Saint Lucia's Sectoral Adaptation Strategy and Action Plan for the Fisheries Sector (Fisheries SASAP) 2018-2028

Under the National Adaptation Planning Process

NAP Global Network

United States In-Country National Adaptation Plan (NAP) Support Program

Gift of the United States Government

Implemented by: IISD

Initial funding for the Network also provided by: Federal Ministry for Economic Cooperation and Development

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Prepared under the guidance of:
Department of Sustainable Development; and,
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Foreword

Saint Lucia's National Adaptation Plan (NAP) has been defined as a ten (10)-year process (2018-2028), consisting of priority cross-sectoral and sectoral adaptation measures for eight key sectors/areas and a segment on the 'limits to adaptation', complemented, incrementally, with Sectoral Adaptation Strategies & Action Plans (SASAPs). Priority sectors for adaptation action include: Tourism; Water; Agriculture; Fisheries; Infrastructure and spatial planning; Natural resource management (terrestrial, coastal and marine); Education; and Health. Other key sectors will be identified through a cyclical, iterative NAP process.

Saint Lucia's NAP process is spearheaded by the Sustainable Development and Environment Division (SDED) of the Department of Sustainable Development, currently housed within the Ministry of Education, Innovation, Gender Relations and Sustainable Development. The NAP process has benefitted from the inputs of multiple stakeholders, comprising public, statutory, academic and private sector bodies. Indeed, this process has involved State and non-State actors, such as media personnel, who play an important role in helping efforts to positively influence thinking, mould outcomes, change behaviour and instigate action across the populace, at all levels.

Saint Lucia's overarching NAP continues to be supplemented by several documents:

- *Saint Lucia's National Adaptation Plan Stocktaking, Climate Risk and Vulnerability Assessment Report*
- *Saint Lucia's National Adaptation Plan Roadmap and Capacity Development Plan 2018-2028*
- *Saint Lucia's Climate Change Communications Strategy*
- *Saint Lucia's Sectoral Adaptation Strategy and Action Plan for the Water Sector (Water SASAP) 2018-2028*
- *Saint Lucia's Sectoral Adaptation Strategy and Action Plan for the Agriculture Sector (Agriculture SASAP) 2018-2028*
- *Saint Lucia's Sectoral Adaptation Strategy and Action Plan for the Fisheries Sector (Fisheries SASAP) 2018-2028*
- *Saint Lucia's Portfolio of Project Concept Notes for the Water Sector 2018-2028*
- *Saint Lucia's Portfolio of Project Concept Notes for the Agriculture Sector 2018-2028*
- *Saint Lucia's Portfolio of Project Concept Notes for the Fisheries Sector 2018-2028*
- *Monitoring and Evaluation Plan of Saint Lucia's National Adaptation Planning Process*
- *Guidelines for the Development of Sectoral Adaptation Strategies and Action Plans: Saint Lucia's experience under its national adaptation planning process*

This process also supported a climate change website, an animated video and training for government entities and journalists in communicating about climate change. A NAP Assembly and Donor Symposium were also all made possible under this process, through the support of several entities.

Specifically, the process has benefited from the financial support of the United Nations Development Programme's (UNDP) Japan- Caribbean Climate Change Partnership (JCCCP). Technical and financial support for Saint Lucia's NAP process has also been provided through the United States (U.S.) In-Country NAP Support Programme (NAP-SP), implemented by the International Institute for

Sustainable Development (IISD). Technical support for the chapter on the 'limits to adaptation' in the NAP was provided under the IMPACT project, funded by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), as part of the International Climate Initiative (IKI). The IMPACT project is jointly implemented by Climate Analytics, the Caribbean Community Climate Change Centre (CCCCC), Secretariat of the Pacific Regional Environment Programme (SPREP) and Charles and Associates (CAA) Inc. The Department extends its thanks to all of the foregoing and takes this opportunity to recognise the consultant, Ms. Clara Ariza, for her tireless efforts in Saint Lucia's NAP process, under the able guidance of SDED.

Saint Lucia looks forward to forging partnerships and alliances that will assist in developing additional SASAPs and implementing the measures, programmes, projects and activities outlined in its NAP, SASAPs and other support documents. Saint Lucia is prepared to welcome support, that is, finance, technology transfer and capacity building, from a variety of sources, including public, private, bilateral, multilateral and alternative sources, all in an effort to help the country build climate resilience and address the seemingly insurmountable phenomenon of climate change.

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Saint Lucia's marine environment and fisheries shape the country's lifestyle and cultural heritage, with small-scale traditional fishing forming a large part of the social fabric and economy of many coastal communities. During the past 6 years, Saint Lucian fisheries have seen a positive compound annual growth of 0.46% in total wild capture landings and aquaculture production has increased, with a compound annual rate of 16% freshwater aquaculture production between 2000 and 2015. The acreage for aquaculture production has also increased from 6.13 acres in 2000 to 40 acres in 2015.

However, despite the slight increase in Saint Lucia's fisheries production in recent years, fish is increasingly imported, and the country has a net import food bill. Contributing to this situation, among other factors, have been the degradation of coral reefs and other important fish nursery and breeding habitats and changes in the migratory behaviour of species with warmer and more acidic waters and the reduction in the number of fishing days with more frequent extreme weather events. As fish stocks reduce and the catchability of fish species becomes more difficult, fisherfolk have to travel further in search of the fish, increasing fuel costs. The decline in national crop production and the increasing difficulty that the fisheries sector experiences with climate variability, make food security under a changing climate a major concern. This is because it is projected that through its direct and indirect impacts, such as more intense tropical storms and reduced fish stocks, global warming will exacerbate current environmental and economic challenges and further affect fisheries and land agriculture in the country.

Adaptation strategies can make major contributions to reshaping the future of climate change impacts on food production. It is therefore of paramount importance for Saint Lucia to plan and start implementing now, the adaptation actions necessary to strengthen its fisheries sector and its fishery-dependent coastal communities, for them to cope with, and better respond to, the multiple and interconnected changes that climate change will bring in the coming decades.

The Government of Saint Lucia recognises the challenges that climate change poses to its population, natural resources and economy, and has taken considerable measures to identify and address, to the extent possible, current and future climate risks at the policy and operational levels.

In 2017, the process to facilitate the integration of climate change adaptation considerations into all relevant policies and programmes and into development planning gained impetus through focused efforts on Saint Lucia's National Adaptation Planning (NAP) process. Through the NAP process, initiatives to address critical climate change-related risks and development priorities will take place in an integrated and coordinated manner, utilising existing and future synergies.

Saint Lucia's NAP has been defined as a 10-year process consisting of key cross-sectoral and sectoral adaptation activities outlined in the NAP document and complemented with Sectoral Adaptation Strategies and Action Plans (SASAPs), which detail adaptation objectives and priority measures, propose activities and timing for the execution of the measures, and offer project concept notes for implementation.

The Fisheries SASAP, here presented, is the third of the NAP's SASAPs targeted in 2017* and has been designed on a similar 10-year framework for action for strengthening the sustainability of Saint Lucia's fisheries and fishery-dependent businesses and the security of fisheries-dependent livelihoods under a changing climate. The Fisheries SASAP, funded with the support of the United States In-Country NAP Support Programme (NAP-SP), implemented by the International Institute for Sustainable Development (IISD), builds on previous efforts and projects, and is the product of an in-depth contextual analysis, supported by a multi-stakeholder consultative process, to define the most adequate and effective solutions to the country's fisheries-related challenges with climate change.

The SASAP consists of 31 adaptation measures deemed critical for building resilience in the country's fisheries and fishery dependent livelihoods. The measures, endorsed by relevant stakeholders, offer solutions to information, technical, institutional, financial, regulatory and policy limitations hampering adaptation in the sector. In the SASAP, the adaptation measures are grouped under 8 strategic objectives and contribute to 4 major expected outcomes, namely:

Outcome 1. Enhanced enabling environment for climate adaptation action in the fisheries sector

Strategic objectives:

1. Improve the national policy, legal, regulatory and institutional framework to facilitate climate adaptation in the fisheries sector.
2. Enhance human and institutional capacities for the design, implementation, monitoring and evaluation of fisheries-related climate adaptation projects.

Outcome 2: Enhanced nutrition, food availability, quality and security through adaptation in the fisheries sector

Strategic objectives:

1. Improve productivity through climate resilient fisheries management systems
2. Promote climate resilient aquaculture production in response to a changing climate
3. Promote alternative livelihoods creation and development and to strengthen climate resilience in fishery –dependent businesses

Outcome 3: Strengthened partnerships for building sustainable and resilient fisheries in a changing climate

Strategic Objective:

1. Improve access to financial and business support for leveraging private sector investment into the fisheries sector

* In 2015, a National Adaptation Strategy and Action Plan for the Tourism Sector[11] was developed.

Outcome 4: Strengthened preparedness to climate variability and extremes in the fisheries sector

Strategic objectives:

1. Strengthen climate monitoring and communication for emergency planning and informed decision making
2. Scale up climate resilient fisheries infrastructure to reduce climate risks

The SASAP provides direction on implementation and funding. Funding is expected to be derived from both national and international sources and implementation is expected to mostly occur through the inclusion and execution of SASAP components and adaptation measures in individual national and regional development and climate change-focused projects and programmes. The SASAP integrates indicative outputs to facilitate the planning and design of such projects. To further provide support (finance, capacity building and technology transfer), the document is complemented with various concept notes, all aligned with the outcomes, objectives and measures defined in the SASAP.

It is expected that the Fisheries SASAP offers guidance to decision-making processes related to development and climate change adaptation in Saint Lucia's fisheries sector. It targets policy makers and managers in the fisheries and fishery-dependent sectors. However, it is highly recommended that during the SASAP's execution, efforts are made to coordinate, and collaborate on, actions which directly or indirectly involve fishing-related activities or fishery value chains but are undertaken in other sectors, by other organisations and across different scales. This will allow for synergies and will increase cross-sectoral adaptation benefits and accelerate adaptation action. It will also permit identifying and preventing potential detrimental effects that development actions in other sectors could have on the fisheries sector under a changing climate.

ACRONYMS

AOSIS	Alliance of Small Island States
AR5	Fifth Assessment Report
CBF	Caribbean Biodiversity Fund
CCAP	Climate Change Adaptation Policy
CRE	Coral Reef Enhancement
CSO	Civil Society Organisation
DoF	Department of Fisheries
DSD	Department of Sustainable Development
ENSO	El Niño Southern Oscillation
EWS	Early Warning Systems
FADs	Fish Aggregating Devices
FEWER	Fisheries Early Warning Emergency Response
GCF	Green Climate Fund
GEF	Global Environmental Facility
GCM	Global Circulation Model
GDP	Gross Domestic Product
GoSL	Government of Saint Lucia
IPCC	Intergovernmental Panel on Climate Change
JCCCP	Japan Caribbean Climate Change Partnership
JICA	Japan International Cooperation Agency
M&E	Monitoring and Evaluation
MoA	Ministry of Agriculture, Fisheries, Natural Resources and Co-operatives
MTDS	Medium-Term Development Strategy
NAP	National Adaptation Plan
NCCC	National Climate Change Committee
NEMS	National Environmental Management Strategy
NEP	National Environmental Policy
NGO	Non-Governmental Organization
NPATF	National Protected Area Trust Funds
RCM	Regional Climate Model
SASAP	Sectoral Adaptation Strategy and Action Plan
SDED	Sustainable Development and Environment Division
SDG	Sustainable Development Goals
SIDS	Small Island Developing States
SLBS	Saint Lucia Bureau of Standards
SLR	Sea Level Rise
SPCR	Strategic Programme for Climate Resilience
SPS	Sanitary and Phytosanitary Standards
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollars
WRMA	Water Resources Management Agency
XCD	Eastern Caribbean Dollars

1. INTRODUCTION

Saint Lucia's marine environment and fisheries shape the country's lifestyle and cultural heritage, with small-scale traditional fishing forming a large part of the social fabric and economy of many coastal communities. During the past 6 years, Saint Lucian fisheries have seen a positive compound annual growth of 0.46% in total wild capture landings. Aquaculture production has also increased; freshwater aquaculture production grew at a compound annual growth rate of 16% between 2000 and 2015 and the acreage for aquaculture production has also augmented from 6.13 acres in 2000 to 40 acres in 2015.

However, despite the slight increase in Saint Lucia's fisheries production in recent years, fish is increasingly imported, and the country has a net import food bill. Contributing to this situation, among other factors, have been the degradation of coral reefs and other important fish nursery and breeding habitats and changes in the migratory behaviour of species with warmer and more acidic waters and the reduction in the number of fishing days with more frequent extreme weather events. As fish stocks reduce and the catchability of fish species becomes more difficult, fisherfolk have to travel further in search of the fish, increasing fuel costs. The decline in national crop production and the increasing difficulty that the fisheries sector experiences with climate variability, make food security under a changing climate a major concern.

It is projected that through its direct and indirect impacts, such as more intense tropical storms and reduced fish stocks, and recurrent drought and flooding affecting aquaculture production, global warming will exacerbate current environmental and economic challenges and further affect fisheries, aquaculture and land agriculture in the country. With climate change, aquaculture activities also face other challenges, mainly due to changing temperatures, scarcity and decreased quality of water (due to recurrent dry periods, increased siltation and pollution of freshwater resources and salinity intrusion due to Sea Level Rise). **Table 1** below, provides a non-exhaustive summary of potential climate change impacts on the Saint Lucia's fisheries and aquaculture.

Table 1. Potential climate change impacts on Saint Lucia's fisheries and aquaculture.

Impacts	Repercussions
Impacts of more frequent extreme weather events (intense rainfall events, hurricanes, high winds, storm surges)	• Loss of fish habitat and of fish stock • Loss of income and livelihoods • Increased dependency on foreign imports • Loss of cultural tradition • Reduced food security
• Heavy siltation caused by exacerbated erosion during intense rainfall events damages coral reefs, affecting their role as fish nurseries and breeding habitats and also as natural barriers that protect coastal areas and their communities against hurricanes and storm surges	
• Damage and loss of vessels and fishing gear and on shore infrastructure	

• Port operations affected by:
  • adverse wave conditions resulting in port closures, undesirable port conditions for vessels, loading of mooring lines; damage to vessels
  • siltation resulting from the increasing amount of sediment washed to the sea during heavy rainfall events
  • debris reaching the sea after extreme events	

Impacts	Repercussions
• Increasing costs. Dredging of marinas will become more costly and frequent as sedimentation (due to soil erosion) increases	
• Freshwater and marine ecosystems and biodiversity increasingly affected by pollution (agro-chemical leaching from soils, and solid waste washed during heavy rainfall events), damaging fish nursery and breeding habitats	
• Increased number of days at sea lost to bad weather and increased risk of accidents for fisherfolk • Commercial and recreational fishing vessels also face less safe conditions and the increased risk of structural damage • Increased risk of damage to fisheries complex amenities and port facilities	
• Freshwater farms damaged or flooded	
Impacts of higher temperatures, prolonged and intense dry episodes and drought	
• Migration of various fish and shellfish species from temperate latitudes towards the poles as the environmental conditions they are adapted to change.	
• Warmer sea temperatures could induce changes in fisheries species diversity (with some species migrating in search of cooler waters, and others disappearing) and increase variability in fisheries yields.	
• Warmer sea temperatures and increasing ocean acidity could induce coral bleaching, decreasing the productivity of coral reefs and their associated ecosystems.	
• Drought and warmer temperatures could negatively affect the production of the components used in fish feed, affecting the cost of aquaculture activities • Aquaculture and irrigated agriculture could compete for scarce water resources with warmer temperatures and prolonged drought periods	
• Warmer temperatures could affect the growth and development of culture fish • Warmer temperatures could increase the incidence, and facilitate the appearance of, new diseases and parasites and affect aquaculture	
Sea level Rise (SLR) impacts	
• Shoreline fishing communities and infrastructure are highly vulnerable	
• Loss of coastal fish breeding and nursery habitats if mangroves are lost due to the SLR	
• Inundation of low lying areas with possible loss of communities, property, utilities, infrastructure, manmade and natural resources. • Higher tides and breaking of waves further inshore	

Adaptation strategies can make a major contribution to reshaping the future severity of climate change impacts on food production. It is therefore of paramount importance for Saint Lucia to plan and start implementing the adaptation actions necessary to strengthen its fisheries sector and its fishery-dependent coastal communities, towards better capacities to withstand and respond to the multiple and interconnected changes that climate change will bring to their activities and livelihoods in the coming decades. Those actions should be geared towards building a sustainable and resilient fisheries sector that improves national food security and nutrition and thus contributes directly to the achievement of the Sustainable Development Goals (SDG) 14 (conserve and sustainably use the

oceans, seas and marine resources for sustainable development) and SDG 2 (end hunger, achieve food security and improved nutrition and promote sustainable agriculture).

Saint Lucia is highly vulnerable to climate change due to three main conditions: (a) its small geographical area, which accounts for the fact that disasters take on country-wide proportions; (b) its location in an area of volcanic, seismic and cyclone activity; and (c) its dependency on economic sectors that are directly affected by climate variability and change. The vulnerability of the island is expected to increase with time as global temperatures rise, making adaptation to climate change an urgent national priority. Without adaptation, lives and livelihoods will be lost, and climate change could cost the country 12.1% of its Gross Domestic Product (GDP) by 2025, rising to 24.5% by 2050 and 49.1% by 2100.[1]

The Government of Saint Lucia (GoSL) recognises the challenges that climate change poses to its population, natural resources and economy, and has taken considerable measures to identify and address, to the extent possible, current and future climate risks at the policy and operational level. Today, Saint Lucia has adopted a revised Climate Change Adaptation Policy (CCAP), various sectoral policies that address climate change and a wide range of interventions have been designed or established as adaptation measures; often facilitated or supported by international donors.

2. SAINT LUCIA'S NATIONAL ADAPTATION PLANNING (NAP) PROCESS

The NAP is a new and major government effort to facilitate the integration of climate change adaptation considerations into all relevant policies and programmes and into development planning. Through the NAP process, initiatives to address critical climate change-related risks and development priorities will take place in an integrated and coordinated manner, utilising existing and future synergies. Saint Lucia's NAP has been defined as a 10-year process, consisting of key cross-sectoral and sectoral adaptation activities outlined in the NAP document and complemented with Sectoral Adaptation Strategies and Action Plans (SASAPs) which detail sectoral adaptation objectives and priority measures, propose activities and timing for the implementation of the measures and offer project concept notes for implementation. The formulation of the NAP and the parallel elaboration of the SASAPs for the water, agriculture and fisheries sectors have entailed consultations and focus group sessions with a multitude of actors.* More details on the NAP process are presented in the NAP document.

3. THE FISHERIES SASAP IN THE FRAMEWORK OF SAINT LUCIA'S NAP

The Fisheries SASAP has been designed as a 10-year framework for action to reduce risks induced by climate change and climate variability in Saint Lucia's fisheries (see **Annex 1**), and to build the necessary capacities of all relevant actors to build climate-resilient and sustainable fisheries

* In 2015, the GoSL developed an Impact Assessment and National Adaptation Strategy and Action Plan for the Tourism Sector.

production systems and value chains. The Fisheries SASAP forms part of Saint Lucia's wider policy response to climate change, builds on previous efforts and projects and is the product of a highly consultative process which started in 2017.

The overarching goal of the Sectoral Adaptation Strategy and Action Plan for the Fisheries Sector is to drive the implementation of effective adaptation actions to strengthen the sustainability of Saint Lucia's fisheries and fishery-dependent businesses and the security of fisheries-dependent livelihoods under a changing climate.

This document presents an overview of the main challenges that climate change poses to fisheries in Saint Lucia. It offers 31 prioritised and concrete fisheries-related adaptation responses (measures) that can be taken or at least initiated in the coming 10 years to address the major challenges identified. With the aim of attracting support (finance, capacity building and technology transfer), a series of stand-alone project notes directly related to the SASAP's adaptation measures is included. In the SASAP, the measures respond to 8 strategic objectives and 4 major outcomes, all aligned with the CCAP's implementation elements (facilitation, implementation and financing).

3.1. TARGET AUDIENCE

The Fisheries SASAP will offer guidance to decision-making processes related to climate change adaptation in Saint Lucia's fisheries sector during the next 10 years. This includes, among others, decisions on investments and activities for the protection of fisheries and fisheries-related activities and livelihoods from hydrometeorological hazard impacts, the promotion, replication and scaling up of climate resilient aquaculture; improving access to financial products and services and business development opportunities for fisherfolks and the construction of climate resilient fisheries facilities infrastructure.

This SASAP targets policy makers and managers in the fisheries. However, it is highly recommended that during the SASAP's execution, attempts are made to coordinate effort and collaborate on actions which directly or indirectly relate to fisheries, but are undertaken in other sectors, by other organisations and across different scales. This will allow the government to identify and take advantage of potential synergies and minimise duplication, while increasing cross-sectoral adaptation benefits and accelerating adaptation action. It will also permit identifying and preventing potential detrimental effects that development actions in fisheries and aquaculture could have on other sectors; or actions other sectors could have on the fisheries sector, under a changing climate.

The parallel preparation of the SASAPs for the water, agriculture and the fisheries sectors has provided a first opportunity for cross-sectoral coordination in adaptation. As a result, these SASAPs share some measures that were identified as common priorities among these sectors. It is expected that this same approach is followed in the development of the remaining SASAPs during the first NAP cycle (2018-2028).

3.2. SCOPE OF THE SASAP

Saint Lucia's Fisheries SASAP has been designed to:

- Include investment priorities that contribute to the SASAP's overarching goal of driving the implementation of effective adaptation actions to strengthen the sustainability of Saint Lucia's fisheries and fishery-dependent businesses, and to secure fisheries-dependent livelihoods under a changing climate.
- Ensure all adaptation priorities have been defined through a transparent consultation process with the participation of national public, private and civil society stakeholders.
- Be implementable by encompassing programmes and projects that are within the implementation and monitoring capacity of the GoSL.
- Be led (implemented and monitored) by identified and committed national institutions.
- Be aligned with national policy and complementary to existing baseline or planned initiatives to minimise duplication and increase efficiency.
- Be composed of climate smart investments that can be funded with public resources or through international funding mechanisms. Given the difficulty of consistently monitoring investments by the private sector, Non-Governmental Organisations (NGOs) and Civil Society Organisations (CSOs), such investments are not included in the SASAP. Nevertheless, the SASAP promotes projects and programmes that catalyse private-sector investments and increase private-sector participation.

4. METHODOLOGICAL APPROACH AND SASAP FORMULATION PROCESS

The development of this Strategy and Action Plan started after water, agriculture and fisheries were ranked, amid all development sectors in Saint Lucia, as those in most urgent need for the development of a detailed adaptation plan in the framework of Saint Lucia's 2018-2028 NAP cycle. Among the key criteria that led to this ranking were the sectors' national significance and the repercussions of non-action. The prioritisation of sectors for SASAP development took place during a cross-sectoral and multi-stakeholder NAP consultation in 2017.

The formulation of Saint Lucia's Fisheries SASAP followed an inclusive, participative and interactive approach. It was possible, primarily, as a result of the efforts made by the Department of Fisheries (DoF), which is the Government agency with responsibility for Fisheries, in making all required information available and ensuring the concerns and solutions to current and future climate challenges raised by all stakeholders in the sector were heard, analysed and included for action in the final SASAP document. This SASAP also had the support of the Department of Sustainable Development (DSD), which leads the coordination of climate change adaptation efforts in Saint Lucia and used key inputs received from members of the multi-sectoral National Climate Change Committee (NCCC).

The steps followed in the elaboration of Saint Lucia's Fisheries SASAP included:

1. **Review of development, fisheries and climate change related documentation,** including policies, plans, strategies, legislation, academic studies and project reports.

2. **Identification of key adaptation measures,** through the rigorous review of relevant national documentation, including, but not restricted to, the CCAP, the Second and Third National Communications to the United Nations Framework Convention on Climate Change (UNFCCC) (2012 and 2017 respectively), the State of Environment Report (2015), the Green Economy Scoping Study for Saint Lucia (UNEP, 2016),the Impact Assessment and National Adaptation Strategy and Action Plan to Address Climate Change in the Tourism Sector of Saint Lucia (2015) and the Census of the Fisheries Sector in Saint Lucia. Priority climate adaptation measures identified as being critical for the sector, were compiled. The identified measures encompass technical solutions to current and future challenges, as well as actions to close key knowledge, information, technology and policy gaps that hinder the implementation of solutions to climate change issues in the country's agriculture and fisheries sectors. Some of the adaptation measures presented also offer mitigation co-benefits, and this is aligned with, and promoted by, the CCAP. An example of this is the introduction and promotion of fuel efficient technologies for aquaculture and fishing operations. Also in alignment with the CCAP, the identified measures were classified into facilitation, implementation and financing categories.

3. **Prioritisation of adaptation measures.** The initial set of measures was presented to, refined and ranked by participants from various ministries, the private sector and CSOs during consultation workshops that took place in, 2017. At these meetings, the participants split in groups, and each group scored from 1 (low) to 5 (high), the level of implementation priority (urgency) of each adaptation measure according to two or more of the following 12 agreed criteria.

   Ranking criteria:
   1. Relevance and alignment with national and sectoral policies, strategies, plans and legislation
   2. Upfront cost of the technologies
   3. Implementing, operational and maintenance cost
   4. Effectiveness and impact
   5. Ease of implementation /feasibility
   6. Social acceptability
   7. Institutional capacity
   8. Size of beneficiary group(s)
   9. Potential environmental risks
   10. Synergies with other initiatives
   11. Sustainability
   12. Scalability and replicability

   It is worth noting that a weighting of 0.1 (least important) to 1.0 (very important) was attached to each criterion. Using an excel tool developed by the Department of Sustainable Development, the final score of each adaptation measure was calculated by adding the total scores of the 12 criteria (obtained by multiplying the weighting of each criterion by the score assigned by the group in charge). The excel tool then categorised the final scores into 3 groups that determined whether

the implementation of each adaptation measure should start in the short-term (2018-2021), medium-term (2021-2024) or long-term (2024-2028).

Meetings with representatives of the DoF (the Government Agency with responsibility for Fisheries) were held after the broad-based consultation to finalise the wording of the adaptation measures, to incorporate all comments received from the participants, and to clarify any inconsistencies. The final list of ranked adaptation measures was used to prepare the Fisheries SASAP (**Section 10**).

In addition, sessions were held with fisherfolk, sea moss growers, aquaculture farmers and other local actors involved in the fisheries value chains for the introduction of the NAP and SASAP processes, for collecting information on their main climate-related concerns and proposed solutions and to ensure that these were addressed in the SASAP.

4. **Preparation of the Project Concept Notes.** At all consultations, participants were invited to submit project concept notes relevant to the adaptation measures discussed. During the local stakeholder sessions, groups of participants collaborated in drafting concept notes, assisted when necessary by technical officers of the DoF. The concept notes received were reviewed and those deemed to be aligned to, and fundable under, the SASAP were further developed and when appropriate, merged. The final set of concept notes prepared to date is presented in **Section 11.**

5. **Formulation of the Fisheries SASAP and preparation of the first draft SASAP document.** The overarching goal and main outcomes of the SASAP were established based on the review and discussion with stakeholders of the major adaptation needs in Saint Lucia's fisheries sector. Strategic objectives, addressing specific needs were also identified, and each adaptation measure was included under the most relevant strategic objective. Based on the discussions held, and on solutions presented in previous reports, activities and potential outputs associated with the prioritised adaptation measures were integrated into the document. The first draft of the Fisheries SASAP was finalised and shared with relevant stakeholders for review in anticipation of validation workshop. In addition, during a broad-based validation of the first draft NAP document, in 2018, participants also had the opportunity to comment and together, further refined the wording of the SASAP's main outcomes, strategic objectives and prioritised measures.

5. GENDER CONSIDERATIONS

The UNFCCC calls for the mainstreaming of gender across all activities involved in the NAP process, with the aim of decreasing gender-based vulnerabilities, promoting gender equality in decision-making and ensuring that the implementation of adaptation measures does not impose additional burden to women in particular, and does not promote the domination of any gender over others. At the same time, the NAP is an inclusive process, which places special attention on increasing the adaptive capacity of vulnerable groups for the planning and implementation of policy and actions to deliver resilience benefits across all levels of society. It is worth noting that in 2010, 40% of Saint Lucian households were headed by women and unemployment was about 7% higher in women than men.[2]

However, this gap decreased to 4% in 2012[3], while the participation of women in the labour force increased from 45% to 47% and that of men decreased from 54% to 52%. Women in the country enjoy equal access to services such as education (Education Act of 1999) and although the level of public representation is not yet equal to men, it is growing. In Saint Lucia, some livelihood activities, such as fishing in the open sea, are by choice, dominated by men, which is culturally acceptable.

In Saint Lucia, poverty, age, and level of education achieved appear to be greater drivers of vulnerability than gender, but more research may be needed. The Minister of Education, Innovation, Gender Relations and Sustainable Development stated in early 2018 that a Gender Policy will be developed in the near future. While this is not specific to climate change, it is expected that the latter will be given due consideration. In addition, as in other Caribbean SIDS, the participation of women in politics and civil service has increased in the past years. Currently, 4 out of the 10 ministries in the country are headed by female Ministers. There are six female Permanent Secretaries (two in one Ministry) and seven Deputy Permanent Secretaries. It is important to note that among the Ministries headed by women Ministers, are the Ministry of Equity, Social Justice, Empowerment, Culture, Sports and Local Government and the Ministry of Health and Wellness. It can well be said that the responsibility of leading climate change-related policy falls mostly on women: the NAP process has been initiated under the leadership of the SDED of the DSD, housed under the Ministry of Education, Innovation, Gender Relations and Sustainable Development, where the Minister, the Permanent and Deputy Permanent Secretary, the Chief of Department, the Deputy Chief of Department, the Chief Technical Officer and 9 out of 10 of the Division's technical officers are female. Incidentally, the Lead Climate Change Negotiator for Saint Lucia, who also serves as Thematic Coordinator for Loss and Damage for the Alliance of Small Island States (AOSIS) under the UNFCCC; and the SIDS representative on the Executive Committee of the Warsaw International Mechanism for Loss and Damage, is a Saint Lucian female based within the Division.

In this context, and to foster equality in adaptation benefits, Saint Lucia's NAP and associated SASAPs focus their attention on vulnerable groups, and although gender-disaggregated information will be collected and assessed, the NAP and SASAPs include activities focussing on women and men based on other vulnerabilities.

6. SAINT LUCIA'S FISHERIES SECTOR

MARINE FISHERIES

Saint Lucia's marine environment and fisheries shape the country's lifestyle and cultural heritage, with commercial fishing forming a large part of the social fabric and economy of many coastal communities. Although the contribution of fisheries to GDP is less than 1%, the fisheries sector is an important source of employment and income for rural fishing communities island-wide. Fisheries provide the livelihood for 1,170 fishing households[4] and support other important industries, such as tourism, which depends on fisheries to stock hotels and restaurants.[5] Saint Lucian fishers are still engaged in traditional fishing methods like trolling, netting and pots, using manually operated trolling gear and long lines, set from small (5-9 m) fiberglass pirogues and wooden canoes; and they target multiple fisheries.[6] There are 10 major fishing landing sites in the island, associated with the coastal

communities of Gros Islet, Castries, Anse la Raye, Canaries, Soufriere, Choiseul, Laborie, Vieux Fort, Micoud and Dennery.[4]

Even though Saint Lucian traditional fisheries remain small, they supply the country with marine produce for local consumption and significantly contribute to national food security. In 2016, the total annual production for commercial capture fisheries in the country was 1,732 metric tons.[7] Large ocean pelagic fish species, lobster and queen conch make up about 80% of the total ex-vessel value of fish landed annually.[7] The landings of wahoo, blue marlin, tunas, and dolphinfish totalled 1,191 metric tons in 2016, (69% of total landings).[7] Important migratory fish species in the country include dolphinfish (*Coryphaena hippurus*); wahoo (*Acanthocybium solanderi*); blackfin tuna (*Thunnus atlanticus*); yellowfin tuna (*Thunnusal bacares*); Skipjack tuna (*Katsuwonus pelamis*); and various species of shark. In addition to the product of its local fisheries, Saint Lucia has augmented fish imports, mainly frozen and chilled fish.[8,6]

Fishing is a major driver and safety net for economic development in rural livelihoods.[6] Yet, fisheries livelihoods usually contribute only partially to household incomes. The Census of the Fisheries Sector in Saint Lucia 2012 recognised that the fisheries sector is a multi-occupational industry. The results of the Census survey show that a majority of respondents have another source of income, either from an alternative occupation within the fishing industry or from other sectors such as construction and farming. An alternative occupation to supplement fishing incomes is particularly common during low season, where most fishers report a decline in daily earnings. The survey also found, that most people involved in fisheries (79% of all respondents) do it because of cultural and traditional reasons, with only less than 1% of responses indicating this livelihood was adopted for economic reasons.[4]

The offshore pelagic fish species that comprise the majority of the country's landings are highly migratory straddling stocks. Some of these fish have been affected by overfishing of some species, environmental changes, including ocean acidification and warmer waters (related to climate change), destruction of coral reefs, and large waves of sargassum seaweed, which lessen oxygen levels.[9] The latter has changed the age structure of dolphinfish migrating in the waters of Saint Lucia. At the same time, fishers report that their operations and livelihoods are also affected by high fuel costs, weather conditions, the untimely payment for fish sold and the high cost of fishing equipment.[4]

AQUACULTURE

Aquaculture is seen as a valuable component of the agricultural diversification thrust and is an industry with the potential to grow significantly to reduce dependence on wild-capture fish stocks[6,9] The Asian freshwater prawn (*Macrobrachium rosenbergii*), the Nile tilapia (*Oreochromis niloticus*) and the red hybrid tilapia are the species cultured inland in Saint Lucia, where aquaculture ponds are usually fed by a continuous flow of pumped freshwater or through gravitational flow from small streams. The water is often recycled for irrigation. In terms of coastal aquaculture, the only marine species which has received considerable attention and is currently cultured using a simple technology, is primarily *Eucheuma cottonni* and to a lesser extent a local strain of the *Gracilaria* spp. of sea moss.[6]

An inland aquaculture facility and grow-out pond development prawn projects established in 1986 contributed positively to the growth of the sector. Further, assistance from the Taiwanese

Government in providing a new aquaculture facility at Union has supported the continued growth of the f freshwater shrimp and tilapia.[6]

7. CLIMATE CHANGE CONTEXT

As recognised in Saint Lucia's CCAP,[10] and referenced earlier, the country is vulnerable to climate change due to three main conditions: (a) its small geographical area, which accounts for the fact that disasters take on country-wide proportions; (b) its location in one of the highest-risk areas of the planet. These risks include, high volcanic and seismic activity, being situated in the tropical cyclone belts, and direct exposure to the forces of the oceans; and (c) its dependence on few sources of income (the agriculture and tourism sectors) for a substantial part of its GDP. These sources of income have been severely reduced for months on end by single climate-related disasters. Another critical indicator of Saint Lucia's vulnerability, is its limited capacity to reactivate the development process after a devastating weather event.[10]

The cost of inaction on climate change in Saint Lucia has been calculated to be at 12.1% of GDP by 2025, rising to 24.5% by 2050 and 49.1% by 2100.[1] Recent extreme climate events have highlighted the vulnerability of the island to climate hazards and provided an indication of the additional costs that failing to prepare for climate change could represent to Saint Lucia in the future. For example, the impact of Hurricane Tomas (2010) had a total cost of 43.4% of the island's GDP.[10] It caused a total estimated USD 336 million in damages to housing, infrastructure and economic sectors, mainly agriculture and tourism, and claimed seven lives. Also, in 2013, an unseasonal low-level trough system passed over the island and produced greater than 224 mm of rainfall in a matter of two to three hours. The system impacted 2,600 persons directly, killed 6, destroyed 47 homes and caused USD 89.2 million in damages. Additionally, Saint Lucia has experienced drought conditions each year since 2012, resulting from a decline in both the total annual and temporal distribution of rainfall. The entire island has been periodically placed on water rationing.[8] To facilitate the understanding of the climate challenges Saint Lucia can expect in the coming decades, the following sections present the country's current climate conditions, observed regional climate trends and future climate projections.

7.1. CLIMATE CHANGE PROJECTIONS FOR SAINT LUCIA

Several studies have developed climate change projections for Saint Lucia in recent years.* While using different models, emission scenarios, baseline periods and projection periods**, all projections**

* In the National Adaptation Strategy and Action Plan for the Tourism Sector (2015),[11] the 5Cs and the GoSL present the results of statistical and dynamic downscaling approaches using SRES scenarios (and where possible or available, the IPCC's RCP4.5) for projecting Saint Lucia's temperature and rainfall in the 2031-2040 and 2051-2100 periods relative to the 1961-1990 baseline.

The Third National Communication to the UNFCCC (2016)[8] presents projections of temperature, precipitation and water excess and deficits (P-E) for the 2040-2069 and 2081-2100 periods relative to the 1981-2015 baseline. The projections were obtained using PRECIS-downscaled scenarios of two climate models (HadCM3 and ECHAM5) and one SRES scenario.

indicate general trends of increasing mean annual temperatures and decreasing precipitation amounts with climate change in Saint Lucia.[8,11,12] For the sake of simplicity, the results of the climate projections produced by CARIBSAVE (2012)[12] for a high emissions scenario (Special Report on Emission Scenarios SRES A2) and relative to the 1979-2009 period, summarised below, indicate that the following could be expected in Saint Lucia:

Mean annual temperature increases in the order of:
0.3 to 0.8 ˚C by 2020; 0.9 to 1.7 ˚C by 2050 and 1.8 to 3.1 ˚C by 2080 (Global Circulation Model, GCM).
2.4 to 3.3 ˚C by 2080 (Regional Climate Model, RCM).

The frequency of hot days increases between 38 and 54% by 2050 and between 55 and 97% by 2080 (GCM).

The frequency of hot nights increases between 38 and 67% by 2050 and between 55 and 97% by 2080 (GCM).

Cold days and cold nights do not occur at all by 2050 and 2080 according to the GCM models.

Annual precipitation decreases in the order of:
-15 to 4mm by 2020; -19 to 4mm by 2050 and -37 to 6mm by 2080 (GCM).
-11% to -32% by 2080 (RCM).

Sea Surface Temperature increases by 0.8 to 3˚C by 2080s (GCM).

Wind speed increases by 2080 by up to 0.5 m/s (GCM); by up to 0.7 m/s (RCM)

The number of sunshine hours per day increases by roughly one hour by 2080 (RCM) due to a reduction in average cloud fraction.

Tropical storms and hurricanes become more intense, but not necessarily more frequent. North Atlantic hurricanes and tropical storms appear to have increased in intensity over the last 30 years. Observed and projected increases in sea surface temperatures 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.

The proportion of total rainfall that falls in heavy events decreases, changing by -25% to +2% by the 2080s (GCM).

In 2012, the CARIBSAVE Partnership published *Climate Change Risk Profile for Saint Lucia,*[12] the most comprehensive climate change projections for Saint Lucia to date. This study generated climate model projections of future scenarios using both a Global Climate Model (GCM) ensemble of 15 models and the Regional Climate Model (RCM), PRECIS downscaled. The RCM was used to provide projections at a finer spatial scale (and thus give a better physical representation of the local climate) than GCMs.

The rate of **Sea Level Rise (SLR)** is difficult to calculate as new evidence suggests that the contribution of ice sheet melting to global SLR will be greater than considered in IPCC projections. This increases the range of potential mean SLR in the Caribbean from 0.18-0.56m (IPCC for an SRES A2 scenario) **to up to 1.45m by 2100,**[13] relative to the 1989-1999 baseline. It has been established that in the northern Caribbean, SLR could be 25% higher than the global average due to physical factors affecting land elevation.[14]

The high level of uncertainty in SLR and hurricane intensity creates difficulties in estimating future changes in storm surge height or frequency.

7.2. CLIMATE CHANGE IMPLICATIONS FOR SAINT LUCIA'S FISHERIES SECTOR

The high ratio of coastline to land area coupled with the concentration of people and economic activity along the coast makes Saint Lucia, and in particular its coastal resources, fishing communities, and fisheries infrastructure, highly vulnerable to the impacts of climate change and particularly at risk from SLR.

Fisheries-dependent livelihoods and economies are challenged by extreme weather events, such as intense tropical storms and hurricanes and associated storm surges and flooding. These events sometimes cause irreparable personal injury, including loss of life. These events damage and often lead to the reduced fishing days, loss of vessels, fishing gear – including fish pots and fish aggregating devices (FADs) and impair fish landing sites, fish markets, fishermen's locker rooms, and other onshore facilities.[15]

Climate change, however, may impact fishing livelihoods more profoundly in the coming decades through its effects on the natural resources on which fishers depend. Impacts include ocean acidification, changes in sea temperatures and circulation patterns and in the frequency and severity of extreme events and SLR.

With climate change, the range and productivity of targeted fish populations, their habitats and food webs are likely to change as fish species and the ecosystems they rely upon move outside of their normal range, and/or respond to changes in oxygen availability which vertically compresses habitats and brings pelagic species closer to the surface.[16] This could have varied consequences for catch potential: fishing in some areas could benefit from the appearance of new migrating species and from the apparent increase in stocks of some species as catches increase closer to the surface, but could also lead to their overfishing. Feeding, migration and breeding behaviour of fish could also change in response to the predicted changes in their physical and biological environment, modifying fish growth, mortality and reproduction patterns and thus, fishery catch potential.[17, 18] Higher surface water temperatures and seawater acidity will affect coral reefs, which act as fish breeding sites and nursery habitats, but also as natural barriers, protecting coastal areas and their communities against hurricanes and storm surges. The decline in the health of essential coastal habitats will result in reduced biomass of reef-associated shallow shelf species; those associated with estuarine environments (many of the shrimp and ground-fish species); the deep-slope species whose juveniles

rely on reefs; and will also impact the offshore pelagic species whose diets depend, at least in part, on reef-associated species.[18] Marine ecosystem productivity is projected to decline in tropical and subtropical areas, more than in temperate and polar ecosystems, with a consequent large decrease in fishery catch potential in the Exclusive Economic Zones of tropical and subtropical countries.[17]

There is evidence indicating that some of the predicted changes have started to occur, such as the migration of various studied fish and shellfish species from temperate latitudes towards the poles, or the bleaching of coral reefs in the Caribbean.[16,18] However, it is difficult for climate change models to project clearly how the condition of fisheries will change in specific ocean areas in the coming decades as species differentiate in their level of tolerance to chemical, physical and biological conditions and there are important gaps in data and studies. One example of this is the absence of species-specific studies of increasing sea surface temperatures and ocean acidification on queen conch and spiny lobster, two of the Caribbean's most economically valuable fishery species.[18]

Based on the studies and evidence available, in 2017, Oxenford and Monnereau[18] published a detailed review of climate change impacts on the fisheries of Caribbean SIDS. Some of the impacts they list are relevant for Saint Lucia and include:

- Decreasing abundance of reef-associated fishes, which are expected to be the hardest hit by climate change initially. This will have the greatest socio-economic impacts on the harvest and postharvest sectors in coastal communities where these reef fish species are primarily harvested by traps, nets and handlines, and locally sold.
- Increases in ciguatera poisoning will affect trade in reef-associated and some deep-slope fishes and will impact on the health of local communities.
- Changes in availability of high-value species (spiny lobster, conch, shrimp) will have particular impact on harvesters (both small-scale and semi-industrial).
- Changes in the productivity and distribution of oceanic pelagic species, such as dolphinfish, tuna, and tuna-like species, are likely to result in reduced abundance and catchability, as stocks are predicted to move northwards and beyond the limited reach of small-scale fleets, at least within the southern SIDS.
- In the short-term, pelagic fishers will most likely have to fish longer or travel further to maintain catch rates or rely on moored Fish Aggregating Devices (FADs). The former will have both financial and safety implications for fishers.
- Smaller catches of pelagic species and associated increased ex-vessel prices will have significant impact on the harvest and the post-harvest sector, especially as it is these species that generally support the greatest value-added processing.
- Possible changes in the migration patterns and distribution of transboundary oceanic pelagic species will also have implications for regional policy and shared management plans, and for fishing quota allocation and access agreements.
- Possible changes in the distribution patterns of early life history stages of demersal species and/or changes in their distribution ranges, could have implications for population connectivity of species across the Caribbean and for the designation of effective networks of Marine Protected Areas.
- Declines in pelagic species and processing opportunities will particularly affect Dominica and Saint Lucia, where pelagic fish species are particularly important.

- Decreases in the profitability of fishing will negatively affect the willingness of investors and the attractiveness of investing in the harvest and post-harvest processing sectors.
- Over the longer-term, as reef resources become increasingly degraded and over-exploited and pelagic species less available, fisherfolk may have to abandon fishing and look for scarce alternative employment opportunities. This will likely require government incentives and training programmes to retool fishers. Alternatively, the sector may adapt by switching from small-scale to medium-sized boats, resulting in higher capital investment and maintenance costs, as well as higher potential losses in cases of extreme-weather events.
- Reductions in fish and shellfish fishery yields will be associated with significant socio-economic impacts on fisherfolk (fishers and other actors in the fish market chain) and their dependents. It will also have implications at the level of national governments for: domestic productivity in the fishing sector; food security and food sovereignty (and by implication on the food import bill); export trade and foreign currency earnings.
- Reducing abundance of fish and shellfish resources will also exacerbate conflict, not only intra-fisheries conflict amongst fishers competing for the same limited resource, including commercial versus recreational fishers, but also between the fisheries sector (consumptive users) and other non-consumptive users (e.g. recreational divers). The latter will be especially acute for reef fishes.

Through the above projected impacts, climate change will increasingly affect Saint Lucia's marine fisheries and add to food security concerns as the country has a net food import bill. Land-based agricultural activities and production have declined in recent decades and their recovery is challenged by climate change, which could also increase the price of imported foods, reducing the access to food for poor and vulnerable segments of the population.

It is therefore of maximum importance to improve now, the performance of fisheries management systems and to work with fishing communities, to build their capacity to withstand and recover from the expected impacts of climate change on their livelihood activities, and to open opportunities for them to protect their assets and diversify their incomes. Adaptation measures will also be needed for inland fisheries and aquaculture activities as these will likely be impacted, among other factors, by changing temperatures, water scarcity, flooding, freshwater pollution (from land-based activities during heavy rain events and flooding episodes), SLR-induced salinisation of coastal rivers and reduced availability of dissolved oxygen, all affecting the productivity and the nutritional value of aquatic products.[17]

8. ENABLING ENVIRONMENT FOR CLIMATE ADAPTATION ACTION IN SAINT LUCIA'S FISHERIES SECTOR

The Fisheries SASAP offers guidance on key investments and capacity building activities (technical, institutional, and regulatory) required for strengthening the sustainability of Saint Lucia's fisheries and fishery-dependent businesses, and the security of fishery-dependent livelihoods under a changing climate. The Fisheries SASAP therefore supports the efforts made by the GoSL to build climate resilience within and across sectors and facilitates the integration of climate change considerations into development projects, programmes and policies of the fisheries and fisheries-related sectors. To achieve this, the Fisheries SASAP has been formulated in alignment with, and in the framework of, the

relevant national and sectoral development and climate policy and building on the progress made in, and the lessons learned from, the implementation of adaptation projects in Saint Lucia's fisheries sector.

8.1. NATIONAL DEVELOPMENT, CLIMATE CHANGE AND FISHERIES POLICY AND PLANNING FRAMEWORK

Saint Lucia's development agenda is guided by national policy imperatives and instruments, including the country's Medium-Term Development Strategy (MTDS), annual Budget Speeches, Annual Estimates of Expenditure (Budget) and corporate plans of individual ministries.[19]

In the field of climate change, the country became a party of the UNFCCC in 1993, submitted its Initial National Communication to the UNFCCC in 2001, its Second National Communication in 2012 and its Third National Communication in 2017. Saint Lucia also submitted its Intended Nationally Determined Contribution (INDC) under the UNFCCC in 2015 and signed the Paris Agreement in 2016. Considerable progress has been made in the integration of climate change into national policies. Currently, the Saint Lucia CCAP of 2015 is the most important policy and guidance document on the matter at the national level (see details in **Annex 1**). It is complemented by Saint Lucia's Strategic Programme for Climate Resilience (SPCR) of 2011 and the Climate Change Public Education and Awareness Strategy and Implementation Plan of 2014.

For the fisheries sector, The National Fisheries Plan of 2013 is "the response of Saint Lucia to the challenge of ensuring the sustainable use of its natural resources in the context of ecosystem protection and support of the long-term interests of fishery dependent people through the development of actions that maximise sustainable economic, financial and social benefits". This Plan presents a strategic approach to the challenge of maximising the Nation's long term returns from its renewable fishery resources in the context of domestic, regional and global conditions; defines the mission, vision and objectives of the National Fisheries Plan; offers a National Fisheries Strategy that presents a road map on the implementation of the Plan; and identifies the results to be achieved and broad actions to be undertaken within the period of the Plan (2013-2022). The development of a national Fisheries Policy has received its approval by the FAO-TCP at the completion of this SASAP.

More recently, The Draft Agricultural Policy Framework and Strategy (2016 - 2021) includes the "*effective management and utilisation of fisheries resources"* as one of its priority areas and sets goals, strategic objectives and policy instruments to this end.

In terms of legislation, the Fisheries Act, No. 10 of 1984, and the Fisheries Regulations, SI No. 9 of 1994, form the basis of laws related to fisheries development and management in the country.

The GoSL has also formulated a considerable number of additional policies, laws and regulations that relate either directly or indirectly to fisheries and climate change adaptation and thus, to the Fisheries SASAP. These are listed in **Table 2**.

Table 2. Key Policy, legislation and planning instruments for the SASAP.*

Policies	
• The Saint Lucia CCAP (2015) • National Climate Change Policy and Adaptation Plan (2003) • National Agricultural Policy (2009 – 2015) • Draft Agricultural Policy Framework and Strategy (2016 - 2021), under review • Food and Nutrition Security Policy and Action Plan (2013) • National Environmental Policy & National Environmental Management Strategy (NEP/NEMS) (2005, revised in 2014)	• National Forestry Policy Revised draft (2008) • National Land Policy (2007) - Revised draft (2017, awaiting guidance on the establishment of an implementing mechanism -a National Land Commission- to be finalised before submission to Cabinet for approval) • National Environmental Education Policy Revised draft (2010) • National Water Policy (2004) • National Wastewater Policy and Strategic Plan (2017, awaiting adoption)
Planning Instruments	
• National Vision Plan (2008) • MTDS (2018-2021 in preparation) • MTDS (2012-2016) Sectoral Action Plan • National Fisheries Plan (2013) • The Biosafety Bill and regulations (in preparation)	• Strategic Programme for Climate Resilience (SPCR) • National Biodiversity Strategy and Action Plan (under review) • Framework for Integrated Environmental Management in Saint Lucia (2005)
Legislation	
• Waste Management Act (2004) • Pesticides and Toxic Chemicals Control Act (2001) • Environmental Management Act (2008) Revised draft (2018) • National Conservation Authority Act (1999) • Physical Development and Planning Act (2001) • Beach Protection Act (1967 and Amendment of 1987) • Land Conservation and Improvement Act (1992)	• Wildlife Protection Act (1980) • Maritime Areas Act (1984) • Fisheries Regulation No.9 (1994) • Fisheries Act No.10 (1984) • Public Health Act Chapter 11.01 (1975 revised in 2001) • Tourism Industry Development Act (1982) • Disaster Management Act (2006) • Disaster Preparedness and Response Act (2005)
National Budget	
• Estimates of Revenue and Expenditure (2016-2017)	

* This list is indicative only

8.2. PROGRESS MADE IN THE IMPLEMENTATION OF CLIMATE CHANGE ADAPTATION ACTIVITIES

In addition to the progress made at the policy level, the GoSL has obtained international funding and technical support for the initiation and execution of a wide range of climate change adaptation projects (see **Box 1**).

In the past years, various important projects for climate change adaptation in the fisheries sector have also taken place, with some of them still ongoing and others approved, but not started. The most relevant of these projects are listed in **Annex 2.**

The lessons learned from the initiatives implemented have been used to inform the Fisheries SASAP formulation process.

Box 1. Most common adaptation initiatives undertaken in Saint Lucia between 2012 and 2017.
Source: GoSL, 2017 [5]

- Development of sectoral policies and strategies to help build climate resilience;
- Budget reform to better integrate climate considerations;
- Adoption of modern technologies;
- Availability of financing schemes and insurance to increase resilience;
- Provision of incentives that seek to modify behaviour;
- Improved research, data collection and management;
- Development of tools for improved decision making;
- Capacity building in public agencies and specific target groups;
- Improved collaboration between agencies;
- Increased public education and outreach.

9. SAINT LUCIA'S SECTORAL ADAPTATION STRATEGY AND ACTION PLAN FOR THE FISHERIES SECTOR (FISHERIES SASAP)

In the framework of Saint Lucia's NAP process, the Fisheries SASAP offers guidance on key investments and interventions (technical, institutional, regulatory) required between 2018 and 2028 for strengthening the sustainability of Saint Lucia's fisheries and fishery-dependent businesses, and the security of fishery-dependent livelihoods under a changing climate.

The SASAP has been designed to support the efforts made by the GoSL to build climate resilience within and across sectors and to promote the integration of climate change considerations into existing and new development projects, programmes and policies of the fisheries sector. To achieve this, the SASAP has been formulated in alignment with, and in the framework of, the relevant national and sectoral development and climate policies; and builds on the progress made in, and the lessons learned from, the implementation of fisheries-related adaptation projects in Saint Lucia.

This Strategy and Action Plan consists of 31 adaptation measures that are deemed critical to improve the current condition of the country's fisheries and fishery-dependent livelihoods and strengthen their sustainability under a changing climate. The measures, endorsed by relevant stakeholders through consultation, offer solutions to information, technical, institutional, financial, regulatory and policy limitations hampering adaptation in the fisheries sector. In the SASAP, the adaptation measures and their indicative outputs are grouped under 4 major outcomes and 8 strategic objectives (that contribute to the achievement of the outcomes). All measures, strategic objectives and outcomes directly respond to the key challenges identified for adaptation in the sector. In addition, all measures correspond to one or more of the three strategic elements of the CCAP (facilitation, implementation and financing -see **Annex 1**). While it is recognised that some of the adaptation measures contribute to the achievement of more than one objective and more than one outcome, for the sake of simplicity, each measure has been included only once in the SASAP (see **Section 10**).

9.1. STRATEGIC GOAL, OBJECTIVES AND OUTCOMES

The overarching goal of the Sectoral Adaptation Strategy and Action Plan for the Fisheries Sector is to drive the implementation of effective adaptation actions to strengthen the sustainability of Saint Lucia's fisheries and fishery-dependent businesses and the security of fisheries-dependent livelihoods under a changing climate.

To accelerate progress towards the achievement of this goal, the Fisheries SASAP has defined 8 strategic objectives, grouped under 4 main outcomes, as follows:

Outcome 1. Enhanced enabling environment for climate adaptation action in the fisheries sector

Strategic objectives:

1. Improve the national policy, legal, regulatory and institutional framework to facilitate climate adaptation in the fisheries sector.

2. Enhance human and institutional capacities for the design, implementation, monitoring and evaluation of fisheries-related climate adaptation projects.

Outcome 2: Enhanced nutrition, food availability, quality and security through adaptation in the fisheries sector

Strategic objectives:

1. Improve productivity through climate resilient fisheries management systems
2. Promote climate resilient aquaculture production in response to a changing climate
3. Promote alternative livelihoods creation and development and to strengthen climate resilience in fishery –dependent businesses

Outcome 3: Strengthened partnerships for building sustainable and resilient fisheries in a changing climate

Strategic Objectives:

1. Improve access to financial and business support for leveraging private sector investment into the fisheries sector

Outcome 4: Strengthened preparedness to climate variability and extremes in the fisheries sector

Strategic objectives:

1. Strengthen climate monitoring and communication for emergency planning and informed decision making
2. Scale up climate resilient fisheries infrastructure to reduce climate risks

9.2. IMPLEMENTATION AND FUNDING OF THE FISHERIES SASAP

The DoF is charged with the responsibility of leading and overseeing the implementation of the Fisheries SASAP, using it to inform and guide the development of the fisheries sector. In its leading role, it is also expected that the DoF will support and collaborate with institutions in charge of other sectors in their implementation of measures that relate, directly or indirectly, to climate adaptation in fisheries (e.g. supporting/advising the relevant authorities in the implementation of measures to reduce chemical and organic pollution of water sources -and thus minimise contamination effects on mangroves and coral reefs). In addition, strong communications and collaboration with the DSD and NCCC - the multi-sectoral institution in charge of overseeing the implementation of the NAP, will help support and track activities conducted by other public-sector agencies that are relevant, and that contribute to achieving the objectives and outcomes of this SASAP. Further to the collaborative development of this SASAP, it is the intention that the document be shared and discussed with all the

partner agencies and that awareness is raised on its objectives and planned activities to gain high level buy-in and facilitate the inclusion of the SASAP priorities in national and sectoral policy and budgets.

It is anticipated that the adaptation measures defined under each objective and outcome will start to be implemented during the 2018-2028 period, according to their degree of urgency (short, medium and long-term). However, it is also clear that their implementation will depend on funding, policy and other opportunities opening up during this time; opportunities will be seized for implementation as they arise, cross-sectorally or sectorally.

Given the broad scope of this SASAP, it is to be expected that the execution of most of the specific measures may occur as a consequence of their inclusion in projects and programmes funded from both national and international sources. The SASAP includes indicative outputs to facilitate the planning and design of such projects and programmes.

The execution of most actions included in the SASAP relies on the assumption that further to national budgetary efforts that are commensurate with national circumstances, the level of international support that Saint Lucia has received for development of projects and programmes in its fisheries sector will be maintained and that additional climate finance for adaptation in these sectors will be attracted, for example, through the Green Climate Fund (GCF), Adaptation Fund and multilateral and bilateral arrangements. The execution of the SASAP will, require the proactive engagement and time of GoSL staff and potentially, the allocation of new public resources. It is also assumed that over time, adaptation will become immersed in all new development projects of the fisheries sector.

In view of the above considerations, it is the intention, in the coming years, and to the maximum extent possible, for elements of the Fisheries SASAP (see **Section 10**) be integrated into the existing and proposed cooperation programmes of Saint Lucia's bilateral and multilateral partners. To ease this process and facilitate funding the implementation of the SASAP, **Section 11** presents a series of stand-alone project concept notes, which are aligned with specific objectives and measures of the Fisheries SASAP and which can be presented, either on their own or as part of programmes to various funding sources. The indicative outputs in the SASAP (**Section 10**) can also be grouped and included in the elaboration of specific programmes and projects, as funding opportunities arise.

9.3. MONITORING AND EVALUATION

The transparent reporting, monitoring and review of adaptation action is critical to measure and steer the progress of Saint Lucia's NAP process, of which the Fisheries SASAP is a building block. It is necessary to design and put in place a monitoring plan for the implementation of the Fisheries SASAP, to ensure that the activities conducted are completed and contribute to the achievement of the established objectives and outcomes. The monitoring and evaluation (M&E) plan will also help to determine corrective actions when changes, due to existing and new circumstances, occur, and will ease reporting. This M&E plan is a supplement of Saint Lucia's overarching NAP, which was developed in parallel with the SASAPs for the Water; Agriculture and Fisheries sectors.

It is expected that on a yearly basis, the lead agency will report to the NCCC on the progress and revisions made to the implementation of the Fisheries SASAP, for inclusion of the relevant information in the NAP M&E system.

10. ADAPTATION MEASURES

This section presents Saint Lucia's Fisheries SASAP. It has been structured according to main outcomes and strategic objectives and suggests the period of execution, or at least initiation, of each adaptation measure (short, medium and long-term) according to the level of urgency established by the stakeholders consulted, with short-term being the most urgent. The SASAP also indicates the element(s) of the CCAP that most accurately correspond to each measure (i.e. facilitation, implementation or finance).* It is suggested that the past, present and approved projects relevant to adaptation in the sector (in **Annex 2**) are consulted when planning projects and programmes and activities to implement the adaptation measures contemplated in this SASAP, for them to build on previous outputs and outcomes and to facilitate synergy building.

* Saint Lucia CCAP is supported by three types of adaptation processes (facilitation, implementation and finance).

Facilitation encompasses activities that provide the enabling environment and enhance adaptive capacity; for example, in awareness- and capacity-building, institutional and governance structures, policies and legislative frameworks, fiscal and economic incentives, knowledge management and dissemination and others, thereby improving conditions for the capacities and awareness at all levels of society.

Implementation encompasses activities geared towards building the resilience of households, communities, vulnerable groups, enterprises, sectors and, ultimately, the nation. Implementation measures will therefore be identified at the national and community levels, with regional and international support and backstopping provided through agreed modalities.

Financing options are linked to one or more of the following five categories: 1. Affordable climate change-related loan financing for civil society and the general public; 2. Economic Incentives; 3. Private Sector Financing; 4. International Funding; 5. Mechanisms to realise sustainable financing for climate change adaptation. These options will be supported by an enabling fiscal regime.

OUTCOME 1. ENHANCED ENABLING ENVIRONMENT FOR CLIMATE ADAPTATION ACTION IN THE FISHERIES SECTOR

STRATEGIC OBJECTIVE 1. IMPROVE THE NATIONAL POLICY, LEGAL, REGULATORY AND INSTITUTIONAL FRAMEWORK TO FACILITATE CLIMATE ADAPTATION IN THE FISHERIES SECTOR.

	Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP	Lead institutions
1	Enhance marine and terrestrial spatial planning to help balance fishery and aquaculture needs, terrestrial development and shoreline protection with rising sea level.	Short Term (2018 to 2021)	Marine and terrestrial spatial planning assessed, improved and endorsed to help balance aquaculture needs, terrestrial development and shoreline protection with rising sea level.	Facilitation	Fisheries; Physical Planning;
2	Integrate climate change considerations into fisheries and aquaculture policy and national development planning.	Medium Term (2021 to 2024)	Fisheries and aquaculture policy reviewed, analysed and integrated into climate change adaptation and national development planning.	Facilitation	Fisheries
3	Regulate entry into selected fisheries to improve opportunities for increasing economic yield and productivity	Medium Term (2021 to 2024)	Legislation to regulate entry into selected fisheries to improve opportunities for increasing economic yield and productivity developed and enforced	Facilitation	Fisheries

STRATEGIC OBJECTIVE 2. ENHANCE HUMAN AND INSTITUTIONAL CAPACITIES FOR THE DESIGN, IMPLEMENTATION, MONITORING AND EVALUATION OF FISHERIES-RELATED CLIMATE ADAPTATION PROJECTS

	Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP	Lead institutions
4	Develop and implement capacity building and outreach programmes for fisheries and aquaculture actors in the value chain (e.g. fishers, vendors, business service providers and management agencies) to facilitate	Medium Term (2021 to 2024)	Capacity building programmes for value chain actors in the fisheries sector (e.g. fishers, vendors, business service providers and management agencies) regarding climate change, expected impacts and	Facilitation	Fisheries; Education

	Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP	Lead institutions
	holistic climate change adaptation planning and implementation.		adaptation strategies and to facilitate holistic climate change adaptation planning and implementation, developed and implemented.		
5	Design a programme to build the capacity of fishermen to identify fishing grounds (e.g. sharing fish ground mapping; training on GPS use and training on safe night fishing) to reduce fuel use, increase and diversify production	Short Term (2018 to 2021)	Capacity building programmes for value chain actors in the fisheries sector (e.g. fishers, vendors, business service providers and management agencies) to facilitate holistic climate change adaptation planning and implementation developed and implemented.	Facilitation	Fisheries

OUTCOME 2: ENHANCED NUTRITION, FOOD AVAILABILITY, QUALITY AND SECURITY THROUGH ADAPTATION IN THE FISHERIES SECTOR

STRATEGIC OBJECTIVE 1. IMPROVE PRODUCTIVITY THROUGH CLIMATE RESILIENT FISHERIES MANAGEMENT SYSTEMS

	Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP	Lead institutions
6	Enhance maritime and coastal fisheries habitats to build resilience (e.g. mangroves restoration, by establishing artificial reefs, propagating and replanting using coral reefs species that are more tolerant to increasing temperature and acidity).	Medium Term (2021 to 2024)	Maritime and coastal fishery habitats restored or artificially enhanced to withstand climate change impacts. Enhancement programmes could include mangroves restoration, artificial reef establishment, propagation and replanting of coral reef species that are more tolerant to increasing temperature and acidity, among others.	Facilitation	Fisheries; Soufriere Marine Management Area
7	Design and implement a programme of best practices to increase fishing vessel stability and safety at sea e.g. by investing in appropriate vessels that are safer in increasingly rough conditions.	Short Term (2018 to 2021)	Programme of best practices to increase stability and safety at sea e.g. by investing in appropriate vessels that are safer in increasingly rough conditions developed and operational.	Facilitation	Fisheries; Ports

	Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP	Lead institutions
8	Improve knowledge and communication products, services, platforms, networks to raise awareness on fisheries, aquaculture and climate change for risk reduction action	Short Term (2018 to 2021)	Knowledge and communication products, services, platforms and networks to raise awareness on fisheries and climate change developed and published and disseminated.	Facilitation	Agriculture; Information Service
9	Evaluate and enhance fisheries management and development polices and plans for climate responsiveness (e.g. based on the changing status of the fish populations due to climate change)	Short Term (2018 to 2021)	Climate resilient fisheries management and development polices and plans for climate responsiveness (e.g. based on the changing status of the fish populations due to climate change) evaluated, developed, tested, improved and promoted.	Facilitation	Fisheries
10	Improve access to higher-value markets to promote greater benefits from fisheries and aquaculture production to compensate for reduced yields due to climate change (e.g. through the enhancement of Sanitary and Phytosanitary Standards (SPS), innovative infrastructure, supply-demand surveys, value chain analysis, and market intelligence)	Medium Term (2021 to 2024)	Access to higher-value markets evaluated and improved to promote greater benefits from fisheries and aquaculture production to compensate for reduced yields due to climate change (e.g. through the enhancement of sanitary and phytosanitary standards, innovative infrastructure, supply-demand surveys, value chain analysis, and market intelligence).	Implementation	Agriculture; Trade Export Promotion; Health; Commerce
11	Reduce capital, operation and other costs in fisheries and aquaculture by introducing and promoting fuel efficient technologies in response to declining yield and productivity in a changing climate	Short Term (2018 to 2021)	Fuel efficient technologies and best practices assessed, identified, tested and promoted to reduce capital and operation costs in fisheries and aquaculture in response to declining yield and productivity.	Implementation	Fisheries; Ports

STRATEGIC OBJECTIVE 2. PROMOTE CLIMATE RESILIENT AQUACULTURE PRODUCTION IN RESPONSE TO A CHANGING CLIMATE

	Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP	Lead institutions
12	Enhance the screening and control of emerging disease in aquaculture in response to changing climate	Medium Term (2021 to 2024)	System for the screening and control of emerging disease in aquaculture developed and promoted.	Facilitation	Fisheries
13	Replace fishmeal and fish oil in aquaculture feed with alternative sources of protein to maintain growth rate in the face of declining wild fish stocks (e.g. research into insect proteins such as black army worm).	Medium Term (2021 to 2024)	Feasibility study to replace fishmeal and fish oil in aquaculture feed with alternative sources of protein to maintain growth rate in the face of declining wild fish stocks (e.g. research into insect proteins such as black army worm) conducted, endorsed and disseminated.	Facilitation	Fisheries
14	Diversify and expand aquaculture to include non-carnivorous commodities and new climate-smart technologies such as aquaponics, intensive aquaculture and marine cage culture. Study the growth and lifecycle of native aquaculture species (e.g. fish, crab, freshwater shrimp, etc.)	Medium Term (2021 to 2024)	Programme with business models to diversify and expand aquaculture to include non-carnivorous commodities and new climate-smart technologies such as aquaponics, intensive aquaculture and marine cage culture assessed, developed, tested and promoted.	Facilitation	Fisheries
15	Diversify livelihoods, markets and/or products and approaches to reduce dependence on fisheries and aquaculture e.g. engage in alternative or supplementary economic activities.	Medium Term (2021 to 2024)	Programme with business model to diversify livelihoods, markets and/or products and approaches to reduce dependence on fisheries and aquaculture e.g. engage in alternative or supplementary economic activities assessed, developed, tested and promoted.	Facilitation	Fisheries; Small Enterprise Development; Commerce; National Skills Development Centre

STRATEGIC OBJECTIVE 3. PROMOTE ALTERNATIVE LIVELIHOODS CREATION AND DEVELOPMENT AND TO STRENGTHEN CLIMATE RESILIENCE IN FISHERY–DEPENDENT BUSINESSES

	Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP	Lead institutions
16	Provide support for capitalising on new business opportunities that arise in response to climate change	Medium Term (2021 to 2024)	Programme to support fisherfolk to capitalise on new business opportunities that arise in response to climate change assessed, developed and promoted.	Finance and implementation	Financial institutions; Small Enterprise Development
17	Enhance research and investments into creating new and alternative fisheries for underutilised wild-caught species and associated strategies for market penetration to support marine-based sustainable livelihood opportunities e.g. Diamond back squid fishery.	Medium Term (2021 to 2024)	Research on, and investments into, creating new and alternative fisheries for underutilised wild-caught species and associated strategies for market penetration to support marine-based sustainable livelihood opportunities e.g. Diamond back squid fishery conducted and promoted.	Facilitation	Agriculture; Fisheries; Commerce
18	Enhance gear and establish programmes to reduce ghost fishing due to losses during more severe storms (e.g. biodegradable panels)	Medium Term (2021 to 2024)	- Enhanced gear to reduce ghost fishing, due to losses during more severe storms (e.g. biodegradable panels) assessed, developed, tested and promoted. - Programmes to reduce ghost fishing designed and implemented.	Facilitation and implementation	Fisheries
19	Implement projects to convert biological waste (e.g. marine and aquaculture) and nuisances into useful products (e.g. ongoing conversion of the sargassum seaweed to fertiliser)	Medium Term (2021 to 2024)	Projects to convert biological waste (e.g. marine and aquaculture) and nuisances into useful products (e.g. ongoing conversion of the sargassum seaweed to fertiliser) evaluated, developed, tested and scaled up.	Facilitation and implementation	Agriculture

OUTCOME 3: STRENGTHENED PARTNERSHIPS FOR BUILDING SUSTAINABLE AND RESILIENT FISHERIES IN A CHANGING CLIMATE

STRATEGIC OBJECTIVE 1. IMPROVE ACCESS TO FINANCIAL AND BUSINESS SUPPORT FOR LEVERAGING PRIVATE SECTOR INVESTMENT INTO THE FISHERIES SECTOR

	Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP	Lead institutions
20	Develop sustainable financial mechanisms to support livelihood investments to diversify and adapt e.g. education fund, infrastructure support etc.	Medium Term (2021 to 2024)	Financial mechanisms and schemes to support livelihood investments to diversify and adapt e.g. education fund, infrastructure support etc. evaluated, developed, tested and rolled out	Facilitation and Finance	Fisheries; Finance
21	Develop and expand social benefits, insurance (life, medical and livelihood protection insurance schemes), pension and compensation schemes for climate related impacts for fishers and their families	Medium Term (2021 to 2024)	Social benefits, insurance (life, medical and livelihood protection insurance schemes), pension and compensation schemes for climate related impacts for fishers and their families assessed, developed, tested, improved and rolled out	Facilitation and Finance	Fisheries; Finance
22	Enhance the 'ease of doing business' to support business development utilising climate smart food production systems e.g. fiscal incentives and improved access to competitive and affordable financial products and services (loans, favourable interest rate and terms)	Short Term (2018 to 2021)	The 'ease of doing business' to support business development utilising climate smart food production systems e.g. fiscal incentives and improved access to competitive and affordable financial products and services (loans, favourable interest rate and terms) studied, formulated and promoted	Facilitation and Finance	Fisheries; Finance; Commerce

OUTCOME 4: STRENGTHENED PREPAREDNESS TO CLIMATE VARIABILITY AND EXTREMES IN THE FISHERIES SECTOR

STRATEGIC OBJECTIVE 1. STRENGTHEN CLIMATE MONITORING AND COMMUNICATION FOR EMERGENCY PLANNING AND INFORMED DECISION MAKING

	Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP	Lead institutions
23	Enhance data collection, research (including modelling) and monitoring of fish stocks to make appropriate investment decisions in the fisheries sector (e.g. SMART FADs) (be aware of the risks of overexploitation and potential climate impacts)	Medium Term (2021 to 2024)	Data collection, research (including modelling) and monitoring of fish stocks assessed, tested and improved for making appropriate investment decisions (e.g. SMART FADs), being aware of the risks of overexploitation and potential climate impacts.	Facilitation	Fisheries; Met Office
24	Develop hazard and risk maps on impacts of climate change for informing fisheries, coastal land and marine use planning	Short Term (2018 to 2021)	Climate-related hazard and risk maps relevant to fisheries developed and utilised in coastal land and marine planning.	Facilitation	Fisheries; Met Office
25	Develop emergency plans for the fisheries sector, with Early Warning Systems (EWS) and associated sensitisation to reduce losses and provide timely rehabilitation and disaster response and timely post-disaster recovery support (e.g. speed up vessel repairs, access to new tools and equipment)	Short Term (2018 to 2021)	- Study conducted to identify mechanisms for improving climate-related and fisheries-relevant information services to help fishers minimise climate risks in their daily activities, including their time at sea. The assessment should cover, among others, existing climatological data collection and information services, EWS, changes in fish stocks, sea weed and invasive species, and an analysis of how improving the services could enable fishers to make informed decisions on where to fish, hazardous areas to avoid and location of SMART FADs, among others. - Digital platform for sharing in a user-friendly way, the crucial information, set-up and operating (e.g. phone app).	Facilitation	Fisheries; Met Office

	Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP	Lead institutions
			- Disaster response and rehabilitation plan for the fisheries sector developed.		
26	Screen, monitor and alert on offshore seaweed movement to decrease the risk of damage to engines, fishing gear and other fisheries infrastructure	Short Term (2018 to 2021)	System to screen, monitor and alert on offshore seaweed movement to decrease engine and fishing gear damage developed, tested, improved and operational.	Facilitation and implementation	NEMO, Met office, Fisheries
27	Monitor and control existing and emerging invasive species (e.g. lionfish)	Short Term (2018 to 2021)	System to monitor and control existing and emerging invasive species (e.g. lionfish) developed and operational.	Facilitation and implementation	Fisheries
28	Enhance existing monitoring/alert networks relevant to climate change and fisheries through effective research, training and outreach mechanisms	Short Term (2018 to 2021)	Existing monitoring/alert networks relevant to climate change and fisheries assessed, enhanced and operational.	Facilitation and implementation	Fisheries; NEMO; Met Office

STRATEGIC OBJECTIVE 2. SCALE UP CLIMATE RESILIENT FISHERIES INFRASTRUCTURE TO REDUCE CLIMATE RISKS

	Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP	Lead institutions
29	Strengthen, retrofit, and/or relocate fisheries and aquaculture infrastructure and assets to better withstand climate impacts	Medium Term (2021 to 2024)	Study conducted to: a) identify fisheries and aquaculture infrastructure that is weak and at high risk of climate impacts; b) suggest solutions to increase the resilience of the identified weak infrastructure, including structural improvements and relocation. Solutions could include the protection of harbour and landing sites; building aquaculture facilities to withstand increased storm damage (e.g. using geo-membrane linings, water	Facilitation and implementation	Infrastructure; Fisheries; agriculture

	Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP	Lead institutions
			recirculating systems and raised dikes in flood-prone pond systems); c) design a plan to increase the resilience of weak but crucial fisheries and aquaculture infrastructure, using the solutions identified in the study. - Plan to increase the resilience of weak but crucial fisheries and aquaculture infrastructure implemented.		
30	Deploy hard defences (e.g. sea walls) to protect fisheries livelihoods and infrastructure to reduce climate impacts on local ecosystem services and/or local livelihoods	Medium Term (2021 to 2024)	Needs for hard defences (e.g. sea walls) to protect fisheries livelihoods and infrastructure from climate impacts assessed, infrastructural solutions costed, designed, funded and implemented.	Facilitation and implementation	Infrastructure; Fisheries
31	Deploy ecosystem-based solutions (soft defences) to address climate impacts on local livelihoods e.g. wetland rehabilitation	Medium Term (2021 to 2024)	Ecosystem-based solutions (soft defences) to address climate impacts on local livelihoods e.g. wetland rehabilitation studied, developed, tested, installed and operational.	Facilitation and implementation	Forestry; WRMA Fisheries

11. CONCEPT NOTES FOR CLIMATE CHANGE ADAPTATION PROJECTS IN SAINT LUCIA'S FISHERIES SECTOR

The project concept notes outlined here are a reflection of the prioritised measures contained in Saint Lucia's NAP and Fisheries SASAP. These are also represented, for ease of reference, in *Saint Lucia's Portfolio of Project Concept Notes for the Fisheries Sector 2018-2028.* The project concepts notes are not presented in order of priority. Implementation of these projects will be based partially on funder interest and partially on urgency-short, medium and long, as elaborated in the SASAP. Given that these documents are living or organic, it is envisaged that additional project concept notes will be added over time.

While the lead agency for *Saint Lucia's Sectoral Adaptation Strategy and Action Plan for the Fisheries Sector (Fisheries SASAP) 2018-2028,* is the Department of Fisheries, the implementation of projects and programmes would require the involvement of multiple agencies and stakeholders. In some cases, collaboration with other lead agencies would be warranted.

PROJECT CONCEPT 1. PILOTING A FINANCIAL SYSTEM TO BUILD THE CAPACITY OF FISHERS TO ADAPT TO CLIMATE CHANGE

CONCEPT NOTE 1	
Project title	**Piloting a financial system to build the capacity of fishers to adapt to climate change**
Objective(s)	To develop and promote competitive value chain financial products and services for fishers to diversify or invest in their livelihood activities.
Rationale In Saint Lucia, land-based agricultural activities and fisheries production have declined in recent decades, leading to a net import food bill and to concerns regarding future national food security and nutrition. The Government of Saint Lucia has made efforts to support the diversification of these sectors. This has been well-received. However, fishers and farmers require financial support to engage in or expand profitable business ventures. Despite being well trained and experienced, many fishers are unable to access competitive and affordable finance to start, operate and sustain or expand their businesses, mainly because local financial institutions are reluctant to offer them loans as they may lack collateral. Other reasons for loan request rejections are the variability of fishers' incomes and the consequent high-risk of loan defaults or the low volume of transactions, associated with high transaction costs, leading to low returns. Climate change adds to the lenders' concerns. Based on lessons learned by the Saint Lucia Development Bank (SLDB) and Credit Union from their small-loan disbursement programmes and in line with the Climate Change Adaptation Policy's Finance element, this project seeks to develop, test and scale up innovative financing mechanisms and models for overcoming the mentioned barriers and facilitating fishers' access to affordable finance.	
Beneficiaries Fishers and their value chain actors (suppliers, processors, distributors, retailers). Including women and youth led-Small and Medium Enterprises	

CONCEPT NOTE 1	
Project title	**Piloting a financial system to build the capacity of fishers to adapt to climate change**
Activities and Tasks • Start loan/credit line as working capital with favourable terms and concessional interest; • Create a matching rebate or sweat-equity instead of 'subsidy'; • Partial loan guarantee as means to share and transfer risks in case of loan defaults; • Training and outreach to fishers to improve their capacity to use and take advantage of the loans/credit lines.	
Main outputs/products **Outcome: Improved access to competitive finance to scale up climate resilient fisheries best practices and businesses** • Feasibility study to assess the needs, gaps, opportunities, challenges and lessons learned (from SLDB and Credit Union) in the development and disbursement of value chain financial products and services in Saint Lucia to implement fisheries businesses conducted, endorsed and published • Value chain financial products and services developed, tested, improved, endorsed and promoted for selected fishers (payment terms, interest rate) • Viable, proven and competitive value chain financial products and services disbursed to support fishers' start or expand their climate resilient business ventures • Knowledge and communication products developed and endorsed to train value chain actors on how to disburse (from bank), access the finance (by fishers) and advice on business and finance management for fishers	
Implementation Potential partners: Government agency with responsibility for Fisheries and Financial institutions (e.g. Saint Lucia Development Bank-SLDB, Credit Union). Responsible agency/partner: Government agency with responsibility for Fisheries	
Cost estimate USD 300,000	
Duration	**2 years**
Additional information • This project is aligned with the Fisheries SASAP's measure 22 and can contribute to implementing measures 16 and 20	

PROJECT CONCEPT 2. EXPANDING SUSTAINABLE FINANCING IN SAINT LUCIA FOR THE PROVISION OF MARINE ECOSYSTEM SERVICES UNDER A CHANGING CLIMATE

CONCEPT NOTE 2	
Project title	**Expanding sustainable financing for the provision of marine ecosystem services under a changing climate in Saint Lucia**
Objective(s)	To address Saint Lucia's marine and coastal resource degradation, climate change threats and management challenges through access to sustainable conservation funding**.**

Rationale

Climate change and environmental degradation are serious threats to Saint Lucia, its natural resources, populations and economy. The designation of new and expansion of existing conservation areas has been included in the National Adaptation Plan (NAP) as a no-regrets adaptation measure for the country to conserve under a changing climate, its biodiversity and critical ecosystems. Fisheries, and some important economic activities (such as ecotourism) depend upon these natural resources. However, reduced national resources limit the possibility of establishing and maintaining important conservation land and marine areas.

This project aims at increasing Saint Lucia's capacity to benefit from a sustainable conservation financing mechanism developed through the 'Sustainable Financing for Eastern Caribbean Marine Ecosystems Project" which was tested and successfully adopted in Eastern Caribbean countries. This initiative was supported by the Global Environment Facility (GEF) "to enhance the long-term sustainability of protected area networks in the participating countries". The financing system consists of a 1:1 matching agreement between the Caribbean Biodiversity Fund (CBF) and the countries involved. Support is required for setting a national fund to help Saint Lucia generate revenue to match with the CBF to increase fund allocation to the country and expand the GEF project has brought to date.

The objectives and achievements of the GEF project were highly relevant, given the economic and environmental importance of marine ecosystems in the Eastern Caribbean region. Scaling up this initiative in Saint Lucia is even more important now, as a study emerging from the same project indicates that the Eastern Caribbean could lose between US$350 million and US$870 million per year between 2015 and 2050 due to declining fish stocks, reduced tourism, loss of shoreline protection, and coral reef degradation. Financial mechanisms to increase the cover of healthy ecosystems and prevent many of the business-as-usual losses is a priority for building Saint Lucia's resilience with climate change.

The GEF project consisted of the following 3 components, which could be further extended in Saint Lucia, taking into consideration the lessons learned in the design and implementation of the regional project.

Component 1: Establishment of Sustainable Financing Mechanisms:

- This component was to finance the facilitation of the establishment of the Caribbean Biodiversity Fund (CBF) and carry out its initial capitalisation.
- The aim was to generate sufficient income to finance sustainable management activities in the protected areas of participating countries through their respective National Protected Area Trust Funds (NPATF).

CONCEPT NOTE 2	
Project title	**Expanding sustainable financing for the provision of marine ecosystem services under a changing climate in Saint Lucia**

- Furthermore, this component was to finance the facilitation of establishing respective NPATFs in each of the participating countries, as well as the designing and implementing of a capitalisation strategy to generate additional financing to that provided by the Caribbean Diversity Fund.

Component 2: Strengthening and phased expansion of marine protected area networks:

- This component was to finance the expansion of the systems of the marine protected areas through the designation of new ones and the establishment of demonstration sites in participating countries to showcase best practices in the management of marine protected areas.

Component 3: Deployment of a regional monitoring and information system:

- This component was to finance the facilitation of eco-regional and management effectiveness monitoring, including regular observation of data collection on biophysical and social economic indicators within the protected areas network, and assessment of management effectiveness.
- Furthermore, this component was to finance the establishment of an electronic database for an eco-regional environmental information system and the facilitation of the dissemination of results derived from monitoring systems.

Beneficiaries: Marine resource users

Activities and Tasks

- Set-up fund or other national revenue-generating mechanism to increase Saint Lucia's access to CBF's funds.
- Expand the implementation of the components of the GEF project in Saint Lucia.

Main outputs/products

- Sustainable financing mechanisms and business models to scale up marine ecosystem services in selected sites of Saint Lucia established and operating
- Research and observation systems, part of the project in place and monitoring environmental and climate change on fish stock, fish nurseries and eco systems
- Promotion and scaling up of Sustainable Financing Activities for Marine Ecosystem services

Implementation
Saint Lucia National Conservation Fund (SLUNCF)

Cost estimate: USD 300,000

Duration 3 years

Additional information This project can contribute to implementing Fisheries SASAP's measures 1, 8, 9, 11, 16, 20, 22 and 31

PROJECT CONCEPT 3. INCREASING THE CAPACITY OF FISHERS AND OTHER ACTORS TO MANAGE CLIMATE RISKS THROUGH IMPROVED DATA MANAGEMENT AND EARLY WARNING SYSTEMS (EWS)

CONCEPT NOTE 3	
Project title	**Increasing the capacity of fishers and other actors to manage climate risks through improved data management and Early Warning Systems (EWS)**
Objective(s)	To create a mobile app based on improved climate monitoring to allow fishers to make informed decisions, increase fishing efficiency, safety at sea and reduce fuel consumption.

Rationale

Fishing communities and livelihoods are amongst the most vulnerable to climate change in Saint Lucia. Not only is climate change projected to reduce fish stocks, but it will induce stronger winds, stronger and more unpredictable rainfall events and will increase the intensity of tropical storms, making fishing activities more expensive (as more fuel would be needed to reach fish stocks), but also more dangerous.

To increase safety at sea and make fishing operations more efficient, this project proposes the design and development of a mobile phone application that allows fishers to access timely, accurate and useful meteorological data and be able to record real-time catch data.). . Through the app, this information will allow them to make quick decisions on hazardous areas to avoid while fishing. The app will be complemented with the installation of technology to send biophysical data remotely on the fish caught aggregation density and well as meteorological data). The app will provide fishers with information on various hazards that may affect them (i.e. sea surges, high winds).

Beneficiaries: All Saint Lucia's fishers and fisheries value chain actors

Activities and Tasks

- Identify and improve existing data collection systems that can be used for generating monitoring information relevant to the fishers (daily weather, movement of fish stocks, sea weed, position of FADs, etc.);
- Design, develop and pilot the app;
- Promote and raise awareness about the app;
- Train fishers on the use of the app.

Main outputs/products

- Material for SMART FADs
- User friendly mobile app designed, developed, piloted, improved, operating and used by fishers
- Communication products to promote the app created and used
- Training materials on the use of the app

Implementation: Government agency with responsibility for Fisheries

Cost estimate: USD 200,000

Duration 1 year

Additional information:

- This project is aligned with the Fisheries SASAP's measures 23, 24,25, 26, 27, 28 and can contribute to implementing measures 1, 4, 5 and 8
- This project will build on the lessons learned from the regional projects 'Fisheries Early Warning Emergency Response' (FEWER) and 'Caribbean Fisheries Co-Management Project' in Saint Lucia [CARIFICO], funded by the Japan International Cooperation Agency (JICA).
- The project will benefit from the existing wide mobile phone coverage in Saint Lucia and from the fact that most of the phones sold in the country are smart phones.
- By providing fishers the location of FADs, which they can track through GPS (in case phone signal is lost at sea), the app will allow fishers to save time and fuel during their fishing activities; therefore, **this adaptation project will offer climate change mitigation co-benefits**

PROJECT CONCEPT 4. DEVELOPMENT AND IMPLEMENTATION OF A NATIONAL CORAL REEF AND SEAGRASS BED MANAGEMENT AND ENHANCEMENT POLICY AND ACTION PLAN TO REDUCE THE IMPACTS OF CLIMATE CHANGE

CONCEPT NOTE 4	
Project title	**Development and Implementation of a National Coral Reef and Seagrass bed Management and Enhancement Policy and Action Plan to reduce the impacts of climate change**
Objective(s)	To create a National Coral Reef Enhancement Action Plan by scaling-up a successful pilot project.

Rationale

Saint Lucia's coral reefs are among the most valuable natural assets of the country. They provide breeding grounds and nursery habitat for economically important fisheries and are a major tourism attraction. They also protect coastal areas and communities against the impacts of hurricanes and storm surges. However, pollution from land-based activities reaching the sea, together with climate change-induced ocean acidification and warmer waters, are leading to the destruction of these important ecosystems.

To improve the health status of coral ecosystems and improve their capacity to deliver their essential environmental and economic services with climate change, this project seeks to create a National Plan for enhancing coral reef systems.

This initiative aims at building and expanding at the national level, the results of the "Coral Reef Enhancement Action' project, which led to the preparation of a Plan of action for coral enhancement within the Pointe Sables Environmental Protection Area (PSEPA); built national capacities on coral enhancement activities and delivered a set of guidelines for the preparation of reef enhancement plans in Saint Lucia.

Beneficiaries: Fishers, tourism sector, dive operators, coastal communities.

Activities and Tasks

- Develop a National Climate Resilient National Coral Reef Enhancement policy and Action Plan, following the guidelines prepared during the 'Coral Reef Enhancement Action' project;
- Enhance data collection and reporting system to expand parameters and location for coral health and cover;
- Develop remote monitoring of biophysical parameters affecting reef health (triggers of coral bleaching)
- Scale up coral restoration initiatives;
- Map critical sea grass areas, assess health and connectivity to coral areas;

Main outputs/products

- Creation of the National Plan using the results of the 'Coral Reef Enhancement Action' project, as well as the lessons learned from it
- National Coral Reef Enhancement Action Plan endorsed
- Knowledge and communication products created to raise awareness on the importance and engagement in the implementation of the National Plan

Implementation

Government agency with responsibility for Fisheries., working with fishers, dive operators, hotels, and other partners

Cost estimate USD 800,000

Duration 5 year

Additional information

This project is aligned with the Fisheries SASAP's measures 1, 4 and 8 and can contribute to implementing measure 6

PROJECT CONCEPT 5. STRENGTHENING AQUACULTURE AND MARICULTURE FARMING THROUGH DIVERSIFICATION AND BUSINESS OPPORTUNITIES

CONCEPT NOTE 5	
Project title	**Strengthening aquaculture and mariculture farming through diversification and business opportunities**
Objective(s)	To introduce climate resilient aquaculture and mariculture best practices, technologies and products to open alternative livelihood and income generating opportunities under a changing climate.

Rationale

In Saint Lucia, the impacts of climate variability and change have contributed to the decline in land-based agricultural activities and fisheries production, leading to a net import food bill and to concerns regarding future national food security and nutrition. The Government of Saint Lucia has made efforts to support the diversification of these sectors, encouraging aquaculture, among other activities. This has been well-received. However, with climate change, aquaculture activities also face challenges, mainly due to changing temperatures, scarcity and decreased quality of water (due to recurrent dry periods, increased pollution of freshwater resources and salt water intrusion due to Sea Level Rise, reduced availability of dissolved oxygen, and reduced availability of feed, all affecting the productivity and the nutritional value of aquatic products and putting farmers' incomes at risk.

This project seeks to foster climate resilient aquaculture and mariculture production and businesses through the identification, testing, introduction and promotion of improved climate-resilient farming practices, technologies, products and by-products (e.g. improved ponds, improved feed, use of resilient local fish species).

The project seeks a clear strategy and an action plan on how aquaculture for fish (e.g. prawn, tilapia) and seamoss production can be developed into a robust, sustainable business that could contribute to socioeconomic and environmental well-being, as well as an alternative livelihood opportunity.

Beneficiaries : Seafood Consumers, Aquaculture /Mari culture Farmers, Fish farming households

Activities and Tasks

- Identify current and future challenges imposed by climate change and other main factors on Saint Lucia's aquaculture and mariculture activities;
- Conduct a study to determine environmentally sustainable and climate-resilient solutions to existing challenges in the aquaculture and mariculture sectors. This should include best practices and the production of new products and sub-products to increase productivity and income (e.g. diversifying aquaculture to include non-canivorous commodities; marine cage culture and climate-smart technologies such as aquaponics, intensive aquaculture, marine cage culture);
- Identify current and future challenges imposed by climate change and other main factors on Saint Lucia's aquaculture and mariculture activities;
- Conduct a feasibility study for the adoption of the best practices identified and the diversification options available and suitable to Saint Lucia's context, including economic, environmental and market considerations;
- Implement pilot tests of the feasible and best climate-resilient best practices and diversification options for the aquaculture and mariculture sectors;
- Upgrade existing facilities and building capacities for improved training and information transfer to strengthen capacity of the DOF and aquaculture farmers;
- Train aquaculture and mariculture farmers in the identified practices and in the production of new commodities;

CONCEPT NOTE 5	
Project title	**Strengthening aquaculture and mariculture farming through diversification and business opportunities**
• Develop a marketing strategy (including a value chain assessment) for value added aquaculture and mariculture products, as well as an action plan to maximise social and economic benefits for fishers, sea moss producers and processors.	
Main outputs/products • Increased range of aquaculture and mariculture products identified, tested and under production • Best aquaculture and mariculture practices adopted and replicated • Marketing strategy for value added aquaculture and mariculture products developed • Increased income and number of aquaculture and mariculture farmers	
Implementation: Government agencies with responsibility for Fisheries, Commerce, Education.	
Cost estimate: USD 750,000	
Duration: 5years	
Additional information • This project is aligned with the Fisheries SASAP's measures 4, 8 10 and 14 and can contribute to implementing measures 1,2, 11, 13 and 20 • This project builds on the Food and Agricultural Organization (FAO) Seamoss (Eucheuma cottoni) Development Programme (2015 to 2018) and the DFID-funded CARIBSAVE Partnership Seamoss Project and Caribbean Fish Sanctuary Partnership Initiative (C-FISH).	

PROJECT CONCEPT 6. UPGRADING FISHERIES FACILITIES TO BE MORE RESILIENT TO THE IMPACTS OF CLIMATE CHANGE.

CONCEPT NOTE 6	
Project title	**Upgrading fisheries facilities to be more resilient to the impacts of climate change.**
Objective(s)	• To upgrade existing fisheries facilities to be more resilient to the impacts of climate change. • To develop a viable business model to raise revenue to maintain and operate the facilities
Rationale Climate resilient infrastructure plays an important role in providing a safe haven and shelter for fishers during storms. Unfortunately, in Saint Lucia, many of the fisheries facilities fall into disrepair, partly due to lack of funding to maintain and manage them. This is of concern as climate change projections indicate that in the coming decades Saint Lucia will experience stronger and more unpredictable rainfall events, stronger winds and more intense tropical storms, decreasing safety at sea for fishers and exposing fisheries facilities to direct impacts. This project seeks to improve existing fisheries complexes in Saint Lucia to be more resilient to the impacts of climate change e.g. hurricane straps, coastal stability; starting with the improvement of the Choiseul Fisheries Complex Facility and to develop a viable business model to raise revenue to maintain and operate the facility.	
Beneficiaries: Fishers	
Activities and Tasks • Develop building codes and standards for fisheries facilities; • Assessment of climate change readiness of Fisheries facilities; • Build resilience and redesign of pilot sites; • Expand sustainable financing mechanisms to support distress to fishers due to climate – related impacts.	
Main outputs/products • In partnership with local fishers, the needs and challenges of existing fishing complexes identified, surveyed, costed and recommended for upgrading (e.g. Choiseul and Castries Fisheries Complex Facility could be upgraded to reduce sedimentation build up and improve safety) • Upgrading Action Plan (strengthening design, cost, work plan, tendering documents, monitoring and evaluation plan) for upgrading developed and endorsed • Business model to raise revenues (e.g. membership fees, income generating activities) to maintain and operate the facility developed, evaluated, tested and improved • Retrofitting initiative monitored and evaluated • Business model implemented	
Implementation: **Potential partners:** Fishers Cooperatives **Responsible agency/partners:** Government agencies with responsibility for Fisheries and Infrastructure	
Cost estimate: USD 1,400,000	
Duration: 2 years	
Additional information This project is aligned with the Fisheries SASAP's measures 8 ,29 and 30 and can contribute to implementing measures 4 and 10	

PROJECT CONCEPT 7. UPGRADING AND INSTALLING CLIMATE RESILIENT INFRASTRUCTURE AT THE CASTRIES FISH LANDING SITE

CONCEPT NOTE 7	
Project title	**Upgrading and installing climate resilient infrastructure at the Castries fish landing site**
Objective(s)	• To create a more climate resilient, environmentally friendly, sustainable and aesthetically pleasing fishing landing site to serve fishers within the Castries basin • To improve the quality of infrastructure at the Castries fish landing site

Rationale

The high ratio of coastline to land area, coupled with the concentration of people and economic activity along the coast makes Saint Lucia, and in particular, its coastal resources, fishing communities, and infrastructure, highly vulnerable to the impacts of climate change and particularly at risk of Sea Level Rise.

Fisheries-dependent livelihoods and economies are challenged by extreme weather events, such as intense tropical storms and hurricanes and associated storm surges and flooding. Besides irreparable personal injuries and household losses, these events damage and often lead to the loss of vessels, fishing gear – including fish traps and fish aggregating devices (FADs) and impair fish landing sites, fish markets, fishermen's locker rooms, and other onshore facilities.

This project proposes the restoration and retrofitting of the Castries fish landing site, which has deteriorated from the exposure to the elements for years and is not fit to sustain recurrent hydrometeorological impacts expected with climate change. Lamentably, the site no longer offers a conducive environment to carrying out business transactions; fishers and buyers are no longer attracted to the fish landing site. Instead, fishers line-up by the side of the road to sell their catch. This situation poses hazards for fishers, fish buyers and visitors who traverse the area during cruise ship season. This situation is also not sustainable, as the landing site is necessary now and in the coming decades, With climate change, there will be more pressures on livelihoods and every opportunity must be taken to secure and sustain them. An attractive and climate resilience fisheries facility will help facilitate a more seamless transition.

Beneficiaries:

Fishers, buyers, fisher families, management of staff of facility, visitors and the general public

Activities and Tasks

- Needs assessment and pre-freasibility study
- Dredging the fish landing site to remove underwater debris and contaminants in the Castries fishing landing site and to begin the process of cleaning up the coastal waterways.
- Installation of an eco-friendly sewage treatment plant to address the impact of direct sewage dumping into the Castries Harbour.
- Establishment of an engine repair workshop for small fishing craft and stock of spare parts most often used by fishers;
- A boat repair area: a properly equipped boat repair area, including some boat lift out facilities, to enable fishermen to repair their vessels on shore;
- Fishing gear repair area: a small shed with a dry, clean floor for the repair and storage of nets and for other fishing gear;
- Construction of fish vending stalls with overhead cover to encourage fishers to retail fish to the general public in a clean and sanitary areas as opposed to the side of the main John Compton Highway;

CONCEPT NOTE 7	
Project title	**Upgrading and installing climate resilient infrastructure at the Castries fish landing site**
• Repair and/or reconstruction of the jetty to facilitate fishers going out to fish and coming in with their catch; • Upgrade and repair of fishers' storage lockers with climate resilient material to better withstand sea blast and erosion; • Placement of solar lighting, solar compacter waste collection bins to maintain proper garbage disposal practices; • Beautification of Fish Landing Site with plants and other artefacts associated with fishing and ocean; • Establishment of outdoor Sea Food Café.	
Main outputs/products • The Castries fish landing site as a climate resilient model of sustainability and an environmentally friendly site for Saint Lucia and the Caribbean	
Implementation Saint Lucia Fisherfolk Cooperative Society Ltd. in collaboration with the Government agencies with responsibility for Fisheries, Planning and Infrastructure	
Cost estimate: To be assessed and discussed	
Duration: To be assessed and discussed	
Additional information: This project can contribute to implementing Fisheries SASAP's measures 1, 29 and 30	

PROJECT CONCEPT 8. PILOT TESTING CLIMATE RESILIENT AND FUEL-EFFICIENT FISHING FLEETS IN SAINT LUCIA

CONCEPT NOTE 8	
Project title	**Pilot testing climate resilient and fuel-efficient fishing fleets in Saint Lucia**
Objective(s)	To promote and strengthen climate resilient and efficient fishing fleets equipped with modern gear to improve business resilience, yield, productivity and income under a changing climate

Rationale

Fishing communities and livelihoods are highly vulnerable to climate change in Saint Lucia. Not only climate change is projected to reduce fish stocks, but it will induce stronger winds, stronger and more unpredictable rainfall events and will increase the intensity of tropical storms, making fishing activities more expensive (as more fuel would be needed to reach fish stocks) but also more dangerous.

Low fish landings, productivity and fishing incomes are currently often associated with the outdated fishing equipment and gear used, as well as with fuel inefficient fishing fleets. To remain competitive and viable under the increasingly difficult fishing conditions induced by climate change, Saint Lucian fishers need access to fuel efficient vessels, equipped with modern gear. This project proposes the acquisition of a small fleet to be shared among members of fishers' cooperatives as a pilot test of business and fisheries' models. The business model is to nurture vertical integration in the sector and the amalgamation of fishing vessels and experienced fishers into a larger business enterprise to reduce operating costs. The pilot test would be in investment in one to three vessels.

Beneficiaries: Fishers cooperatives

Activities and Tasks

- Appropriate vessel, fishing equipment and gear selected and procured;
- Legal documents and agreements for vessel ownership are signed;
- MoU for the Business model for the vessel's operation are signed between partners members of the fisheries cooperative;
- Captains and crew who will be required to operate mechanised fishing vessel and gear obtain required certification to operate vessel;
- Captain and crew obtain modernised fishing equipment and gear training to engage in sustainable fishing;
- Necessary licenses and permits to allow the pilot project to take place are issued to the relevant parties;
- Proper records on fish catch and other auxiliary data such as fishing days, fuel consumption, fishing grounds etc. are maintained;
- Captain, crew and processors obtain certification in fish handling, processing and business skill;
- Catch structure comprising adult ocean pelagic species developed and promoted.
- Analytical report on the cost and returns and lessons learned of the pilot fishing vessel operations documented and presented to all key stakeholders for knowledge sharing.

Main outputs/products

- Acquisition of appropriate vessels for undertaking a pilot project that will result in greater efficiencies and meet necessary standards in the fishing industry
- Efficient operation of acquired fishing vessel
- Development of viable climate resilient fishing models and businesses

Implementation

Responsible agency/partners: Government Agency with responsibility for Fisheries.

CONCEPT NOTE 8	
Project title	**Pilot testing climate resilient and fuel-efficient fishing fleets in Saint Lucia**
Partners: organisations: Fisheries Cooperatives, Attorney General Office	
Cost estimate: USD 600,000	
Duration: 2 years	
Additional information This project is aligned with the Fisheries SASAP's measures 7, 8 ,9 and 18 and can contribute to implementing measures 4, 10, and 11	

PROJECT CONCEPT 9. COASTAL ADAPTATION BLUEPRINT FOR SAINT LUCIA

CONCEPT NOTE 9	
Project title	**Coastal Adaptation Blueprint for Saint Lucia**
Objective(s)	• To assess both climatic and non-climatic pressures and the impact on coastal ecosystems. • To develop spatially explicit maps of ecosystem types to include sea bed conditions, bathymetry, etc. • To develop socio- economic scenarios of selected coastal communities for use in vulnerability and adaptation assessments. • To develop climate change scenarios for defining the necessary adaptation activities. • To generate indicators of impact, vulnerability and adaptation to climate change in the coastal zone. • To identify optimal locations and species for monitoring programmes, to best inform adaptive management via delivery of up- to- date relevant information. • To develop and test/implement adaptation strategies for case study sites, to include tripartite ecosystem (mangrove, seagrass bed, coral reefs) rehabilitation and restoration activities involving local communities/stakeholders

Rationale

Climate change adaptation decisions and actions in Saint Lucia are based on data that is inadequate, sporadic, fragmented and poorly shared. Most of the coastal management, planning and development interventions inadequately consider climate risks and as such, there is a need to better understand climatic and human pressures and related risks in coastal management decision-making.

Coral reefs, mangroves and sea grass beds are important marine ecosystems and provide valuable goods and services The ability of these ecosystems to sustain the generation of goods and services is being threatened by a myriad of natural and anthropogenic disturbances, which result in their degradation and alteration of their ecological complexity These disturbances include storms and hurricanes; (increase sea surface temperature; overfishing; mechanical injury and derived effects from divers (and anchoring; and terrestrial pollutant runoff related to unregulated agricultural practices, land conversion and development activities. Climate change has resulted in, and is expected to, exacerbate the degradation and decline of these critical marine ecosystems.

The reduction of local stresses such as pollution, sedimentation, mechanical damage and overfishing, as well as the protection of critical areas, where natural environmental conditions improve resistance and resilience, is expected to accelerate recovery of these ecosystems. However, one of the major challenges for natural resources managers, is the continual collection of data as it relates to climatic and ecosystem changes. Many of the islands lack both the financial and human capacity to continue to monitor these changes outside of donor-funded projects. Fortunately, there is now a move towards the use of citizen science as well as the use of everyday technology to assist in the monitoring of changes to the ecosystems.

This project aims to provide a critical evaluation of the best available information for guiding decisions on complex climate change and environmental issues. This information is crucial for planning and implementing adequate climate change adaptation measures, and also to inform the development and implementation of policies that permit building climate resilience of marine resources and associated and sectors.

CONCEPT NOTE 9	
Project title	**Coastal Adaptation Blueprint for Saint Lucia**

At this time Marine Spatial Planning, remains primarily as a concept rather than a well-defined framework in the context of addressing the conflicting objectives of climate change adaptation and usage of the marine space in Saint Lucia. It is expected that through the implementation of this project, a robust, reliable and comparable collection of data will enable the development of climate change decision support tools to organise, analyse and in inform the MSP process.

Beneficiaries: Saint Lucia's coastal areas' habitants

Activities and Tasks

- A spatial decision support system (DSS) will be developed which will allow for visual representation of data that will be generated from the following assessments;
  - Climatic and non- climatic pressures
  - Critical marine habitats
  - Capture Fisheries Data
  - Socio- economic dependencies and interactions
- Development of a methodology that can be replicated and will gather the historic and current local knowledge and perception of climatic events, impacts that can be used for better integrated decision- making and support the DSS;
- Development and implementation of Rapid Adaptation Plans (RAPs) for proposed sites (based on outputs and recommendations from Component 1) to include coral reef and seagrass beds enhancement.

Main outputs/products

- Field survey on ecological, climatic (temperatures, sea level rise , pH, etc.) and non- climatic (pollution, sedimentation, etc) parameters resulting in an assessment of the health status of coral reefs, seagrass beds and mangroves, as well as the provision of background data on factors influencing ecosystem health
- Assessment of the socio-economic sectors and level of their dependency from the relevant stakeholder groups to determine community socio- economic vulnerabilities
- Spatial decision support system and GIS- based web viewing tool
- List of species present in seagrass beds, coral reef and mangroves; present coral cover of live coral and seagrass; frequency of disease occurrence; composition of biodiversity among sites; coral reef and seagrass health indices
- Build capacity among stakeholder and communities to assess and monitor habitat health.
- Rapid Adaptation Plan to include, but not be limited to, coastal habitat enhancement and monitoring plan
- Feasibility Assessment Report for habitat restoration intervention area
- A coastal habitat (mangrove, coral reef and seagrass) seeding/nursery procedures/ plan
- A complete pilot habitat restoration
- Monitoring Plan

Implementation: Government Agency with responsibility for Fisheries

Cost estimate: USD 1,650,000.00

Duration: 1.5 years (30 months)

Additional information

This project is aligned with the Fisheries SASAP's measures 4, 6, 8 and 31 and can contribute to implementing measures 1, 24,26, 27 and 28

PROJECT CONCEPT 10. PILOTING WATER AND FEED EFFICIENT AQUACULTURE SYSTEMS TO INCREASE PRODUCTION, PROFITABILITY, EMPLOYMENT AND CLIMATE RESILIENCE IN THE SECTOR

CONCEPT NOTE 10	
Project title	**Piloting water and feed efficient aquaculture systems to increase production, profitability, employment and climate resilience in the sector**
Objective(s)	To test the introduction of water efficient aquaculture systems in Saint Lucia to reduce drought-related risks To develop local complete shrimp and Tilapia feeds to reduce aquaculture costs, increase productivity and generate employment

Rationale

In Saint Lucia, the impacts of climate variability and change have contributed to the decline in land-based agricultural activities and fisheries production, leading to a net import food bill and to concerns regarding future national food security and nutrition. The Government of Saint Lucia has made efforts to support the diversification of these sectors, encouraging aquaculture, among other activities. This has been well-received. However, with climate change, aquaculture activities also face challenges, mainly due to changing temperatures, scarcity and decreased quality of water (due to recurrent dry periods, increased siltation and pollution of freshwater resources and salinity intrusion due to Sea Level Rise), reduced availability of dissolved oxygen, and reduced availability of feed, all affecting the productivity and the nutritional value of aquatic products and putting farmers' incomes at risk.

Aquaculture in Saint Lucia has started experiencing some of the projected impacts of climate change referenced above. Recurrent flooding and drought are changing the way farmers engage in this sector. They have started to construct small and less productive ponds in areas away from the valleys where there is no sufficient flat land available, just to reduce the increasing risk of flooding in flood prone valleys, brought about by stronger and more unpredictable rains. Tensions between crop and aquaculture farmers have started to build around their competing water use during dry periods. Further, aquaculture farmers currently use local feeds that are not stable in water, (leading to wastage, pollution and to less than optimal growth); or incur high imported feed purchase costs, which reduces their income.

Given the importance of making the aquaculture sector a profitable alternative or complement to the more climate exposed crop agriculture and marine fisheries, it is of necessary to increase the operational efficiency and production of aquaculture systems in Saint Lucia, while considering the potential impacts of climate change in the sector. This project proposes to pilot the introduction of low water input aquaculture production systems and the development of a low-cost nutritionally complete feed for the island's aquaculture (shrimp and Tilapia) as a way to increase productivity, create new businesses, improve water use efficiency and reduce the risk of conflicts under a changing climate change.

Beneficiaries: Pilot area residents (possibly Mahout, Micoud,)

Activities and Tasks

- Identify, purchase and install water-efficient aquaculture systems and technologies to introduce at the pilot sites;
- Train farmers on the use of the water efficient aquaculture systems;
- Pilot the water efficient aquaculture systems;
- Conduct research and feasibility study on complete shrimp and Tilapia feed alternatives that could be produced in Saint Lucia;
- Pilot the production and use of the complete feed alternatives;

CONCEPT NOTE 10	
Project title	**Piloting water and feed efficient aquaculture systems to increase production, profitability, employment and climate resilience in the sector**
• Evaluate the results of the use of the alternative complete feeds produced for scaling-up production; • Train farmers/vulnerable groups on the production of the alternative complete feeds; • Train farmers on the correct use of the alternative complete feeds.	
Main outputs/products • Increased climate resilience in national aquaculture systems • Created employment opportunities for vulnerable groups (e.g. youth), thus helping to reduce social ills and reduce rural to urban migration • Reduced pollution • Increased production of Tilapia and shrimp on the island • Increase knowledge and capacity of technical officers to provide support to farmers and interested persons	
Implementation Government agencies with responsibility for aquaculture, agriculture, commerce; private sector (technology suppliers); and aquaculture farmers.	
Indicative cost: USD 400,000	
Duration: 4 year	
Additional information: This project is aligned with the Fisheries SASAP's measures 16 and 17 and can contribute to implementing measures 2, 4, 8, 9 and 10	

12. CONCLUSION

As Saint Lucia is highly vulnerable to climate change, securing the availability and supply of nutritious and high quality and competitive food, while protecting lives, livelihoods, economic activities and critical infrastructure from the impact of climate change-induced hazards, requires urgent action. The Fisheries SASAP, as a building block of Saint Lucia's NAP process, provides a framework for guiding this action and initiating the continuous and coherent process of integrating climate change considerations into policies, projects, programmes and other investments pertinent to the country's fisheries sector. This SASAP seeks to contribute to strengthening the sustainability of Saint Lucia's fisheries and fishery-dependent businesses and the security of fisheries dependent livelihoods under a changing climate by establishing means to overcome existing policy, legal, regulatory, institutional, technical, financial, business and social barriers. The implementation of the SASAP will require a concerted effort by all stakeholders from both the private and public sectors. Financing the SASAP will require the mobilisation of national, bilateral and international resources. High level political buy-in and commitment will contribute to the SASAP's implementation success, and to the achievement of the greater adaptation goals Saint Lucia has endorsed in its CCAP and in its various water-specific or -relevant policies, strategies and plans.

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ANNEX 1. SAINT LUCIA CLIMATE CHANGE ADAPTATION POLICY (2015)

The Saint Lucia Climate Change Adaptation Policy (CCAP) of 2015 outlines the general strategy for understanding and addressing the risks posed by climate change. It seeks to "ensure that Saint Lucia and its people, their livelihoods, social systems, and environment are resilient to the risks and impacts of climate change." The Policy endorses the principles of a cross sectoral approach to climate adaptation and concretely addresses: 1) adaptation facilitation- (appropriate policy, legislative and institutional environment); 2) adaptation financing (measures to ensure adequate and predictable financial flows) and, 3) adaptation implementation (concrete actions to prepare for, or respond to, the impacts of climate change).

The CCAP's execution will encompass activities geared towards building the resilience of households, communities, vulnerable groups, enterprises, sectors and ultimately, the nation, with efforts directed towards achieving the following objectives by 2022: a) Priority adaptation measures to the adverse effects of climate change developed and implemented at all levels; b) Identification of vulnerable priority areas and sectors and appropriate adaptation measures using available and appropriate information, recognising that such information may be incomplete; c) Adaptation measures in vulnerable priority areas supported by existing data sets and traditional knowledge, or new data developed as necessary; and d) Appropriate adaptation measures integrated into national and sectoral development strategies and linked as far as national circumstances will allow, to the national budgeting process.

In terms of facilitation, the CCAP proposes actions related to strengthen inter-agency and inter-sectoral collaboration, for example, identifying a suitable mechanism for strengthening the nexus between climate change adaptation and disaster risk reduction and formalising the relationship between the NCCC and other coordinating bodies, as appropriate.

Among the actions that the CCAP outlines for implementation, is the development of NAPs. Importantly, the CCAP puts specific focus on:

- Protecting freshwater resources, promoting watershed management and implement rainwater harvesting and storage;
- Establishing integrated coastal management and adaptation measures to increase the resilience of coastal systems, communities, critical infrastructure, and economic activities;
- Protecting human health from climate change- related diseases;
- Diversifying economic opportunities in agriculture and fishing, biodiversity conservation and management;
- Formulating appropriate building and zoning codes and promoting integrated early warning and response systems; and
- Promoting strategic partnerships between the public sector, private sector and civil society in the implementation of adaptation measures.

Importantly, while focused on addressing climate change adaptation, the CCAP recognises that some mitigation activities provide meaningful adaptation co-benefits and increase resilience.

ANNEX 2. FEATURES OF SIGNIFICANT PAST, PRESENT AND APPROVED PROJECTS CONTRIBUTING TO CLIMATE CHANGE ADAPTATION IN SAINT LUCIA'S FISHERIES SECTOR

Project	Total Investment Cost	Donor/ Sponsor	Responsible Institutions	Direct Beneficiaries Targeted	Lessons Learned and Key Success Factors
Sustainable Financing for Eastern Caribbean Marine Ecosystems Project **Regional Project** **Period: 2012-2016** **Status: Completed**		GEF, World Bank, The Nature Conservancy	Department of Fisheries, Ministry of Finance	SMMA, DOF, NGOs, CBOs	Lessons Learnt: - Constant communication with senior government officials made the deliverable under this project easier to achieve. - Planning for the changing donor environment by making the objectives of the Saint Lucia National Conservation Fund as broad as possible - Further work needs to be done in the region as this was the first fund of its kind and there must be constant engagement of stakeholders at all levels.
Climate Resilient Eastern Caribbean Marine Managed Area Network (ECMMAN) **Regional Project** **Period: 2013- 2017** **Status: Completed**	The German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) 4 million Euros.	The Nature Conservancy (Grant Awardee) Organisation of Eastern Caribbean States (OECS), United Nations Environmental Programme/ Specially Protected Areas and Wildlife in the Caribbean Region-Regional Activity Centre(UNEP/SPAW-RAC),Caribbean Regional Fisheries Mechanism (CRFM), PCI Media	Saint Lucia National Trust, Ministry with responsible for Fisheries/ Forestry	Nationally, over 100 direct beneficiaries, including fishers (Savannes Bay), Dive operations, staff and members of the Saint Lucia National Trust, Soufriere Marine Management Association,	- Promotion of initiatives that develop/ enhance socio-economic benefits to communities that are ecologically sustainable. - Similar project framework can be implemented in other coastal communities, promoting unique sustainable livelihood opportunities while building ecological resilience. - Creating partnerships and networks both locally (at a site level), nationally and regionally, to help build and maintain support, as well as sharing lessons learnt and creating opportunities to improve.

		Impact (Implementing Partners)		Anbaglo Saint Lucia Dive Association, Staff of Department of Fisheries, Forestry, Community based organisations and members of the communities of Praslin, Savannes, Vieux Fort (Unicrafters, Eco-south Tours)	
Caribbean Aqua Terrestrial Solutions (CATS) **Regional Project** **Period : 2013- 2017** **Status: Completed**	German Federal Ministry for Economic Cooperation and Development	Caribbean Public Health Agency (CARPHA), GIZ	Department of Fisheries; SMMA; Department of Forestry	Direct Beneficiaries SMMA/CAMMA Office and Staff, SMMA BOD; Direct users of SMMA.	- Similar project framework can be implemented in other coastal communities, promoting unique sustainable livelihood opportunities while building ecological resilience. - Creating partnerships and networks locally (at a site level), nationally and regionally, to help build and maintain support, as well as sharing lessons learnt and creating opportunities to improve.
Climate Change Adaptation in the Eastern Caribbean Fisheries Sector (GEF CC4FISH Programme) **Regional Project Period: September 2015 to Dec 2019**	5,460,000 USD under SCCF-A (Adaptation)	GEF	**FAO with DOF and regional partners**	DOF, Members of Fisherfolk Cooperatives	This is an on-going project. Key questions DOF colleagues will need to ask during annual evaluation will be: i. How were the barriers (policy, regulatory, institutional, technical, financial, business and social) addressed? ii. Which part of the project could be further scaled up as the new proposal?

Status: Ongoing					iii. What are the exit strategies of this project i.e. when the project ends in 4 years' time, how will these outcomes and outputs be continued, sustained, scaled up or replicated? iv. How and who (value chain actors) will carry on with these interventions promoted? v. How will the knowledge generated to be managed, shared and sustained?
Ridge to Reef Ecosystem Rehabilitation, Climate Change Adaptation, Improvement in Fish Biomass in two Coastal Communities in Saint Lucia **National Project Period: August, 2016 to Aug 2018** **Status: Ongoing** **(This project initiative is an upscale of the GEF-SGP outlined below)**	816,893 USD	5Cs and KfW (German Development Bank)	5Cs along with Min. Of Agriculture, Min. of Sustainable Development, Min. of Tourism and other relevant private, public and community based organisations including IICA, SMMA	Final Beneficiaries: Canaries and Choiseul - General population of Canaries and Choiseul, - 4 persons chosen to be trained as coral farmers. - Canaries Watershed Farmers - Canaries Village Fisherfolk – Anbaglo, Saint Lucia Dive Association	- It is critical that there is continuous dialogue and consultation with community groups and members so as to encourage support and buy-into project activities and objective(s). It is encouraged that community involvement start at the planning stages of the project and be maintained throughout. - The period 2016- 2017 resulted in little to no project activities being implemented at the two project sites. Late in 2017. - Project implementing agency is currently with the Min. of Agriculture from the Min. of Tourism. To date, very few outputs have been achieved, with the project expected to come to a close as of August 2018.
Towards the establishment of a Multiple Use National Park as an integrated	127,572 USD	GEF SGP USD 44,999	GEF, Canaries Community Improvement Foundation,	Anticipated beneficiaries will be the 4 persons chosen to be	- Extreme weather events affected the project implementation (the passage of hurricane Irma and Maria has attributed to the delay in the hiring and

planning and management framework from ridge to reef and as a means of addressing soil erosion, reducing sewage pollution, practicing coral reef rehabilitation and the development and promotion of livelihoods in the community of Canaries, Saint Lucia. **National Project Period: September 1, 2017 to June 2018 (8 months)** **Status: Ongoing**	along with other relevant public and private sector agencies e.g. Dept. Of Fisheries	trained as coral farmers; 15-20 village residents who benefit from the livelihoods training programmes; the Canabelle Soap making group, who will gain further technical assistance and a new revenue stream through access to vertiver for essential oil production; the CCIF board members who will receive significant capacity training and the landowners and subsistence farmers up the Canaries river valley, whose land will become more resilient to high rain events and flooding.	implementation of coral nursery expert. As a result, this project output was not completed). - It is important to stress how critical it is to actively engage community groups, members and stakeholder agencies throughout project cycle.

Action Plan for enhancing coral reef systems within the Pointe Sables Environmental Protection Area towards building resilience to the impacts of climate change. **National Project** **Period: June 2014 – December 2019** **Status: Ongoing**	500,000 USD	World Bank	Ministry of Finance – Project Coordinating Unit, in collaboration with DSD and proponent agencies	Saint Lucia National Trust	- The development of guidelines for the establishment of coral reef enhancement projects/programmes in Saint Lucia - This pilot could be scaled up to a national coral reef enhancement plan.
Fisheries Early Warning Emergency Response (FEWER) **Regional Project** **Period: February 2017 to June 2018** **Status: Ongoing**		Implemented under the Caribbean Regional Track of the Pilot Programme for Climate Resilience (PPCR) under grant funding from the IDB.	UWI through Mona Office Research and Innovation, CRFM. National DOF, Meteorological Offices	Fishers throughout participating countries	- Access to accurate and reliable data is critical