. Part 1 Basic Plan. The National Emergency Management Agency (NEMA), Basseterre, St. Kitts.

³⁰ Yan, J. 2018. *Natural Hazard Profiles of St. Kitts and Nevis – Output Report*. Technical assistance for the preparation of a disaster vulnerability assessment for the health, education and public infrastructure sectors in St. Kitts and Nevis. AECOM International Development Europe SL.

³¹ Ibid.

Adaptation Actions: To achieve the objective, St. Kitts and Nevis will:

- Strengthen institutional arrangements for integrated adaptation and disaster risk reduction across community to national levels, through developing linkages and a coordinated disaster network spanning the high level National Disaster Mitigation Council to community level disaster preparedness committees.
- Integrate relevant data, assessment reports and maps on natural hazards into the national information management system and national geographic information system (SKNGIS) to enable knowledge sharing and support effective decision-making for integrated adaptation and disaster risk reduction.
- Promote comprehensive disaster management that addresses all aspects of disaster risk management in an integrated manner including risk reduction, preparedness, response, recovery and rehabilitation through investment in capacity building and implementation of best practices within government, civil society and the private sector.
- Establish and maintain early warning systems for hazards, including droughts, floods, heatwaves, hurricanes and storm surge that are climate related, to enable effective disaster preparedness and response with a focus on vulnerable communities and sectors.
- Integrate ecosystem-based approaches to adaptation and disaster risk reduction that build resilience to multiple hazards in policies, plans and programmes for key areas and sectors.

Inter-sectoral Coordination

Objective: To establish linkages between sectors to enable information sharing and effective decision-making, coordination and implementation of climate change adaptation.

Current status: Overall responsibility for climate change adaptation is shared among several ministries and government agencies, including the Ministry of Sustainable Development, Ministry of Agriculture, Cooperatives, Fisheries, Lands and Housing, Ministry of Public Infrastructure and Ministry of Finance, CSOs and the private sector. Ensuring effective coordination and information sharing to support a cross-sectoral and integrative approach to adaptation and building resilience is critical and is meant to be facilitated through the National Climate Change Committee (NCCC) mandated under the National Climate Change Policy. The secretariat for the NCCC will be the St. Kitts Department of Environment. Additionally, a cross-sectoral and multi-stakeholder approach is needed to enable ecosystem-based management and integrated adaptation and disaster risk reduction.

Key gaps:

- The NCCC is yet to be formally constituted and operationalised to coordinate and provide technical guidance on planning and implementation of adaptation and climate resilient development.

- A culture of cooperation and knowledge sharing is lacking among sectoral agencies and the administrations in St. Kitts and in Nevis.

Adaptation Actions: To achieve the objective, St. Kitts and Nevis will:

- Operationalise the NCCC and establish Adaptation Working Groups comprised of the key implementing agencies for climate change adaptation in St. Kitts and Nevis, including agency representatives from the Ministry of Sustainable Development, Ministry of Agriculture, Cooperatives, Fisheries, Lands and Housing, Ministry of Public Infrastructure and Ministry of Finance, NEMA, Nevis Island Administration and relevant CSO and private sector representatives.
- Increase the human resources and capacity within the St. Kitts Department of Environment to effectively serve as the NCCC secretariat and enable a coordinated, multi-sectoral approach to climate change adaptation.
- Establish climate change focal points in the relevant GoSKN ministries and agencies with clear roles and responsibilities for climate change adaptation, including supporting the NCCC to monitor implementation of sectoral vulnerability and risk assessments and adaptation actions and mobilise climate financing.
- Create a database of all ongoing climate change adaptation programmes and projects in St. Kitts and Nevis to enhance coordination and avoid duplication of efforts, and integrate into a national information management system.
- Ensure project staff of climate change adaptation programmes and projects provide annual updates to the Adaptation Working Groups and NCCC to facilitate knowledge exchange, learning and synergies.

Investment and Economic Planning

Objective: To reduce the economic impacts of climate change, enhance recovery from these impacts and leverage opportunities through effective planning and investment.

Current status: Economic planning and investment programmes are developed and implemented for specific sectors, and involve government funding and funding from regional institutions, multi-lateral donors and the private sector. A National Designated Authority (NDA) for the Green Climate Fund (GCF) in St. Kitts and Nevis has been established within the Department of Economic Affairs and Public Sector Investment Programme (PSIP), Ministry of Sustainable Development. The NDA is meant to coordinate activities and develop projects to mobilise climate finance through the GCF, with technical support from the St. Kitts Department of Environment.

Key gaps:

- Current economic and development planning processes give limited consideration to climate change impacts and adaptation.

- There is limited understanding of potential economic impacts and vulnerabilities and opportunities for investment related to climate change.
- There is limited in-country expertise and experience related to climate finance and ensuring access to GCF.

Adaptation Actions:

- Build capacity for assessment of the costs and benefits of climate change impacts for economic development and potential opportunities for investment and application of assessment tools, such as the Caribbean Climate Online Risk and Adaptation Tool (CCORAL)³², among GoSKN ministries and agencies.
- Integrate climate change adaptation considerations systematically into the design and budgets of any new GoSKN projects, including PSIP projects;
- Mainstream climate change considerations into the annual development of budgets for all GoSKN ministries and reporting on annual performance by Permanent Secretaries, including specific adaptation and resilience building initiatives.
- Enhance awareness and readiness for GCF project development and implementation among government, civil society and private sector actors to mobilise available climate finance with support from the GCF Readiness and Preparatory Support Programme.
- Promote private sector investment and public-private partnerships to support adaptation and climate resilient development where feasible.

5. Implementation Framework

5.1 Institutional Arrangements

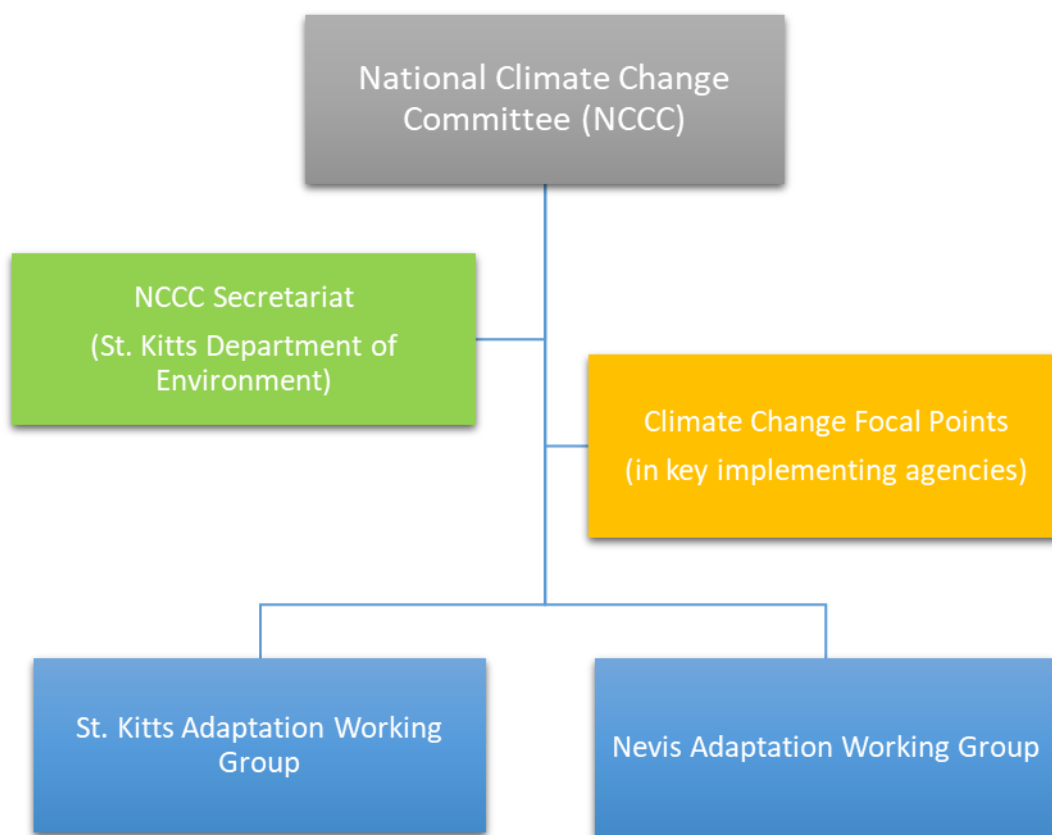
The St. Kitts Department of Environment, with oversight from the NCCC, will have overall responsibility for coordinating implementation of this National Climate Change Adaptation Strategy. This includes catalysing and supporting implementation of specific activities by the various lead and supporting stakeholders identified in the programmes of action below.

To facilitate this process, Climate Change Focal Points will be appointed from the relevant GoSKN ministries and agencies to serve on the NCCC, with clear roles and responsibilities for addressing the impacts of climate change. Two working groups will be established under the NCCC, the St. Kitts Adaptation Working Group and the Nevis Adaptation Working Group that will address island-specific adaptation needs (see Figure 2). The working groups will be comprised of the Climate Change Focal Points from the GoSKN implementing agencies and relevant CSO and private sector representatives involved in climate change adaptation. The St. Kitts Adaptation Working Group will include agency representatives from the Ministry of Agriculture, Cooperatives, Fisheries, Lands and Housing, Ministry of Finance, Ministry of

³² The Caribbean Climate Online Risk and Adaptation Tool (CCORAL) is an online support system and toolbox for climate resilient decision-making developed by the Caribbean Community Climate Change Centre (CCCCC). It includes tools for screening budgets, legislation, policies and projects/programmes using a climate change lens and identifying gaps and opportunities for adaptation and building resilience.

Sustainable Development, Ministry of Public Infrastructure, Ministry of Tourism and NEMA in St. Kitts, while the Nevis Adaptation Working Group will include various agency representatives from the Nevis Island Administration. The working groups will be able to nominate additional members from government, civil society and the private sector as well as other institutions to support its work. The Department of Environment will chair the St. Kitts Adaptation Working Group, while the Nevis Department of Physical Planning and Environment will chair the Nevis Adaptation Working Group. The working groups will report to the NCCC and will support it in monitoring implementation of sectoral vulnerability and risk assessments and adaptation actions and mobilising climate financing.

Figure 2. Proposed institutional arrangements for Implementation of the National Climate Change Adaptation Strategy



Implementation of the National Climate Change Adaptation Strategy will require a cross-sectoral approach that engages a wide range of stakeholder at all levels, including:

- National government (line ministries and agencies) and local government (town and village councils) – Government agencies will be key in mainstreaming adaptation into development agenda and leading on planning, implementation, M&E and resource mobilisation.
- CSOs – Civil society will play an important role in planning, implementation including community mobilisation, M&E and resource mobilisation for adaptation.

- Private sector (registered corporations and small and micro enterprises) – The private sector will be important in adaptation planning, implementation, M&E and financing.
- Academic and research institutions – Academic and other technical agencies will play an important role in adaptation planning, implementation and M&E.
- Regional and international multilateral agencies – These agencies will be key for technical support and financing for adaptation.
- Media (broadcast, print and social media) – The media will be important in adaptation implementation including awareness raising, advocacy and public engagement.

5.2 Gender Considerations

This National Climate Change Adaptation Strategy seeks to enable an inclusive process, with specific emphasis on building the capacity of vulnerable groups to plan and implement adaptation actions and enhancing resilience in St. Kitts and Nevis. As an important driver of vulnerability to climate change, gender needs to be taken into account. For example, while women comprise 52.7% of the population, they represented 61.1% of those living in poverty in 2012 (GoSKN 2011). Women are more likely to work in lower paying jobs or to be unemployed compared to men. They are also not well represented in the political and decision-making process with only 13.3% of women holding political seats in parliament and 11.1% in ministerial positions in Government (World Bank 2017).

Sectoral and cross-sectoral adaptation actions therefore need to be designed to be sensitive to differences in how women and men are impacted by and address climate change and promote gender equality and gender-responsive adaptation. In particular, gender-disaggregated information will need to be collected and analysed as part of vulnerability assessments and analysis of options for adaptation and building resilience in St. Kitts and Nevis. The new National Gender Policy, which is being developed by the St. Kitts Department of Gender Affairs, Ministry of Community Development, Gender Affairs and Social Services, can also inform implementation of the National Climate Change Adaptation Strategy.

5.3 Resource Mobilisation

The potential costs of adaptation to the impacts of climate change are significant, and the GoSKN will be required to mobilise the requisite resources to reduce its vulnerability and build adaptive capacity and resilience to sustain adaptation planning and implementation as outlined in this Strategy.

In mobilising financial resources, the GoSKN will explore scaling up of existing funding sources as well as access to new funding sources, domestic, regional and international. Domestic

sources will be explored including budgetary allocations from government revenue, domestic sources of private revenue (including environmental and other fines, fees and revenues such as licenses and tariffs for non-environmentally friendly or high-greenhouse gas emitting activities), seed financing from domestic stakeholders (line ministries), funds from voluntary markets (e.g. carbon market offset for visitors, donations) and private finance sources. These funds will be allocated via:

- direct budget support (to achieve high level transformative changes in policy and practice);
- sector support (to provide additional support for mainstreaming of climate change actions into programmes);
- project support (for implementation of initiatives to deliver specific results); and
- extra-budgetary support.

Regional and international sources will also be identified including bilateral financing from donor countries, multilateral funds such as the Adaptation Fund, GCF and Global Environment Facility, and private investments (recognising that these are often stimulated by public financing). St. Kitts and Nevis's NDA for GCF has been established within the Department of Economic Affairs and PSIP, Ministry of Sustainable Development. The NDA is currently coordinating activities and developing projects to mobilise climate finance through the GCF, with technical support from the St. Kitts Department of Environment, and this could prove a valuable source of funds to support implementation of this Strategy.

Strengthening the role of the private sector to channel funding into climate-resilient and low-carbon activities will also be a priority.

5.4 Priority Areas and Programmes for Action

The National Climate Change Adaptation Strategy emphasises the need for adaptation efforts to focus on the following five priority areas and sectors over the period 2018-2030 based on stakeholder recommendations and their importance to human well being, livelihoods and the economy in St. Kitts and Nevis:

- Agriculture (crops and livestock)
- Fisheries and coastal and marine ecosystems
- Human health
- Tourism
- Water resources

Additionally, inter-sectoral coordination, stakeholder capacity building, research and M&E will be key to support sectoral adaptation efforts, and are also a focus for the period 2018-2030.

Programmes for action for each of these priority areas are outlined below, including specific actions and activities over the short term (1-4 years), medium term (5-10 years) and long term (10+ years) for adaptation. Lead and supporting government agencies and other stakeholders

responsible for implementation of each of the activities are identified as well as an indicative budget to support implementation of each programme.

5.3.1 Programme of action 1: Inter-sectoral Coordination and Stakeholder Capacity Building

Inter-sectoral coordination and stakeholder capacity building			
Objective: To establish linkages between sectors and build stakeholder capacity for effective decision-making, coordination and implementation of climate change adaptation			
Priority adaptation actions	Activities	Timeframe	Lead organisation and key partners
Establish mechanisms for a coordinated and multi-sectoral approach to climate change adaptation	Operationalise the NCCC	Short term	Lead: Ministry of Agriculture, St. Kitts – Department of Environment; Partners: Ministry of Finance, Ministry of Health, Ministry of Public Infrastructure, Ministry of National Security, Ministry of Sustainable Development, Ministry of Tourism - St. Kitts; Ministry of Agriculture, Ministry of Communication, Ministry of Health, Ministry of Tourism - Nevis; St. Kitts National Trust, Nevis Historical & Conservation Society; Chamber of Commerce; farmers, fisherfolk and their organisations; hotel, dive and tour operators; private landowners
	Establish Adaptation Working Groups for St. Kitts and for Nevis under the NCCC comprised of the key implementing GoSKN agencies and relevant CSO and private sector representatives	Short term	
	Establish climate change focal points in the relevant GoSKN ministries and agencies with clear roles and responsibilities for climate change adaptation, including supporting the NCCC to monitor implementation of sectoral vulnerability and risk assessments and adaptation actions and mobilise climate financing	Short term	
	Create a database of all ongoing climate change adaptation programmes and projects in St. Kitts and Nevis to enhance coordination and avoid duplication of efforts	Short term	
	Ensure project staff of climate change adaptation programmes and projects provide annual updates to the Adaptation Working Groups and NCCC to facilitate knowledge exchange, learning and synergies	Short term	

Build the technical and organisation capacity of government agencies, CSOs and the private sector for climate change adaptation	Build the technical and organisational capacity for vulnerability assessments and adaptation planning and implementation among the climate change focal point network and other staff at government agencies, CSOs and private enterprises through training, coaching and study exchanges, including at regional and international Centres of Excellence	Short term	
	Increase the human resources capacity within the St. Kitts Department of Environment to serve as the NCCC secretariat to enable a coordinated, multi-sectoral approach to climate change adaptation	Medium term	
	Enable public-private partnerships to facilitate information sharing, training, financing and deployment of innovative technologies and practices to support climate change adaptation	Medium term	
Proposed budget: \$755,000 US³³			

³³ Estimates based on past project expenditures for similar activities.

5.3.2 Programme of action 2: Information Management, Research and M&E for Decision-making

Information management, research and M&E for decision-making			
Objective: To establish a comprehensive system of information management, research and M&E to inform climate change adaptation planning and decision-making			
Priority adaptation actions	Activities	Timeframe	Lead organisation and key partners
Strengthen institutional arrangements to inform vulnerability assessments and adaptation planning and decision-making	Establish memoranda of understanding (MOUs) and other strategic partnerships among academia, CSOs and the public and private sector for systematic observations, modelling of climate change, research and M&E	Short term	Lead: Ministry of Agriculture, St. Kitts – Department of Environment; Partners: Ministry of Health, Ministry of Public Infrastructure, Ministry of National Security, Ministry of Sustainable Development, Ministry of Tourism - St. Kitts; Ministry of Agriculture, Ministry of Communication, Ministry of Health, Ministry of Tourism - Nevis; St. Kitts Meteorological Office; Nevis Meteorological Office; St. Kitts National Trust, Nevis Historical & Conservation Society; Chamber of Commerce; farmers, fisherfolk and their organisations; hotel, dive and tour operators; private landowners; Clarence Fitzroy Bryant College (CFBC); Digicel; Flow;
Enhance the collection, analysis and use of climate change related data to inform vulnerability assessments and adaptation planning and decision-making	Conduct systematic observations and modelling to improve understanding of climate change and its current and potential impacts	Short to medium term	
	Undertake baseline surveys and establish an ongoing monitoring programme to assess the status and health of species, habitats and ecosystem services within coastal, marine and terrestrial ecosystems to support adaptation and ecosystem-based management	Short term to medium term	
	Conduct research into best practices and innovations in ecosystem-based management, including watershed management, integrated water resources management and integrated coastal zone management, that are relevant to the small island context of St. Kitts and Nevis	Short to medium term	
	Develop and implement R&D programme on climate-smart technologies and practices for agriculture, energy efficiency,	Medium term	

	renewable energy, infrastructure and physical development, and water conservation and management		Caribbean Agricultural Research & Development Institute (CARDI); Inter-
Enable effective information management and sharing for adaptation planning and implementation	Establish a national information management system for sharing climate change related data and information across sectors and various stakeholders and documenting experiences, lessons and best practices for adaptation to support effective implementation over the long term	Medium term	American Institute for Cooperation on Agriculture (IICA); Food and Agriculture Organisation (FAO); Organisation for Eastern Caribbean States (OECS) Commission; University of the West Indies (UWI)
Proposed budget: \$8 million US ³⁴			

5.3.3 Programme of action 3: Climate Smart Agriculture

Climate smart agriculture			
Objective: To integrate climate smart technologies into agricultural development to ensure food and nutrition security and resilient livelihoods			
Priority adaptation actions	Activities	Timeframe	Lead organisation and key partners
Assess systematically the key climate change impacts and vulnerabilities and specific adaptation measures for the agricultural sector	Conduct a vulnerability assessment to identify the key climate change impacts and vulnerabilities for the agricultural sector	Short term	Lead: Ministry of Agriculture, St. Kitts - Department of Agriculture and Department of Environment; Ministry of Agriculture, Nevis - Department of Agriculture, Department of Cooperatives and Disaster Management Department
	Identify and develop specific adaptation measures for the agricultural sector based on the vulnerability assessment	Short term	
Mainstream climate change and disaster risk management considerations into legislation, regulations, policies	Develop a sectoral adaptation plan for climate change for agriculture based on the vulnerability assessment	Short term	Partners: Ministry of Sustainable Development, St. Kitts

^{34 34} Estimates based on past project expenditures for similar activities.

and plans for the agricultural sector			– Physical Planning and Lands and Survey Departments; Ministry of Communication, Nevis – Physical Planning and Water Departments; Ministry of Public Infrastructure, St. Kitts – Water Services Department; St. Kitts Meteorological Office; Nevis Meteorological Office; NEMA; farmers and their organisations, private landowners; insurance providers; CFBC; CARDI; CANARI; Caribbean Catastrophe Risk Insurance Facility (CCRIF); IICA; Embassy of Republic of China (Taiwan); FAO; OECS Commission; UWI
Improve climate information services and response mechanisms for climate risk and disaster management in small-scale farming	Establish agro-meteorological stations and early warning system for key hazards, including drought, floods and hurricanes, to enable effective disaster preparedness and response within small-scale farming	Short term	
	Build the technical and organisational capacity of agricultural extension services to support agricultural risk and disaster management	Medium to long term	
Improve climate information services and response mechanisms for climate risk and disaster management in small-scale farming	Identify feasible insurance options and promote agriculture insurance to address loss and damage from natural hazards	Medium term	
	Promote climate smart practices and technologies in agriculture through investments in capacity building and implementation of innovative practices	Build the technical and organisational capacity within national authorities and farmer organisations for climate smart agriculture to build resilience in small scale farming	Short term
Promote climate smart practices and technologies in agriculture through investments in capacity building and implementation of innovative practices	Promote the use of established low regret climate smart practices and technologies for crop and livestock production through demonstration projects and small grants, including greenhouses, use of drought resistant species, integrated pest management, water and irrigation management and agro-forestry for soil stabilisation	Short term	
	Strengthen mechanisms for application of science and technology for climate smart agriculture	Expand R&D related to climate smart agricultural practices and technologies, including climate-resilient species	Medium term
Create incentives for the implementation of climate		Medium term	

	smart agriculture, including subsidies and tax breaks		
St. Kitts			
Mainstream climate change and disaster risk management considerations into legislation, regulations, policies and plans for the agricultural sector	Update and implement the St. Kitts Agricultural Development Strategy (2013-2016) to enable effective climate change adaptation and disaster risk management	Short term	Lead: Ministry of Agriculture, St. Kitts - Department of Agriculture and Department of Environment Partners: Ministry of Sustainable Development, St. Kitts – Physical Planning and Lands and Survey Departments; Ministry of Public Infrastructure, St. Kitts – Water Services Department; St. Kitts Meteorological Office; NEMA; farmers and their organisations, private landowners; CFBC; CARDI; IICA; Embassy of Republic of China (Taiwan); FAO; UWI
Improve climate information services and response mechanisms for climate risk and disaster management in small-scale farming	Enhance coordination between St. Kitts Department of Agriculture and key technical agencies for climate change and disasters, including the Department of Environment, St. Kitts Meteorological Office and NEMA	Short term	
Promote climate smart practices and technologies in agriculture through investments in capacity building and implementation of innovative practices	Develop and implement an integrated programme for soil and water conservation, including the use of dryland farming techniques, low tillage, check dams in ghauts and rainwater harvesting for water storage and irrigation for agriculture	Short to medium term	
Strengthen mechanisms for application of science and technology for climate smart agriculture	Invest in R&D in St. Kitts focused on climate-resilient species, including drought resistant crops and new cattle and pig breeds, and use of hydroponics and aquaponics	Medium to long term	
Nevis			
Mainstream climate change and disaster risk management considerations into legislation, regulations, policies and plans for the agricultural sector	Finalise and implement the Draft Nevis Agricultural Strategic Plan (2018-2022), which integrates climate change adaptation and disaster risk management	Short term	Lead: Ministry of Agriculture, Nevis - Department of Agriculture, Department of Cooperatives and

Promote climate smart practices and technologies in agriculture through investments in capacity building and implementation of innovative practices	Expand water storage capacity to 50,000 gallons to supply crops, livestock and associated natural ecosystems and heritage and address future water shortages due to rising demands from agricultural sector	Short term	Disaster Management Department Partners: Ministry of Communication, Nevis – Physical Planning and Environment Department and Water Department; Nevis Meteorological Office; Nevis Growers; New River Farmers and Growers; farmers, private landowners; CFBC; CARDI; IICA; Embassy of Republic of China (Taiwan); FAO; UWI
	Promote semi-intensive livestock techniques for Nevis, including silage feed and forage banks with perimeter fences to reduce damage from stray dogs and pests	Short to medium term	
	Develop measures to protect against coastal erosion, sea blast and saltwater damage that affect coconut plantations and crop production, especially on the SE coast of Nevis	Short to medium term	
Strengthen mechanisms for application of science and technology for climate smart agriculture	Expand R&D focused on genetics for more climate resilient livestock, including new cattle breeds, and use of hydroponics and aquaponics in Nevis	Medium to long term	
Proposed budget: \$14,230,000 US (including \$9,000,000 for St. Kitts and \$5,230,000 for Nevis) ³⁵			

³⁵ Estimates based on St. Kitts Agricultural Development Strategy (2013-2016) and draft Nevis Agricultural Strategic Plan (2018-2022).

5.3.4 Programme of action 4: Integrated Water Resources Management³⁶

Integrated water resources management			
Objective: To promote integrated water resources management (IWRM) to provide a safe and reliable water supply for St. Kitts and Nevis and build resilience to climate change.			
Priority adaptation actions	Activities	Timeframe	Lead organisation and key partners
Revise legislation, regulations, policies and plans to support IWRM	Develop a National IWRM Policy and Strategy	Short term	Lead: Ministry of Public Infrastructure, St. Kitts – Water Services Department; Ministry of Communication, Nevis – Physical Planning and Water Departments Partners: Ministry of Sustainable Development, St. Kitts – Physical Planning and Lands and Survey Departments; Ministry of Health – St. Kitts Environmental Health Department and Nevis Environmental Health Unit; Ministry of Agriculture, St. Kitts - Department of Agriculture, Department of Environment; Ministry of Agriculture, Nevis - Department of Agriculture, Department of Cooperatives, Disaster
	Develop a Watershed Management Plan that identifies watersheds vulnerable to flow changes and creates decision support systems to facilitate effective IWRM and watershed management	Short term	
	Update physical development plans and land use zoning for St. Kitts and Nevis to protect critical watersheds and other areas for aquifer recharge, maintaining river flows and slope stabilisation	Short term	
	Revise the Water Resources Act to include IWRM and climate change considerations	Medium term	
	Formulate and implement a regulatory regime to govern wise use and allocation of water, including the strategic location of dams, desalination plants and sewage treatment plants for agriculture and tourism as major water users.	Long term	

³⁶ Priority adaptation actions, activities and budget based on the 2014 Final Impact Assessment Report and National Adaptation Strategy and Action Plan for the Water Sector of St. Kitts and Nevis, 2016 Nevis Framework for Strategic Water Resources Management and 2018 Investment Plan for a Climate Resilient Water Sector in St. Kitts and Nevis.

Promote IWRM through investments in data management, capacity building and improved implementation	Provide technical and organisational capacity building to St. Kitts Water Services Department and Nevis Water Department staff on IWRM and watershed management	Short term	Management Department; NEMA; Nevis Electric Company; St. Kitts Electric Company; Nevis Meteorological Office; St. Kitts Meteorological Office; St. Kitts Solid Waste Management Corporation; Attorney General's Chambers; Bureau of Standards; hotel and tour operators; farmers and their organisations; private landowners; Digicel; Flow; CARDI; IICA; FAO; Global Water Partnership; OECS Commission; UWI
	Establish mechanisms for collection and management of hydro-meteorological data, including installing automatic stations for optimal coverage and acquiring data storage facilities	Short term	
	Establish a groundwater monitoring system, including collection of biophysical, water quality and use data	Short term	
	Ensure sustainable use and pumping levels of current and future aquifers based on groundwater monitoring data	Short to medium term	
	Enhance the system for data collection and analysis of water use (for residential and non-residential uses) to improve demand side management, including through adoption of smart metering	Short to medium term	
Enable the participation of civil society, communities and the private sector in IWRM	Enhance water conservation and demand side management through fiscal measures, including price adjustments and subsidies and tax breaks for uptake of water-saving technologies	Short to medium term	
	Promote dry land farming systems through capacity building for agricultural extension staff in the	Short to medium term	

	Departments of Agriculture in St. Kitts and Nevis, farmer field schools and establishing demonstration plots		
St. Kitts			
Revise legislation, regulations, policies and plans to support IWRM	Update and implement the 2013 Water Conservation Plan for St. Kitts to address water supply shortfall, including use of desalination and wastewater recycling to supply potable water and non-potable water for landscaping, golf courses and other uses in tourism sector	Short term	Lead: Ministry of Public Infrastructure, St. Kitts – Water Services Department Partners: Ministry of Sustainable Development, St. Kitts – Physical Planning and Lands and Survey Departments; Ministry of Health – Environmental Health Department; Ministry of Agriculture, St. Kitts - Department of Agriculture and Department of Environment; NEMA; St. Kitts Electric Company; Bedrock Exploration and Development Ltd; hotel and tour operators; farmers and their organisations; private landowners; CARDI; Caribbean Development Bank; IICA; FAO; Global Water Partnership
Promote IWRM through investments in data management, capacity building and improved implementation	Establish and implement a programme to develop 3-5 million imperial gallons per day (MGD) of new water sources to address current water shortages and future needs in St. Kitts, focusing on deep water aquifers resilient to drought, saltwater intrusion and the impacts of land development	Short to medium term	St. Kitts Electric Company; Bedrock Exploration and Development Ltd; hotel and tour operators; farmers and their organisations; private landowners; CARDI; Caribbean Development Bank; IICA; FAO; Global Water Partnership
	Conduct a water audit and invest in upgrading and climate proofing water distribution infrastructure to ensure efficient water use and reduce losses from leakages and weather-related damage	Short to medium term	
Enable the participation of civil society, communities and the private sector in IWRM	Enhance rainwater harvesting and storage and wastewater recycling practices within residential areas and hotels/guesthouses through a public education and awareness campaign	Short term	St. Kitts Electric Company; Bedrock Exploration and Development Ltd; hotel and tour operators; farmers and their organisations; private landowners; CARDI; Caribbean Development Bank; IICA; FAO; Global Water Partnership
	Conduct a feasibility study and, where appropriate, promote use of check dams in ghauts and	Short term	

	rainwater harvesting in agriculture for irrigation and aquifer recharge		
Nevis			
Revise legislation, regulations, policies and plans to support IWRM	Implement policy and institutional reforms detailed in the 2016 Nevis Strategic Framework for Water Resources Management and ensure consistency with federal policies and institutions	Short to medium term	Lead: Ministry of Communication, Nevis – Water Department and Physical Planning and Environment Department Partners: Ministry of Agriculture, Nevis - Department of Agriculture, Department of Cooperatives and Disaster Management Department; Ministry of Health, Nevis – Environmental Health Unit; Nevis Electric Company; Bedrock Exploration and Development Ltd;
Promote IWRM through investments in data management, capacity building and improved implementation	Conduct a water audit and invest in retrofitting aging wells and climate proofing water distribution infrastructure to ensure efficient water use and reduce losses from leakages and weather-related damage	Short to medium term	hotel and tour operators; farmers and their organisations; private landowners; CARDI; Caribbean Development Bank; IICA; FAO
	Develop 1.5 MGD of new groundwater sources for Nevis to accommodate future demand, particularly for the expanding tourism sector	Medium term	
Enable the participation of civil society, communities and the private sector in IWRM	Conduct a scoping study and develop alternative water supplies for agriculture to support livelihood resilience and reduce pressure on the potable water supply in Nevis	Short term	
Proposed budget: \$17,405,000 US (including \$12,000,000 for St. Kitts and \$5,405,000 for Nevis)			

5.3.5 Programme of action 5: Climate Change and Disease Prevention³⁷

Climate change and disease prevention			
Objective: To reduce vulnerability to the adverse impacts of climate change on public health through improved disease prevention and response.			
Priority adaptation actions	Activities	Timeframe	Lead organisation and key partners
Assess systematically the key climate change impacts and vulnerabilities and specific adaptation measures for the health sector	Conduct a vulnerability assessment to identify the key climate change impacts and vulnerabilities for the health sector	Short term	Lead: Ministry of Health, St Kitts – Community and Institution Based Health Services Departments, Environmental Health Department; Ministry of Health, Nevis – Health Promotion Unit, Environmental Health Unit Partners: Ministry of Sustainable Development, St. Kitts; Ministry of Public Infrastructure, St. Kitts – Water Services Department; Ministry of Communication, Nevis - Water Department; Ministry of Agriculture, St. Kitts - Department of Environment; Ministry of Agriculture, Nevis - Disaster Management Department; NEMA; St. Kitts Meteorological Office; Nevis Meteorological Office; St. Kitts Solid
	Identify and develop specific adaptation measures for the health sector based on the vulnerability assessment	Short term	
	Enhance research and monitoring programmes to better understand linkages between climate change and diseases and improve prevention and response	Medium to long term	
Develop and implement an early warning system and response mechanisms focused on disease prevention	Establish a health early warning system in collaboration with the Meteorological Office, including long range forecasting and early detection for diseases linked to climate change such as mosquito-borne diseases	Short term	Ministry of Public Infrastructure, St. Kitts – Water Services Department; Ministry of Communication, Nevis - Water Department; Ministry of Agriculture, St. Kitts - Department of Environment; Ministry of Agriculture, Nevis - Disaster Management Department; NEMA; St. Kitts Meteorological Office; Nevis Meteorological Office; St. Kitts Solid
	Develop and implement a climate change, health and sanitation education and awareness raising programme targeted at residents and at tourists to improve disease prevention	Short term	
Build the capacity of the GoSKN's officers and service providers	Conduct a capacity needs assessment of the public health sector, including Ministry of	Short term	Meteorological Office; Nevis Meteorological Office; St. Kitts Solid

³⁷ Adaptation actions and budget estimates derived in part from the 2015 Second National Communication to the UNFCCC.

involved in public health to support disease prevention and response	Health and service providers, to identify key gaps to fill		Waste Management Corporation; Bureau of Standards; hotel and tour operators; private landowners; UWI
	Develop a capacity building strategy for the public health sector to support improved disease prevention and response		
	Build the technical capacity of government officers and service providers in public health for vector control, disease prevention and response and disaster risk management through training, mentoring and study exchanges	Short to medium term	
	Establish a health emergency response network as part of the disaster response system in collaboration with NEMA and the National Disaster Mitigation Council	Medium term	
Proposed budget: \$4,950,000 US³⁸			

³⁸ ³⁸ Estimates based on past project expenditures for similar activities.

5.3.6 Programme of action 6: Integrated Coastal Zone Management³⁹

Integrated coastal zone management (ICZM)			
Objective: To promote ICZM to build the resilience of coastal and marine ecosystems and associated communities and livelihoods to climate change and disasters			
Priority adaptation actions	Activities	Timeframe	Lead organisation and key partners
Strengthen the legal, institutional, regulatory and policy framework for ICZM and mainstream climate change adaptation and disaster risk reduction	Develop an ICZM Strategy and Action Plan to enable a coordinated, cross-sectoral approach	Short term	Lead: Ministry of Sustainable Development, St. Kitts – Physical Planning and Lands and Survey Departments; Ministry of Communication, Nevis – Physical Planning and Environment; St. Kitts Department of Marine Resources (DMR); Nevis Department of Fisheries
	Strengthen and enforce building codes and standards related to coastal setbacks to climate proof against coastal erosion and flooding with sea level rise, storm surge and rough seas	Short term	Partners: Ministry of Agriculture, St. Kitts – Department of Agriculture and Department of Environment; Ministry of Agriculture, Nevis - Department of Agriculture and Disaster Management Department; Ministry of Public Infrastructure, St. Kitts – Maritime Affairs Department and Water Services Department; Nevis Water Department; St. Kitts Meteorological Office; Nevis Meteorological Office; St. Kitts Air and Sea Ports Authority
	Update and enforce existing legislation, policies and plans to enable ecosystem-based management of coastal and marine resources and build resilience through ICZM and ecosystem approach to fisheries (EAF), including the National Conservation and Environmental Protection Act, Fisheries, Aquaculture and Marine Resources Act and draft National Fisheries Management Plan.	Short to medium term	
	Establish a Coastal Zone Management Unit to oversee and implement ICZM	Medium term	
Build technical and organisational capacity for ICZM and	Conduct a vulnerability assessment to identify climate change impacts, vulnerabilities	Short term	

³⁹ Adaptation actions and budget estimates derived from the 2015 Second National Communication to the UNFCCC, National Biodiversity Strategy and Action Plan (2014-2020) and past project expenditures for similar activities.

ecosystem-based adaptation and disaster risk reduction	and specific adaptation measures for fisheries and marine resources and related livelihoods		(SCASPA); NEMA; Attorney General's Chambers; Bureau of Standards; Coast Guard; Digicel; Flow; farmers, fisherfolk and their organisations; hotel, dive and tour operators; private landowners; insurance providers; CANARI; CCRIF; FAO; OECS Commission; UWI
	Enhance awareness and capacity for ICZM among resource managers in government, civil society and the private sector through use of ICTs, training, coaching, study visits and peer exchanges	Short term	
	Strengthen capacity for EAF linked to ICZM and fisheries extension services to support climate change adaptation and disaster risk management in small-scale fisheries based on the vulnerability assessment	Short to medium term	
	Establish tide gauges and coral reef early warning systems in St. Kitts and in Nevis to improve data collection and monitoring of changes in sea level and ocean conditions and impacts on critical coastal and marine ecosystems	Short to medium term	
	Conduct a capacity needs assessment for the new Coastal Zone Management Unit	Medium term	
	Build the technical and organisational capacity of the Coastal Zone Management Unit based on the needs assessment	Medium to long term	
Promote ICZM through documentation, sharing and demonstration of best	Document lessons, best practices and innovations from past and existing ICZM initiatives in St. Kitts and Nevis and share knowledge with other	Short term	

practices and innovations	SIDS via written outputs and ICTs		
	Promote ICZM through demonstration projects showcasing best practices innovations and scaling up of these initiatives, such as ridge to reef approaches involving slope stabilisation, pollution control and coastal protection through restoration and use of coastal and marine PAs	Short to medium term	
	Diversify fisheries-based livelihoods to reduce pressure on coastal and marine ecosystems and build climate resilience, including promoting aquaculture, mariculture and climate smart FADs to access underutilised pelagic fisheries	Short to medium term	
Proposed budget: \$12,900,000 US			

5.3.7 Programme of action 7: Climate proofing the tourism product

Climate proofing the tourism product			
Objective: To promote a resilient and sustainable tourism product through integrated adaptation and disaster risk reduction			
Priority adaptation actions	Activities	Timeframe	Lead organisation and key partners
Assess the key climate change impacts and vulnerabilities and specific adaptation measures for the tourism sector	Conduct a vulnerability assessment for the tourism sector to identify the key impacts and vulnerabilities from climate change and disasters	Short term	Lead: Ministry of Tourism, St. Kitts; Ministry of Tourism, Nevis; St. Kitts Tourism Authority
	Identify and develop specific measures for adaptation and disaster risk reduction in the tourism sector based on the vulnerability assessment	Short term	Partners: Ministry of Sustainable Development, St. Kitts – Physical Planning and Lands and Survey Departments; Ministry of Communication, Nevis – Physical Planning and Water Departments; Ministry of Agriculture, St. Kitts - Department of Environment; Ministry of Agriculture, Nevis - Disaster Management Department; Ministry of Public Infrastructure, St. Kitts – Water Services Department; St. Kitts Meteorological Office; SCASPA; NEMA; Nevis Electric Company; St. Kitts Electric Company; hotel, dive and tour operators; private landowners; insurance providers; UWI
Mainstream climate change adaptation and disaster risk reduction considerations into legislation, regulations policies and plans for planning and development of the tourism sector	Develop a sectoral adaptation plan for climate change for the tourism sector based on the vulnerability assessment	Short term	
	Strengthen and enforce building codes and standards, such as coastal and river setbacks and restrictions on hillside development, to climate proof infrastructure and build resilience	Short term	
	Update the Tourism Sector Strategy and Action Plan for St. Kitts and the Draft Nevis Tourism Strategy to integrate climate change and disaster risk reduction considerations and enable effective adaptation	Medium term	
	Revise the National Physical Development Plan and proposed Nevis Physical Development Plan to enable climate proofing of new	Medium term	

	infrastructure, especially coastal development, and sustainable land management		
Integrate climate proofing considerations in the design, construction and retrofitting of tourism related infrastructure and services	Integrate climate proofing considerations in the design and construction of all new tourism related infrastructure projects through capacity building in screening tools, sustainable building practices and standards and ecosystem-based solutions that maintain natural defences	Short term	
	Encourage the private sector and communities to retrofit existing buildings through tax breaks and other incentives, including ecosystem-based solutions that maintain natural defences	Medium term	
Proposed budget: \$15,450,000 US⁴⁰			

6. Monitoring, Evaluation and Review

The Department of Environment and the NCCC will conduct annual reviews of implementation of the National Climate Change Adaptation Strategy to track progress, and update it as needed, in collaboration with all relevant stakeholders. In particular, the Strategy will need to be updated to reflect targets and indicators developed as mandated under the NDC and SDGs as well as the National Conservation and Environmental Protection Act to ensure climate resilient development (see Table 2 outlining the relevant SDG targets to be met through the National Climate Change Adaptation Strategy). Recommendations from the annual reviews will further inform any revisions to the Strategy to ensure that it remains relevant to current and emerging needs, that lessons gained from experience are applied and that there is full transparency and accountability.

⁴⁰ Estimates based on the St. Kitts Tourism Sector Strategy and Action Plan (2014-2019) and Draft Nevis Tourism Strategy.

Table 2. Alignment of the National Climate Change Adaptation Strategy with the SDGs and related targets

SDG Goal and Target	National Climate Change Adaptation Strategy		
	Relevant area /sector	Adaptation objective	Adaptation actions
Goal 1: No Poverty			
1.5 By 2030, build the resilience of the poor and those in vulnerable situations, and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.	Agriculture (crops and livestock)	To ensure food and nutrition security and resilient livelihoods through integration of climate smart technologies and ecosystem-based management into agricultural development.	<ul style="list-style-type: none"> • Conduct a vulnerability assessment to identify the key climate change impacts, vulnerabilities and specific adaptation measures for the agricultural sector. • Improve agricultural extension services and response mechanisms for agricultural risk and disaster management in small-scale farming, including early warning systems and insurance. • Explore synergies with other sectors to develop innovative programmes that support economic diversification and promote enhanced natural resource management, including via agro-forestry and agro-tourism.
	Fisheries and coastal and marine ecosystems	To ensure conservation and sustainable use and management of fisheries and coastal and marine ecosystems and build their resilience through ecosystem-based adaptation and disaster risk reduction.	<ul style="list-style-type: none"> • Conduct a vulnerability assessment to identify the key climate change impacts, vulnerabilities and specific adaptation measures for fisheries and marine resources and related livelihoods. • Improve fisheries extension services and technical support for enterprise and product development and disaster risk reduction mechanisms in small-scale fisheries, including insurance.

SDG Goal and Target	<i>National Climate Change Adaptation Strategy</i>		
	Relevant area /sector	Adaptation objective	Adaptation actions
	Human Health	To reduce vulnerability to the adverse impacts of climate variability and change on human health and well-being through improved preparedness and response.	<ul style="list-style-type: none"> Integrate human health and climate change considerations into poverty reduction strategies and programmes, recognising the link between disease transmission, the environment and living conditions.
	Cross-cutting – integrated adaptation and disaster risk reduction	To save lives and protect property from the impacts of climate change and natural disasters through integrated adaptation and disaster risk reduction across all sectors.	<ul style="list-style-type: none"> Establish and maintain early warning systems for hazards, including droughts, floods, heatwaves, hurricanes and storm surge that are climate related, to enable effective disaster preparedness and response with a focus on vulnerable communities and sectors.
Goal 2: Zero Hunger			
2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme	Agriculture (crops and livestock)	To ensure food and nutrition security and resilient livelihoods through integration of climate smart technologies and ecosystem-based management into agricultural development.	<ul style="list-style-type: none"> Conduct a vulnerability assessment to identify the key climate change impacts and vulnerabilities and specific adaptation measures for the agricultural sector. Improve agricultural extension services and response mechanisms for agricultural risk and disaster management in small-scale farming, including early warning systems and insurance. Strengthen mechanisms for application of science and technology for climate-smart solutions, including drought-resistant species and use of aquaponics and aquaculture.

SDG Goal and Target	<i>National Climate Change Adaptation Strategy</i>		
	Relevant area /sector	Adaptation objective	Adaptation actions
weather, drought, flooding and other disasters, and that progressively improve land and soil quality.			<ul style="list-style-type: none"> Promote ecosystem-based approaches through investments in research and practices for integrated pest and soil management and integrated crop-livestock-forestry systems that enable conservation and sustainable resource use. Mainstream sustainable land, water and waste management into sectoral plans, including updating the St. Kitts Agricultural Development Strategy and draft Nevis Agricultural Strategic Plan. Explore synergies with other sectors to develop innovative programmes that support economic diversification and promote enhanced natural resource management, including via agro-forestry and agro-tourism.
	Fisheries and coastal and marine ecosystems	To ensure conservation and sustainable use and management of fisheries and coastal and marine ecosystems and build their resilience through ecosystem-based adaptation and disaster risk reduction.	<ul style="list-style-type: none"> Strengthen institutions for fisheries and coastal and marine resource management through integrating climate change, ecosystem-based adaptation and disaster risk reduction considerations into legislation, regulations and policies, including the draft National Fisheries Management Plan. Conduct a vulnerability assessment to identify the key climate change impacts and vulnerabilities and specific adaptation measures for fisheries and marine resources and related livelihoods. Improve fisheries extension services and technical support for enterprise and product development and disaster risk reduction mechanisms in small-scale fisheries, including insurance. Expand research and monitoring of coastal and marine ecosystems to better understand climate change

SDG Goal and Target	National Climate Change Adaptation Strategy		
	Relevant area /sector	Adaptation objective	Adaptation actions
			vulnerabilities and potential adaptation options, including for ocean acidification and sargassum influx.
Goal 3: Good Health and Well Being			
3.13 Strengthen the capacity of all countries, particularly developing countries, for early warning, risk reduction, and management of national and global health risks	Human health	To reduce vulnerability to the adverse impacts of climate variability and change on human health and well-being through improved preparedness and response.	<ul style="list-style-type: none"> • Conduct a vulnerability assessment to identify the key climate change impacts and vulnerabilities and specific adaptation measures for the health sector. • Develop and implement an early warning system and health and sanitation education and awareness raising programme targeted at residents and at tourists, which focuses on disease prevention. • Mainstream climate change and disaster risk reduction and management considerations into health sector legislation, planning and programmes, with emphasis on vulnerable groups. • Facilitate the development of integrated waste management systems to improve sanitation and sewerage and solid waste disposal on St. Kitts and Nevis. • Integrate human health and climate change considerations into poverty reduction strategies and programmes, recognising the link between disease transmission, the environment and living conditions. • Build the capacity of the GoSKN's Public Health Unit and service providers to support disease prevention and treatment.
Goal 6: Clean Water and Sanitation			
6.4 By 2030, substantially increase water-use efficiency across all sectors	Water resources	To provide a safe and reliable water supply for St. Kitts and Nevis and ensure	<ul style="list-style-type: none"> • Strengthen legislation and institutions to govern the sustainable use of water resources and address possible conflicts and gaps, including revision of the Water

SDG Goal and Target	National Climate Change Adaptation Strategy		
	Relevant area /sector	Adaptation objective	Adaptation actions
and ensure sustainable withdrawals and supply of freshwater to address water scarcity, and substantially reduce the number of people suffering from water scarcity		efficient water use to build resilience to climate variability and change.	<p>Resources Act and establishment of a new Water Resources Agency.</p> <ul style="list-style-type: none"> • Promote integrated water resources management through policies and programmes for water security, including development of a Watershed Policy and Integrated Water Resources Management Policy that consider climate change adaptation and disaster risk reduction. • Enable private sector and community participation in integrated water resources management, including enhanced use of water conservation technologies, use of storage tanks, rainwater harvesting and recycling of grey water for demand side management. • Reduce the vulnerability of the water supply system through climate-proofing water storage, supply and distribution infrastructure. • Promote increased energy efficiency and use of renewable energy technologies, which are affordable, reliable and environmentally-friendly, to provide a decentralised and secure energy supply for water supply and distribution.
6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.			<ul style="list-style-type: none"> • Protect catchments and freshwater resources from pollution, including through suitable watershed, wastewater and solid waste management strategies, in close collaboration with the agricultural and tourism sectors.
Goal 7: Affordable and Clean Energy			

SDG Goal and Target	<i>National Climate Change Adaptation Strategy</i>		
	Relevant area /sector	Adaptation objective	Adaptation actions
7.5 By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing states, and land-locked developing countries, in accordance with their respective programmes of support.	Infrastructure and physical development	To promote sustainable physical development and climate proof existing and planned infrastructure to build resilience.	<ul style="list-style-type: none"> Promote the increased use of renewable energy technologies where appropriate, which are affordable, reliable and environmentally-friendly, to enable a decentralised and secure energy supply for communications, transport and commercial and residential buildings. Harmonise physical development planning with strategies for enhanced energy, food and water security and conservation and sustainable use of biodiversity and natural resources for sustainable land management.
	Cross-cutting - information management, research and M&E	To establish a comprehensive system of information management, research and M&E to inform climate change adaptation planning and decision-making.	<ul style="list-style-type: none"> Develop and implement a research and development (R&D) programme on climate-smart technologies and practices for agriculture, energy efficiency, renewable energy, infrastructure and physical development, and water conservation and management.
Goal 11: Sustainable Cities and Communities			
11.5 By 2030, significantly reduce the number of deaths, the number of people affected, and the direct economic losses relative to global gross domestic product caused by disasters, including water-	Infrastructure and physical development	To promote sustainable physical development and climate proof existing and planned infrastructure to build resilience.	<ul style="list-style-type: none"> Revise legislation, regulations and policies concerning physical development and land use zoning to address conflicts and gaps, insecure land tenure and perverse incentives with regard to climate change. Mainstream climate change adaptation and disaster risk reduction considerations into physical development policies, plans and programmes, including the National Physical Development Plan and proposed Nevis Physical Development Plan.

SDG Goal and Target	<i>National Climate Change Adaptation Strategy</i>		
	Relevant area /sector	Adaptation objective	Adaptation actions
related disasters, with a focus on protecting the poor and people in vulnerable situations			<ul style="list-style-type: none"> Establish and enforce building codes and standards to build resilience through reducing exposure to hazards, including via coastal setbacks and restrictions on hillside development, and promoting sustainable resource use, including via energy and water conservation. Integrate climate proofing considerations, including ecosystem-based solutions that maintain natural defences against coastal erosion, flooding, drought and heat stress, in the design and construction of new physical infrastructure and encourage the private sector and communities to retrofit existing buildings through tax breaks and other incentives. Promote the increased use of renewable energy technologies where appropriate, which are affordable, reliable and environmentally-friendly, to enable a decentralised and secure energy supply for communications, transport and commercial and residential buildings. Harmonise physical development planning with strategies for enhanced energy, food and water security and conservation and sustainable use of biodiversity and natural resources for sustainable land management.
11.9 By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels.			
	Cross-cutting – integrated adaptation and disaster risk reduction	To save lives and protect property from the impacts of climate change and natural disasters through integrated adaptation and disaster risk reduction across all sectors.	<ul style="list-style-type: none"> Strengthen institutional arrangements for integrated adaptation and disaster risk reduction across community to national levels, through developing linkages and a coordinated disaster network spanning the high level National Disaster Mitigation Council to community level disaster preparedness committees. Integrate relevant data, assessment reports and maps on natural hazards into the national information management

SDG Goal and Target	<i>National Climate Change Adaptation Strategy</i>		
	Relevant area /sector	Adaptation objective	Adaptation actions
			<p>system and national geographic information system (SKNGIS) to enable knowledge sharing and support effective decision-making for integrated adaptation and disaster risk reduction.</p> <ul style="list-style-type: none"> • Promote comprehensive disaster management that addresses all aspects of disaster risk management in an integrated manner including risk reduction, preparedness, response, recovery and rehabilitation through investment in capacity building and implementation of best practices within government, civil society and the private sector. • Establish and maintain early warning systems for hazards, including droughts, floods, heatwaves, hurricanes and storm surge that are climate related, to enable effective disaster preparedness and response with a focus on vulnerable communities and sectors. • Integrate ecosystem-based approaches to adaptation and disaster risk reduction that build resilience to multiple hazards in policies, plans and programmes for key areas and sectors.
Goal 12: Responsible Production and Consumption			
12.10 Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products.	Tourism	To promote a sustainable and competitive tourism product and build resilience to climate variability and change through integrated adaptation and disaster risk reduction.	<ul style="list-style-type: none"> • Revise legislation, regulations and policies concerning tourism development to address conflicts and pursue incentives with regard to climate change. • Conduct a vulnerability assessment to identify the key climate change impacts and vulnerabilities and specific adaptation measures for the tourism sector. • Mainstream climate change adaptation and disaster risk reduction considerations into policies, plans and programmes for planning and development of the tourism

SDG Goal and Target	National Climate Change Adaptation Strategy		
	Relevant area /sector	Adaptation objective	Adaptation actions
			<p>sector, including the St. Kitts Tourism Sector Strategy and Action Plan and draft Nevis Tourism Strategy.</p> <ul style="list-style-type: none"> • Revise and enforce building codes and standards, such as coastal setbacks, to climate proof any new tourism related infrastructure including through ecosystem-based solutions that maintain natural defences against coastal erosion, flooding, drought and heat stress. • Explore linkages with other sectors to diversify and expand the sustainable tourism product, including agro-tourism, eco-tourism and heritage tourism, and target other source markets beyond the United States and Europe. • Identify and develop innovative, market-based incentives to promote sustainable tourism.
Goal 13: Climate Action			
<p>13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.</p> <p>13.2 Integrate climate change measures into national policies, strategies and planning.</p> <p>13.3 Improve education, awareness-raising and human and institutional capacity on climate change</p>	<p>Key sectors/areas:</p> <ul style="list-style-type: none"> • Agriculture • Fisheries and coastal and marine ecosystems • Forest and terrestrial ecosystems • Finance and banking • Human health • Infrastructure and physical development • Tourism • Water resources 	<p>Overall objectives:</p> <ul style="list-style-type: none"> • To reduce the vulnerability of St. Kitts and Nevis to the adverse impacts of climate variability and climate change through cross-sectoral and multi-faceted measures that build adaptive capacity and resilience over the long term. • To mainstream climate change adaptation into 	<p>All actions listed in NCCAS</p>

SDG Goal and Target	National Climate Change Adaptation Strategy		
	Relevant area /sector	Adaptation objective	Adaptation actions
<p>mitigation, adaptation, impact reduction and early warning.</p> <p>13.5 Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing states, including focusing on women, youth, and local and marginalised communities.</p>	<p>Cross-cutting areas:</p> <ul style="list-style-type: none"> • Stakeholder capacity building and engagement • Information management, research and M&E • Integrated adaptation and disaster risk reduction • Inter-sectoral coordination • Investment and economic planning 	<p>the national development agenda, including the planning, budgeting and implementation of new and existing policies, programmes and projects.</p> <ul style="list-style-type: none"> • Ensuring mitigation co-benefits, where possible, through prioritising adaptation measures that minimise greenhouse gas emissions and enhance natural ecosystems functioning as carbon sinks; and • Mobilising external climate finance to support effective adaptation planning and implementation. 	
Goal 14: Life Below Water			
14.2 By 2020, sustainably manage and protect marine		To ensure conservation and sustainable use and	<ul style="list-style-type: none"> • Strengthen institutions for coastal and marine conservation and management through establishing a Coastal Zone Management Unit and integrating climate

SDG Goal and Target	National Climate Change Adaptation Strategy		
	Relevant area /sector	Adaptation objective	Adaptation actions
and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans.	Fisheries and coastal and marine ecosystems	management of fisheries and coastal and marine ecosystems and build their resilience through ecosystem-based adaptation and disaster risk reduction.	<p>change, ecosystem-based adaptation and disaster risk reduction considerations into legislation, regulations and policies, including the National Conservation and Environmental Protection Act and draft National Fisheries Management Plan.</p> <ul style="list-style-type: none"> • Conduct a vulnerability assessment to identify the key climate change impacts and vulnerabilities and specific adaptation measures for fisheries and marine resources and related livelihoods. • Improve fisheries extension services and technical support for enterprise and product development and disaster risk reduction mechanisms in small-scale fisheries, including insurance. • Promote ecosystem-based management of coastal and marine areas through investments in research and practices for integrated coastal zone management, ‘ridge to reef’ and watershed management, ecosystem approach to fisheries and marine spatial planning. • Manage coastal and marine ecosystems, and relevant species, to reduce non-climate threats that weaken their resilience, including through reducing environmental degradation, unsustainable resource use and the spread of invasive species such as Lionfish (<i>Pterois</i> spp.). • Establish a comprehensive system of coastal and marine management areas based on the PA System Plan, and a sustainable financing mechanism to support these management areas. • Build the capacity of resource managers to ensure effective and participatory planning and management of coastal and marine resources, including in PAs and management areas.

SDG Goal and Target	National Climate Change Adaptation Strategy		
	Relevant area /sector	Adaptation objective	Adaptation actions
14.3 Minimise and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels.			<ul style="list-style-type: none"> Expand research and monitoring of coastal and marine ecosystems to better understand climate change vulnerabilities and potential adaptation options, including for ocean acidification and sargassum influx.
Goal 15: Life on Land			
15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.	Forests and terrestrial ecosystems	To ensure conservation and sustainable use and management of forest and terrestrial ecosystems and build their resilience through ecosystem-based adaptation and disaster risk reduction.	<ul style="list-style-type: none"> Strengthen forest, conservation and environmental management legislation, regulations, policies and plans through integration of climate change, ecosystem-based adaptation and disaster risk reduction considerations. Promote integrated watershed management as an ecosystem-based approach to forest and terrestrial resources through investments in research and practices. Manage forest and terrestrial ecosystems, and relevant species, to reduce non-climate threats that weaken their resilience, including through reducing deforestation, soil erosion and loss and the spread of invasive species. Build the capacity of resource managers to ensure sustainable and participatory planning and management of forest and terrestrial resources, including in the Central Forest Reserve and the proposed Nevis Peak and Camps River National Parks as key PAs. Enhance carbon sinks through efficient and effective management of forests and wetlands.
15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.			

SDG Goal and Target	<i>National Climate Change Adaptation Strategy</i>		
	Relevant area /sector	Adaptation objective	Adaptation actions
15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.			
Goal 16: Peace, Justice and Strong Institutions			
16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels.	Cross-cutting: inter-sectoral coordination	To establish linkages between sectors to enable information sharing and effective decision-making, coordination and implementation of climate change adaptation.	<ul style="list-style-type: none"> Operationalise the NCCC and establish Adaptation Working Groups comprised of the key implementing agencies for climate change adaptation and relevant CSO and private sector representatives in St. Kitts and Nevis. Increase the human resources and capacity within the St. Kitts Department of Environment to effectively serve as the NCCC secretariat and enable a coordinated, multi-sectoral approach to climate change adaptation. Create a database of all ongoing climate change adaptation programmes and projects in St. Kitts and Nevis to enhance coordination and avoid duplication of efforts, and integrate into a national information management system. Ensure project staff of climate change adaptation programmes and projects provide annual updates to the Adaptation Working Groups and NCCC to facilitate knowledge exchange, learning and synergies.

SDG Goal and Target	<i>National Climate Change Adaptation Strategy</i>		
	Relevant area /sector	Adaptation objective	Adaptation actions
16.10 Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements.	Cross-cutting: information management, research and M&E	To establish a comprehensive system of information management, research and M&E to inform climate change adaptation planning and decision-making.	<ul style="list-style-type: none"> Establish a national information management system for sharing climate change related data and information across sectors and various stakeholders and documenting experiences, lessons and best practices for adaptation to support effective implementation over the long term.

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