

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

Under the National Adaptation Planning Process



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

Gift of the United States Government



Implemented by:



Initial funding for the Network also provided by:





Saint Lucia's Sectoral Adaptation Strategy and Action Plan for the Agriculture Sector (Agriculture SASAP) 2018-2028 under the National Adaptation Planning Process

Prepared under the guidance of:

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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.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	4
ACRONYMS	7
1. INTRODUCTION	8
2. SAINT LUCIA’S NATIONAL ADAPTATION PLANNING (NAP) PROCESS	9
3. THE AGRICULTURE SASAP IN THE FRAMEWORK OF SAINT LUCIA’S NAP	9
3.1. Target audience	10
3.2. Scope of the SASAP	10
4. METHODOLOGICAL APPROACH AND SASAP FORMULATION PROCESS	11
5. GENDER CONSIDERATIONS	13
6. SAINT LUCIA’S AGRICULTURE SECTOR	14
7. CLIMATE CHANGE CONTEXT	15
7.1. Climate change projections for Saint Lucia	16
7.2. Climate change implications for Saint Lucia’s agriculture sector.....	17
8. ENABLING ENVIRONMENT FOR CLIMATE ADAPTATION ACTION IN SAINT LUCIA’S AGRICULTURE SECTOR 19	
8.1. National development, climate change and agriculture policy and planning framework	19
8.2. Progress made in the implementation of climate change adaptation activities	20
9. SAINT LUCIA’S SECTORAL ADAPTATION STRATEGY AND ACTION PLAN FOR THE AGRICULTURE SECTOR (AGRICULTURE SASAP) 2018-2028	21
9.1. Strategic goal, objectives and outcomes.....	21
9.2. Implementation and funding of the agriculture SASAP	23
9.3. Monitoring and evaluation	24
10. ADAPTATION MEASURES	24
Outcome 1. Enhanced enabling environment for climate adaptation action in the agriculture sector	25
Strategic objective 1. Improve the national legal, regulatory and institutional framework to facilitate climate adaptation in the agriculture sector	25
Strategic objective 2. Strengthen research and development in climate resilient agriculture to improve access to climate resilient varieties and local inputs (organic fertiliser and natural pesticides).....	26
Strategic objective 3. Enhance human and institutional capacity for the design, implementation, monitoring and evaluation of agriculture-related climate adaptation projects.....	30
Outcome 2. Enhanced nutrition, food availability, quality and security through adaptation in the agriculture sector	31
Strategic Objective 4. Promote climate resilient crop production	31
Strategic Objective 5. Promote climate resilient livestock production	32
Strategic Objective 6. Strengthen resilience and ecosystem services through integrated sustainable land and watershed management.....	33

Strategic Objective 7. Scale up water supply side management by improving rainwater harvesting and water storage infrastructure	34
Strategic Objective 8. Scale up water demand side management by improving water and soil conservation best practices.....	34
Strategic Objective 9. Promote Sustainable Wastewater Management by reducing, reusing and recycling of agro-waste resources	34
Outcome 3. Strengthened partnerships for scaling up climate resilient agriculture	35
Strategic Objective 10. Forge a strong public private partnership to scale up climate resilient agriculture best practices and businesses	35
Strategic Objective 11. Leverage private sector resources by improving access to resilient financial and business supports and best practices for scaling up crop and livestock production.....	35
Outcome 4. Built adaptive capacity to climate variability and extremes in the agriculture sector	36
Strategic Objective 12. Improve agro-meteorological data monitoring, emergency planning and informed decision-making.....	36
Strategic Objective 13. Minimise agriculture-related climate change risks by adopting Ecosystem-based Adaptation solutions	37
Strategic Objective 14. Scale up climate resilient agricultural infrastructure to reduce climate risks	37
11. CONCEPT NOTES FOR CLIMATE CHANGE ADAPTATION PROJECTS IN SAINT LUCIA’S AGRICULTURE SECTOR	38
Project concept 1. Production and marketing of alternative and biological pesticides for the scaling up of climate resilient agriculture in Saint Lucia.....	39
Project concept 2. Strengthening the capacity of the agriculture extension officers to provide timely and reliable support for farmers to adopt and scale up Climate Resilient Agriculture (CRA) businesses.	42
Project concept 3. Climate Resilient Agriculture Demonstration Centre (CRADE): Enabling the transformation of vulnerable groups in 3 subsistence farming communities into competitive national agri-business leaders under a changing climate	45
Project concept 4. Alternative water solutions for building climate resilience in vulnerable groups dependent on rainfed farming	48
Project concept 5. Public sensitisation towards improving the management, conservation and protection of water resources under a changing climate	50
Project concept 6. Building climate resilience in Saint Lucia through the documentation of effective indigenous practices for replication and scale-up, with a focus on sustainable land management, seed storage, pest and disease management	52
Project concept 7. Climate Resilient Agriculture (CRA) Demonstration Farms: Key means to disseminate information for promoting and expanding effective and simple farming solutions to climate-induced challenges	54
Project concept 8. Establishment of the Beausejour Agriculture Station as National Centre of Excellence for Climate Resilient Livestock Production	57
Project concept 9. Undertaking key policy and regulation updates to enable climate change adaptation planning in the agriculture sector.....	60

Project concept 10. Improving climate services in Saint Lucia through the development of a free agro-met mobile app for the country’s farming community	62
Project concept 11. Agricultural diversification and agro-processing for increasing climate resilience in vulnerable farming communities.....	64
12. CONCLUSION	66
13. REFERENCES	67
ANNEX 1. Potential climate change impacts on Saint Lucia’s agriculture sector	69
ANNEX 2. Saint Lucia Climate Change Adaptation Policy (2015)	71
ANNEX 3. Features of significant past, present and approved projects contributing to climate change adaptation in Saint Lucia’s agriculture sector	72

LIST OF TABLES

Table 1. Key policy, legislation and planning instruments for the Agriculture SASAP.

EXECUTIVE SUMMARY

Agriculture has been one of the sectors most severely impacted by extreme weather events in Saint Lucia in recent years. National food production systems have been challenged by multiple hurricanes, droughts, flooding and major landslides. Hurricane Tomas alone, hit Saint Lucia in 2010, just after the country had experienced its worst drought in forty years and caused agricultural losses and damages of around XCD 151.8 million*, from which the agricultural sector has not yet fully recovered. Indeed, climate change poses additional threats to the future of agricultural production on the island.

With climate change, increasing temperatures, changes in precipitation patterns (including more frequent and intense drought episodes), increasing storm intensity (and flooding) and high winds are anticipated, all with serious negative effects on food production in Saint Lucia. It is expected that climate change will further increase water demand (and reduce supply with more frequent drought), worsen the incidence of pests, weeds and disease; change the suitability of agricultural land for crop production and exacerbate current land degradation processes.

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 now, the adaptation actions necessary to build climate-resilient and sustainable agricultural systems that can improve national food security and nutrition in the short and long term. At the same time, efforts can help reduce greenhouse gas emissions by increasing carbon stocks in terrestrial systems and enhancing resource use efficiency.

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 Agriculture SASAP, here presented, is one of the first three of the NAP's SASAPs targeted in 2017* and has been designed on a similar ten-year framework for action to overcome barriers and

* Equivalent to approximately USD 56.94 million

* In 2015, a National Adaptation Strategy and Action Plan for the Tourism Sector¹⁰ was developed.

facilitate the adoption and scaling up of climate-resilient agriculture in Saint Lucia. The Agriculture SASAP, funded with the support of the United States In-Country NAP Support Program, through the NAP Global Network, builds on previous efforts and projects, and is the product of an in-depth contextual analysis and search for potential effective solutions to the country's agriculture-related challenges with climate change, supported by a multi-stakeholder consultative process which started in 2017.

The Agriculture SASAP consists of 45 adaptation measures deemed critical for building climate resilient agriculture systems in the country. 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 fourteen strategic objectives and contribute to four major expected outcomes, namely:

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

Strategic objectives:

1. Improve the national legal, regulatory and institutional framework to facilitate climate adaptation in the agriculture sector
2. Strengthen research and development in climate resilient agriculture to improve access to climate resilient varieties and local inputs (organic fertiliser and natural pesticides)
3. Enhance human and institutional capacity for the design, implementation, monitoring and evaluation of agriculture-related climate adaptation projects

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

Strategic objectives:

4. Promote climate resilient crop production
5. Promote climate resilient livestock production
6. Strengthen resilience and ecosystem services through integrated sustainable land and watershed management
7. Scale-up water supply side management by improving rainwater harvesting and water storage infrastructure
8. Scale up water demand side management by improving water and soil conservation best practices
9. Promote sustainable wastewater management by reducing, reusing and recycling of agro-waste resources

Outcome 3: Strengthened partnerships for scaling up climate resilient agriculture

Strategic objectives:

10. Forge a strong public private partnership to scale up climate resilient agriculture best practices and businesses
11. Leverage private sector resources by improving access to resilient financial and business supports and best practices for scaling up crop and livestock production

Outcome 4: Built adaptive capacity to climate variability and extremes in the agriculture sector

Strategic objectives:

12. Improve agro-meteorological data monitoring, emergency planning and informed decision-making
13. Minimise agriculture-related climate change risks by adopting Ecosystem-based Adaptation solutions
14. Scale up climate resilient agricultural 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 contains 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 project concept notes, all aligned with the outcomes, objectives and measures defined in the SASAP.

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

ACRONYMS

AR5	Fifth Assessment Report
CAFF	Climate Adaptation Financing Facility
CARPHA	Caribbean Public Health Agency
CCAP	Climate Change Adaptation Policy
5Cs	Caribbean Community Climate Change Centre
CDB	Caribbean Development Bank
CEHI	Caribbean Environmental Health Institute
CFL	Consolidated Foods Limited
CIMH	Caribbean Institute for Meteorology and Hydrology
CO ₂	carbon dioxide
CSO	Civil Society Organisation
CSR	corporate social responsibility
DSD	Department of Sustainable Development
EbA	Ecosystem-based Adaptation
ENSO	El Niño Southern Oscillation
EU	European Union
GCCA	Global Climate Change Alliance
GCF	Green Climate Fund
GCM	Global Circulation Model
GDP	Gross Domestic Product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GoSL	Government of Saint Lucia
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
J-CCCCP	Japan Caribbean Climate Change Partnership
M&E	Monitoring and Evaluation
MoA	Ministry of Agriculture
MoU	Memorandum of Understanding
MTDS	Medium-Term Development Strategy
NAP	National Adaptation Plan
NCCC	National Climate Change Committee
NGO	Non-Governmental Organisation
OECS	Organisation of Eastern Caribbean States
RCM	Regional Climate Model
SASAP	Sectoral Adaptation Strategies and Action Plans
SDED	Sustainable Development and Environment Division
SDG	Sustainable Development Goals
SIDS	Small Island Developing State(s)
SLR	Sea Level Rise
SPCR	Strategic Programme for Climate Resilience
SRES	Special Report on Emission Scenarios
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar
V&A	Vulnerability and Adaptation
WASCO	Water and Sewerage Company Inc.
WRMA	Water Resources Management Agency
XCD	Eastern Caribbean Dollar

1. INTRODUCTION

Agricultural production will have to increase by 60% in the coming decades to satisfy, by 2050, the demands for food and feed of 9 billion people.^{1,2} However, land available for agriculture is limited and the required boost in global food production will have to occur while the sector copes with the negative effects of climate change and reduces its large global carbon footprint. These are major and interconnected challenges that must be addressed simultaneously and require a transformation in food production systems. The transformation entails that millions of food producers adapt to climate change. Transformation also necessitates a reversal to the widespread degradation of agriculture's natural resource base, including water and soils, which threatens the sustainability of food production.³

Adaptation strategies will make a major contribution in reshaping the future severity of climate change impacts on global, national and local food production. It is therefore of paramount importance to plan and start implementing now, the adaptation actions necessary to build climate-resilient and sustainable agricultural systems that will improve national food security and nutrition in the short and long term, while reducing greenhouse gas emissions (by increasing carbon stocks in terrestrial systems and enhancing resource use efficiency). Those actions are aligned with the 2030 development agenda contribute directly to the achievement of the Sustainable Development Goals (SDG) 2 (end hunger, achieve food security and improved nutrition and promote sustainable agriculture); and 13 (take urgent action to combat climate change and its impacts); and indirectly to the attainment of most other SDGs.

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, including agriculture, 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 2100.⁴ **Annex 1** provides a non-exhaustive summary of potential climate change impacts on the agriculture sector.

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 a 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 priority 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 AGRICULTURE SASAP IN THE FRAMEWORK OF SAINT LUCIA'S NAP

The Agriculture 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 agriculture sector, and to build the necessary capacities of all relevant actors to develop climate-resilient and sustainable food production systems and value chains. The Agriculture 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 Agriculture Sector is to overcome the barriers (policy, regulatory, institutional, technical, financial, business and social) to facilitate the adoption and scaling up of climate resilient agriculture best practices and businesses for enhancing food and nutrition security in Saint Lucia under a changing climate.

This document presents an overview of the main challenges that climate change poses to agriculture in Saint Lucia. It offers, through the SASAP, a series of 45 prioritised and concrete agriculture-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), various stand-alone project concept notes directly related to the SASAP's adaptation measures are included. In the SASAP, the measures respond to 14 strategic objectives and 4 major outcomes, all aligned with the CCAP's implementation elements (facilitation, implementation and financing).

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

3.1. TARGET AUDIENCE

The Agriculture SASAP will offer guidance to decision-making processes related to climate change adaptation in Saint Lucia's agriculture sector during the next 10 years. This includes, among others, decisions on investments and activities for the promotion, replication and scaling up of climate resilient best farming practices; agribusiness development; the efficient use of water in agriculture; improving access to financial products and services for farmers; the construction of agricultural infrastructure; promoting and implementing integrated and sustainable land and watershed management systems and improving land use governance in the country.

This SASAP targets policy makers and managers in the agriculture sector. 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 farming activities or agricultural value chains, 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 agriculture could have on other sectors; or actions other sectors could have on agriculture, 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 Agriculture SASAP has been designed to:

- Include investment priorities that contribute to the SASAP's overarching goal of overcoming existing barriers and facilitating the adoption and scaling up of climate resilient agriculture.
- 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 specifically included in the SASAP. Nevertheless, the SASAP promotes projects and programmes that catalyse private-sector investments and increase non-state party participation in general.

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 Agriculture SASAP followed an inclusive, participative and interactive approach. It was possible, primarily as a result of the efforts made by the Department of Agriculture, Fisheries, Natural Resources and Cooperatives (DoA), 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 multisectoral National Climate Change Committee (NCCC).

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

1. **Review of development, agriculture 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 Communication to the United Nations Framework Convention on Climate Change (UNFCCC) (2012 and 2017 respectively)⁵, the State of Environment Report (2015)⁶, the Green Economy Scoping Study for Saint Lucia (2016)⁷, the Vulnerability and Adaptation Assessment Report elaborated in the framework of the Second National Communication to the UNFCCC (2010)⁸, the Food and Nutrition Security Policy and Action Plan (2013),⁹ and the Impact Assessment and National Adaptation Strategy and Action Plan to Address Climate Change in the Tourism Sector of Saint Lucia (2015)¹⁰. An initial list of 45 priority climate adaptation measures identified as critical for the sector was 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. Some of the adaptation measures presented also offer mitigation co-benefits, and this is aligned with, and promoted by, the CCAP. Examples of this are the use of solar pumps and drip irrigation for precision farming and the application of agroforestry and permaculture best practices for

agricultural production and carbon sequestration. Also in alignment with the CCAP, the identified measures were classified into facilitation, implementation and financing categories (see **Annex 2**).

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 to be noted 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 DSD, 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 DoA 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 Agriculture SASAP (**Section 10**).

In addition, sessions were held with farmers and other local actors involved in the agriculture 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 all of 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 DoA. The concept notes received were reviewed, those deemed to be

aligned to, and fundable under, the SASAP were further developed and when appropriate merged. The final set of stand-alone project concept notes prepared to date, is presented in **Section 11**.

5. **Formulation of the Agriculture 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 agriculture. 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 Agriculture SASAP was finalised and shared with sectoral stakeholders for review in anticipation of a 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.
6. **Preparation of the second and final version of the final SASAP document.** The second version of the Agriculture SASAP document integrated the comments received during the SASAP and NAP validation workshops and was submitted to all the stakeholders consulted for final comments. These were integrated in the SASAP's final version.

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.¹¹ However, this gap decreased to 4% in 2012¹², 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 Agriculture, women and youth participate in all activities of their choice; there are many female farmers providing leadership in the sector at the community and sector levels; women actively participate in Farmer Field School exercises and are highly recognised for their skills at making observations in the field that might require the attention of the agriculture extension staff (Graham, 2015).

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, four 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, for whom no clear policy strategy has been formulated in agriculture (Graham, 2015), 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 AGRICULTURE SECTOR

Agriculture in Saint Lucia is predominantly small scale, with the average farm size estimated at 3 acres. It is conducted on lands of varying soil types and topography and is dominated by traditional rain-fed production systems, with limited use of modern technologies (Agriculture Policy, 2017)*.

Agriculture provides 21% of Saint Lucia's total employment (2012) and continues to be an important productive sector for the country although its contribution to the Gross Domestic Product (GDP) has steadily decreased in the past decades, from 13.85% 1990 to 3% of in 2015,¹³ largely due to damages caused by natural disasters, pests and diseases.¹⁴ Saint Lucian banana production for export, despite also contracting, continues to dominate the sector. It occupies 48% of the cultivated land, accounts for 41.4%⁵ of gross agricultural output and, in 2015, total banana exports reached 14,787 tonnes. Other tropical fruit, coconut, cocoa, vegetables and herbs, tree crops and cut flowers are also cultivated. The livestock sector is small and dominated by the poultry and pork sub-sectors.¹⁵

Agriculture has been one of the sectors most severely impacted by extreme events in the country in recent years. Farmers have been challenged by multiple hurricanes, droughts, flooding and major

* Agriculture Policy Framework and Strategy (2016 to 2021).

landslides. Hurricane Tomas alone, hit Saint Lucia in 2010, just after the country had experienced its worst drought in forty years and caused agricultural losses and damages of approximately XCD 151.8 million¹⁶ (around USD 56.9 million), from which the sector has not yet fully recovered. In addition to direct impacts, it is reported that after the hurricane, local farmers also observed a marked increase in the incidence of disease affecting some crops.¹⁷

Farmers recognise the damages caused by extreme weather events (hurricanes, storms, intense rainfall and strong winds) and changing and unpredictable weather systems as the principal causes of vulnerability in their sector vis-à-vis climate change.¹⁷ In fact, in 2011, after Hurricane Tomas, the number of active farmers fell by about 500 from the existing 1,500 in 2010. This situation adds to the reduction in farming populations in the country already recorded in the latest agricultural census (2007)¹⁸ and linked to the abandonment of farmlands, the loss of prime agricultural lands to physical development, and to urban migration; as displaced agricultural workers seek employment in the tourism and construction sectors.^{5,6}

The 2007 Agricultural Census found that between 1986 and 2007, the population living in farm holding households had declined in both absolute and relative terms (from 47% of the national population to about 21%) and the total area in agricultural holdings declined drastically (by 41%), with more than 70% of the farms operating more than 100 acres in 1996, disappearing by 2007. However, the census recorded a small increase in the number of farms of less than 1 acre of area and also in the number of women operating agricultural holdings. With the exception of pigs and poultry, the major decline in farming population and holdings recorded since 1996 was also reflected in the lower total number of heads of grazing livestock kept in the country, although at the time of the last census, the fewer existing holdings had greater livestock numbers.¹⁸

In addition to the decreased number of agricultural land holdings, declining agricultural land holding household population, climate-related impacts, pests and diseases, the sector faces multiple other challenges, such as lack of financial investment and support for farmers and an inadequate research and systematic observation framework, which result in inadequacy of data to support planning processes.^{8,9, 15, 17}

7. CLIMATE CHANGE CONTEXT

As recognised in Saint Lucia's CCAP, 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.¹⁹

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 2100.⁴ 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.¹⁹ 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.⁵ 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 indicate general trends of increasing mean annual temperatures and decreasing precipitation amounts with climate change in Saint Lucia.**^{5,10,20} For the sake of simplicity, the results of the climate projections produced by CARIBSAVE (2012)²⁰ 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).

* In the National Adaptation Strategy and Action Plan for the Tourism Sector (2015),¹⁰ 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 (2017)⁵ 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.

In 2012, the CARIBSAVE Partnership published *Climate Change Risk Profile for Saint Lucia*,²⁰ 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 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).

The rate of **sea level rise** is difficult to calculate as new evidence suggests that the contribution of ice sheet melting to global sea level rise will be greater than considered in IPCC projections. This increases the range of potential mean sea level rise in the Caribbean from 0.18-0.56m (IPCC for an SRES A2 scenario) **to up to 1.45m by 2100**,²¹ relative to the 1989-1999 baseline. It has been established that in the northern Caribbean, sea level rise could be 25% higher than the global average due to physical factors affecting land elevation.²²

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

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

Agriculture is highly exposed to the impacts of climate-related hazards, with extended drought, flooding and other weather extremes (including tropical storms) causing substantial damage and exacerbating soil degradation (erosion) processes. For example, the drought of 2010 and 2011 accounted for a reduction of 15% in banana exports during the first semester of 2010 alone. Hurricane Tomas, also in 2010, caused damages of around XCD 151.8 million (approximately USD 56.2 million) in the agricultural sector.¹⁶ The flooding, and to a lesser extent, the winds of the hurricane, destroyed

entire banana fields and reduced production in the following years. Although various projects, grants and subsidies have been initiated by the government to support the affected farmers, the agricultural sector is still recovering from the effects of the hurricane.

Climate change is expected to affect Saint Lucia's agricultural production, mainly through the direct effects on crop production of increasing temperatures, changes in precipitation patterns (including more frequent and intense drought episodes), increasing storm intensity (and flooding) and high winds. With higher temperatures, climate change could also increase water demand (and reduce supply with more frequent drought) and increase the incidence of pests, weeds and disease. With changes in temperature and precipitation, shifts in the crop suitability of agricultural land are also to be expected. In addition, climate change may as well aggravate land degradation processes (erosion). While some areas may be impacted by sea level rise (e.g. salt water intrusion into freshwater supplies), a 2011 study indicated that sea level rise is not expected to significantly affect Saint Lucia's agricultural production.²³

An analysis of the economic and social impacts of climate change in the Caribbean²⁴ indicates that the region could see a loss of up to USD 87 million in agricultural income from decreased production of five major crops by the 2020s and of up to USD 272 million by the 2050s. The study also shows that the yields of bananas and plantains in the region could decline between 12 and 20% by the 2020s and between 20 and 32% by the 2050s.²⁴

Climate change is also expected to directly impact livestock production through heat stress and indirectly, through the deterioration of pastures for grazing, reduced water availability and increased disease outbreaks. These impacts could be expressed as reduced feed intake, reduced fertility levels, increased sweating and panting, weight loss and increased mortality. Consequently, milk, egg and meat production are also expected to decline. Poultry and birds have shown the greatest vulnerability to increasing temperatures and local farmers have to date, sustained considerable losses as a result of heat related illnesses.¹⁷

As Saint Lucia is a major food importer, local, regional and global changes in food production and availability could increase food prices and reduce the access to food of poor and vulnerable segments of the population. Further, increasing production costs could make small-scale farming impossible, and eliminate the agriculture-based livelihoods of entire farming communities.¹⁷

In view of the above information, securing Saint Lucia's economic growth and development in the near, middle and long-term, requires not only a good understanding of existing and emerging agriculture challenges, but also, the collaboration of stakeholders in strategically planning and implementing urgent actions to build climate resilience in the agriculture and associated sectors. Of key relevance are actions geared towards strengthening the resilience of the farms and farmers, protecting the integrity of the productive assets and resources (land, soil, forest, watershed and rivers), ensuring national food security and protecting lives, health and property.

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

8.1. NATIONAL DEVELOPMENT, CLIMATE CHANGE AND AGRICULTURE 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.^{25,26}

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 ratified 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 2**). 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.

The most important instrument related to agriculture in Saint Lucia is the National Agricultural Policy (2009 – 2015) and its successor, the Draft Agricultural Policy Framework and Strategy (2016 - 2021), currently under review. The **Draft Agricultural Policy Framework and Strategy (2016 - 2021)** is built on 11 key strategic priority areas, each with individual policy goals, strategic objectives and policy instruments. While all priority areas relate to the Agriculture SASAP, Priority Area 11: Disaster Risk Reduction and Climate Change Adaptation, is of direct relevance to its implementation.

The GoSL has also formulated a considerable number of additional policies, laws and regulations that relate either directly or indirectly to agriculture and climate change adaptation and thus, to the Agriculture SASAP. These are listed in **Table 1**.

Table 1. Key Policy, legislation and planning instruments for the Agriculture SASAP.*

Policies	
<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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)

* This list is indicative only

<ul style="list-style-type: none"> • National Environmental Policy & National Environmental Management Strategy (NEP/NEMS) (2005, revised in 2014) 	<ul style="list-style-type: none"> • National Wastewater Policy and Strategic Plan (2017, awaiting adoption)
Planning Instruments	
<ul style="list-style-type: none"> • National Vision Plan (2008) • MTDS (2018-2021) • MTDS (2012-2016) Sectoral Action Plan • The National Action Plan to Combat Desertification/Land Degradation (2008) • The National Avian Influenza Plan (2009) 	<ul style="list-style-type: none"> • Strategic Programme for Climate Resilience (SPCR) • National Biodiversity Strategy and Action Plan (under review) • Framework for Integrated Environmental Management in Saint Lucia (2005)
Legislation	
<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • Beach Protection Act (1967 and Amendment of 1987) • Land Conservation and Improvement Act (1992) • Wildlife Protection Act (1980) • 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	
<ul style="list-style-type: none"> • Estimates of Revenue and Expenditure (2016-2017) 	<ul style="list-style-type: none"> • Estimates of Revenue and Expenditure (2017-2018)

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 below). In the past years, various important projects for climate change adaptation in the water sector have also taken place, with some of them still ongoing and others approved, but not started. Some of the most relevant of these projects are listed in **Annex 3**.

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

Most common adaptation initiatives undertaken in Saint Lucia between 2012 and 2017.

Source: GoSL, 2017⁵

- Development of climate-proof sectoral policies and strategies;
- 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 AGRICULTURE SECTOR (AGRICULTURE SASAP) 2018-2028

In the framework of Saint Lucia's NAP process, the Agriculture SASAP offers guidance on key investments and interventions (technical, institutional, regulatory) required between 2018 and 2028 for overcoming existing barriers and facilitating the adoption and scaling up of climate resilient agriculture in the country.

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 agriculture 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 policy; and builds on the progress made in, and the lessons learned from, the implementation of agriculture-related adaptation projects in Saint Lucia.

This Strategy and Action Plan consists of 45 adaptation measures that are deemed critical to promote and scale-up climate resilient agriculture in the country. The measures, endorsed by relevant stakeholders through consultation, offer solutions to information, technical, institutional, financial, regulatory and policy limitations hampering adaptation in the agriculture sector. In the SASAP, the adaptation measures and their indicative outputs are grouped under 4 major outcomes and 14 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 -for details see **Annex 2**). 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 Agriculture Sector is to overcome the barriers (policy, regulatory, institutional, technical, financial, business and social) to facilitate the adoption and scaling up of climate resilient agriculture best practices and businesses for enhancing food and nutrition security in Saint Lucia under a changing climate.

To accelerate progress towards the achievement of this goal, the Agriculture SASAP has defined 14 strategic thematic objectives, grouped under four main outcomes, as follows:

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

Strategic objectives:

1. Improve the national legal, regulatory and institutional framework to facilitate climate adaptation in the agriculture sector
2. Strengthen research and development in climate resilient agriculture to improve access to climate resilient varieties and local inputs (organic fertiliser and natural pesticides)
3. Enhance human and institutional capacity for the design, implementation, monitoring and evaluation of agriculture-related climate adaptation projects

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

Strategic objectives:

4. Promote climate resilient crop production
5. Promote climate resilient livestock production
6. Strengthen resilience and ecosystem services through Integrated Sustainable Land and Watershed Management
7. Advance water supply side management by improving rainwater harvesting and water storage infrastructure
8. Scale up water demand side management by improving water and soil conservation best practices
9. Promote sustainable wastewater management by reducing, reusing and recycling of agro-waste resources

Outcome 3: Strengthened partnerships for scaling up climate resilient agriculture

Strategic objectives:

10. Forge a strong public private partnership to scale up climate resilient agriculture best practices and businesses
11. Leverage private sector resources by improving access to resilient financial and business supports and best practices for scaling up crop and livestock production

Outcome 4: Built adaptive capacity to climate variability and extremes in the agriculture sector

Strategic objectives:

12. Improve agro-meteorological data monitoring, emergency planning and informed decision-making
13. Minimise agriculture-related climate change risks by adopting Ecosystem-based Adaptation solutions
14. Scale up climate resilient agricultural infrastructure to reduce climate risks

9.2. IMPLEMENTATION AND FUNDING OF THE AGRICULTURE SASAP

The DoA is charged with the responsibility of leading, overseeing the implementation of the Agriculture SASAP, and of using it to inform and guide its own activities. In its leading role, it is also expected that the DoA 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 agriculture (e.g. supporting WRMA in the implementation of measures to reduce pollution of water sources to ensure long-term water availability by executing actions to prevent water pollution from farming activities). 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 agriculture and agriculture-related sectors 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, nonetheless, 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 these sectors.

In view of the above considerations, it is the intention, in the coming years, and to the maximum extent possible, for elements of the Agriculture 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 Agriculture 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 Agriculture SASAP is a building block. It is necessary to design and put in place a monitoring plan for the implementation of the Agriculture 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 agencies will report to the NCCC on the progress and revisions made to the implementation of the Agriculture SASAP, for inclusion of the relevant information in the NAP M&E system.

10. ADAPTATION MEASURES

This section presents Saint Lucia's Agriculture 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 3**) 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 AGRICULTURE SECTOR

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

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
<p>1 Integrate SLR and land use strategies into the Agriculture Policy Framework and Strategy (2016 to 2021)</p>	<p>Medium Term (2021 to 2024)</p>	<ul style="list-style-type: none"> - Assessment study on expected sea-level rise impacts and associated land use strategies for Saint Lucia conducted and used to inform appropriate changes to the draft Agriculture Policy Framework and Strategy - SLR and land use strategies incorporated into the Agriculture policy and Strategy. 	<p>Facilitation</p>
<p>2 Implement Land Policy to enable land zoning to safeguard quality agricultural lands and identify lands best suited for the production of specific crops</p>	<p>Medium Term (2021 to 2024)</p>	<ul style="list-style-type: none"> - Study to determine land suitability for key crops conducted and used to inform the implementation of the Land Policy. - Roadmap to implement the Land Policy developed and endorsed. - Lobby undertaken for the endorsement and implementation of the Land Policy. 	<p>Facilitation</p>
<p>3 Relocate production areas/farms to lands with high agricultural capability and productivity</p>	<p>Medium Term (2021 to 2024)</p>	<ul style="list-style-type: none"> - Assessment on the needs, gaps, opportunities and challenges for the relocation of production areas/farms to lands with good agricultural capability conducted and endorsed. - Trials conducted with farmers to relocate production areas/farms to lands with good agricultural capability. 	<p>Facilitation and implementation</p>

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
4 Recover and improve abandoned agricultural lands including diversification	Medium Term (2021 to 2024)	<ul style="list-style-type: none"> - Mapping of abandoned agricultural lands conducted. - Study analysing opportunities to utilise, improve and recover these lands conducted. 	Facilitation
5 Revise, update and enforce regulations to govern the production of crops and livestock adjacent to aquifers and waterways based on best practices	Medium Term (2021 to 2024)	Regulation to govern the production of crops and livestock adjacent to waterways assessed, revised, updated and enforced	Facilitation

STRATEGIC OBJECTIVE 2. STRENGTHEN RESEARCH AND DEVELOPMENT IN CLIMATE RESILIENT AGRICULTURE TO IMPROVE ACCESS TO CLIMATE RESILIENT VARIETIES AND LOCAL INPUTS (ORGANIC FERTILISER AND NATURAL PESTICIDES)

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
6 Establish an “Enhanced-Value Chain Business Development Centre” to develop and promote Climate Resilient Agriculture (CRA) best practices and businesses (e.g. Soufriere, Region 6)	Short Term (2018 to 2021)	Enhanced-Value Chain Development Centre to develop and promote CRA best practices and businesses (e.g. Soufriere) selected, established and operational.	Facilitation and implementation
7 Study and implement agro-biodiversity benefits (e.g. mixed species planting, intercropping, beneficial plants that attract beneficial insects)	Short Term (2018 to 2021)	<ul style="list-style-type: none"> - Study on the agro-biodiversity benefits in strengthening farm resilience, yield and farmers’ income conducted, published and disseminated. - Awareness raising campaigns on the benefits of agro-biodiversity, based on the study conducted. - Communication products and services developed and published to train farmers on agro-biodiversity practices and raise awareness of the benefits of their benefits among value chain actors. 	Facilitation and Implementation

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
8 Conduct research on environment friendly and integrated pest/disease management systems for crops and livestock. Research produce and market natural pesticides (e.g. indigenous entomo* -pathogenic fungi) as alternative to imported chemicals	Short Term (2018 to 2021)	<ul style="list-style-type: none"> - Research on environment friendly and integrated pest/disease management systems for crops and livestock and the production and marketing of natural pesticides (e.g. indigenous entomo-pathogenic fungi) conducted. - Best environment-friendly pest/disease management systems identified piloted and commercialised. - Awareness raising campaign on the hazards of chemical pesticides conducted. 	Facilitation and Implementation
9 Introduce/adapt and promote the cultivation and conservation of alternative/diversified and climate resilient varieties of crops, animals and pastures	Short Term (2018 to 2021)	<ul style="list-style-type: none"> - Alternative/diversified and climate resilient varieties of crops, animals and pastures identified or developed/introduced and tested. - Production and marketing strategies for the best alternative crops, animals and pastures developed and implemented. 	Facilitation and Implementation
10 Introduce alternative heat and drought tolerant crop varieties; crop varieties with a higher harvest index (improving water use and irrigation efficiency); non-transgenic, where possible	Short Term (2018 to 2021)	<ul style="list-style-type: none"> - Alternative heat and drought resistant crop varieties; crop varieties with a higher harvest index (making irrigation more effective) introduced, tested and promoted. - Risk assessment conducted, and regulations established if genetically modified varieties are used. - Production and marketing strategies for the best alternative crops, animals and pastures developed and implemented. 	Facilitation and Implementation

* Of an insect.

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
11 Sustainably cultivate and conserve heirloom species	Long Term (2024 to 2028)	<ul style="list-style-type: none"> - Study on heirloom species in Saint Lucia conducted. The study should include a list of heirlooms, the conditions under which the species grow/are grown and suitable areas for production, an analysis of the market potential for the most promising (and marketable) species/varieties as well as recommendations for their sustainable cultivation. - Pilot tests of sustainable heirloom cultivation based on the recommendations of the study conducted. - Training on sustainable heirloom cultivation delivered to interested farmers. 	Facilitation and Implementation
12 Introduce/adapt for cultivation of more salt-tolerant/resistant crops and pastures	Short Term (2018 to 2021)	<ul style="list-style-type: none"> - Study to identify, multiply and market more salt-tolerant/resistant crops and pastures conducted, endorsed and published. - Risk assessment conducted, and regulations established if genetically modified varieties are used. - Production and marketing strategies developed and operational. 	Facilitation and Implementation
13 Promote and implement in-situ and ex-situ conservation measures for vulnerable agricultural species	Short Term (2018 to 2021)	<ul style="list-style-type: none"> - Study to identify and protect vulnerable agricultural species conducted - Programme to establish in-situ and ex-situ conservation measures for vulnerable agricultural species developed and executed. 	Facilitation and Implementation

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
14 Establish germplasm of hardy native species/underutilised indigenous species (herbal/medicinal) to be used for habitat or species restoration (agro-forestry measure)	Short Term (2018 to 2021)	<ul style="list-style-type: none"> - Study to identify and improve hardy native species/underutilised indigenous species (herbal/medicinal) to be used for habitat or species restoration conducted and endorsed. - Germplasm bank of hardy native species/underutilised indigenous species (herbal/medicinal) established. 	Facilitation
15 Strengthen quarantine services, monitor, control and where possible eradicate invasive species	Short Term (2018 to 2021)	<ul style="list-style-type: none"> - Study to monitor, control and regulate (quarantine) invasive species to reduce competition conducted, and disseminated. - Knowledge and communication products and services developed and published to train and raise awareness for farmers and value chain actors. 	Facilitation and Implementation
16 Improve soil testing and apply corresponding soil amelioration measures (e.g. leaching with fresh water)	Long Term (2024 to 2028)	<ul style="list-style-type: none"> - Facilities for soil testing equipped and staffed - Technical and financial feasibility study on the research to apply on soil amelioration measures (e.g. leaching with fresh water) conducted and reported 	Facilitation
17 Develop and adopt alternative production systems such as aquaculture, mariculture, hydroponics and aquaponics following CRA best practices	Medium Term (2021 to 2024)	<ul style="list-style-type: none"> - Barriers for the scaling up of alternative production systems such as aquaculture, mariculture, hydroponics and aquaponics studied and identified. - Financial and business models to scale up alternative production systems such as aquaculture, mariculture, hydroponics and aquaponics developed, tested, adopted and scaled up. 	Facilitation and Implementation

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
		- Feasibility study to use solar for pumping and fertigation* to reduce operation cost tested and promoted.	

STRATEGIC OBJECTIVE 3. ENHANCE HUMAN AND INSTITUTIONAL CAPACITY FOR THE DESIGN, IMPLEMENTATION, MONITORING AND EVALUATION OF AGRICULTURE-RELATED CLIMATE ADAPTATION PROJECTS

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
18 Set up demonstration plots showcasing climate resilient farming techniques. Facilitate farmers training on climate resilient agriculture through farmer field schools. Develop training for new and existing extension officers using non-private lands or Memoranda of Understanding.	Short Term (2018 to 2021)	<ul style="list-style-type: none"> - Demonstration plots showcasing climate resilient farming techniques established and operational. - Farmers training on climate resilient agriculture facilitated through farmer field schools. - Knowledge and communication products and services developed and promoted. - Training for new and existing extension officers conducted and certified. 	Facilitation and Implementation

* Injection of fertilizers, soil amendments, and other water-soluble products into an irrigation system.

OUTCOME 2. ENHANCED NUTRITION, FOOD AVAILABILITY, QUALITY AND SECURITY THROUGH ADAPTATION IN THE AGRICULTURE SECTOR

STRATEGIC OBJECTIVE 4. PROMOTE CLIMATE RESILIENT CROP PRODUCTION

	Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
19	Strengthen implementation of Good Agriculture Practices (GAP) and permaculture best practices to strengthen climate change resilience	Short Term (2018 to 2021)	<ul style="list-style-type: none"> - Best climate resilience-building permaculture and GAP identified, developed, improved and adopted by farmers. - Knowledge and communication products and services to train and raise awareness on these practices among farmers and value chain actors developed and published. 	Implementation
20	Adopt CRA best practices to extend the use of soil and water and energy-efficient conservation measures (mulching, appropriate terracing, drip irrigation, solar pump, wind power, etc) to reduce water losses and erosion	Short Term (2018 to 2021)	<ul style="list-style-type: none"> - CRA best practices to extend the use of soil and water conservation measures (mulching, appropriate terracing, drip irrigation, solar pump, etc) and reducing water losses and soil erosion identified, tested, promoted and adopted by farmers - Knowledge and communication products and services to train and raise awareness for value chain actors developed and used 	Implementation
21	Develop, test and scale up (through viable financial business models) technologies for controlled environment production (e.g. cold	Short Term (2018 to 2021)	<ul style="list-style-type: none"> - Controlled environment production technologies appropriate for Saint Lucia, identified, developed/adapted, tested and adopted. - Viable business models established for engaging the private sector in the production/import of the elements required for the technologies. 	Implementation

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
frames,* greenhouses/polytunnel** with plastic and polycarbonate)		- Competitive financial products and services established to scale up the adoption of technologies by farmers.	
22 Adopt, cultivate and market alternative cash crops (e.g. fat poke, cashew, beets, dwarf coconuts)	Short Term (2018 to 2021)	- Study for the identification of promising alternative cash crops conducted. - Most promising alternative cash crops tested and promoted for farming livelihood diversification, and income.	Facilitation and Implementation
23 Improve cropping sequences for short term crops in collaboration with farmer networks	Short Term (2018 to 2021)	Study to test various cropping sequences for short term crops undertaken, best results disseminated and promoted.	Facilitation and Implementation
24 Identify and adopt alternative agricultural management practices that improve water efficiency of livestock	Short Term (2018 to 2021)	Alternative agricultural management practices that improve water efficiency of livestock are identified, tested and scaled up.	Implementation

STRATEGIC OBJECTIVE 5. PROMOTE CLIMATE RESILIENT LIVESTOCK PRODUCTION

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
25 Develop, adopt and scale up feed conservation techniques e.g. zero grazing for livestock (use of “cut and carry” technique or imported feed) and fodder banks to reduce need for extensive grazing and potential for soil erosion	Short Term (2018 to 2021)	- Feed conservation techniques e.g. zero grazing for livestock (use of “cut and carry” technique or imported feed) identified and promoted. - Fodder banks to reduce need for extensive grazing and potential for soil erosion established and operational.	Implementation

* Transparent-roofed enclosure, built low to the ground, used to protect plants from adverse weather, primarily excessive cold or wet.

** Tunnel typically made from steel and covered in polythene, usually semi-circular, square or elongated in shape.

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
26 Develop, promote and implement the most cost effective semi intensive production systems (e.g. rotational grazing) to encourage pasture growth and organic matter production for improved pasture productivity and heat stress reduction (shade trees/shed, sprinklers)	Short Term (2018 to 2021)	<ul style="list-style-type: none"> - Study conducted to identify the most appropriate and cost-effective efficient semi intensive production systems (e.g. rotational grazing) to encourage pasture growth and organic matter production in Saint Lucia. - Most appropriate production systems promoted and adopted by farmers for improving productivity of pasture lands and reducing heat stress (shade trees/shed, sprinklers). - Effectiveness of the semi intensive production systems implemented monitored. 	Implementation
27 Develop, adopt and scale up climate resilient pasture management e.g. alter stocking distribution using watering points and fences, fodder banks	Medium term (2021 to 2024)	Climate resilient pasture management practices tested, and disseminated among livestock farmers with support from extension officers	Implementation

STRATEGIC OBJECTIVE 6. STRENGTHEN RESILIENCE AND ECOSYSTEM SERVICES THROUGH INTEGRATED SUSTAINABLE LAND AND WATERSHED MANAGEMENT

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
28 Adopt a watershed management planning approach for zoning (e.g. within agroforestry system)	Short Term (2018 to 2021)	Watershed management planning approach for zoning (e.g. within agroforestry system) adopted, promoted and scaled up.	Implementation

STRATEGIC OBJECTIVE 7. SCALE UP WATER SUPPLY SIDE MANAGEMENT BY IMPROVING RAINWATER HARVESTING AND WATER STORAGE INFRASTRUCTURE

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
29 Construct climate resilient infrastructure to improve water supply and storage for crops and livestock production (e.g. dams, water storage tanks) and improve farm drainage infrastructure, storm drains, cultivation and harvesting practices to reduce impacts of soil waterlogging stress during heavy precipitation periods	Short Term (2018 to 2021)	Infrastructure to improve water supply and storage for crops and livestock production (e.g. dams, water storage tanks) constructed/installed and operational through programmes designed to promote climate resilient farming. The programmes should also consider improving farm drainage infrastructure.	Implementation
30 Adopt new water capture technologies and retrofit damaged water infrastructure (e.g. dams, ponds and swales for rain water harvesting, groundwater abstraction) for use in agriculture	Short Term (2018 to 2021)	New water conservation technologies and damaged water infrastructure (e.g. dams, ponds and swales for rain water harvesting) assessed, costed, installed, retrofitted, operational and scaled up.	Implementation

STRATEGIC OBJECTIVE 8. SCALE UP WATER DEMAND SIDE MANAGEMENT BY IMPROVING WATER AND SOIL CONSERVATION BEST PRACTICES

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
31 Scale up irrigation systems with high water efficiency and water-conserving technologies	Short Term (2018 to 2021)	Irrigation systems with high water efficiency and water-conserving technologies assessed, developed, installed, operational and scaled up.	Implementation

STRATEGIC OBJECTIVE 9. PROMOTE SUSTAINABLE WASTEWATER MANAGEMENT BY REDUCING, REUSING AND RECYCLING OF AGRO-WASTE RESOURCES

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
32 Scale-up and develop sustainable waste management system for crop and livestock production	Medium Term (2021 to 2024)	Sustainable Waste Management Systems to reduce, recycle, reuse waste from crop and livestock production developed, operational and scaled up.	Implementation

OUTCOME 3. STRENGTHENED PARTNERSHIPS FOR SCALING UP CLIMATE RESILIENT AGRICULTURE

STRATEGIC OBJECTIVE 10. FORGE A STRONG PUBLIC PRIVATE PARTNERSHIP TO SCALE UP CLIMATE RESILIENT AGRICULTURE BEST PRACTICES AND BUSINESSES

	Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
33	Facilitate the development of partnerships for active involvement of the private sector in community climate resilience building (e.g. agriculture insurance)	Short Term (2018 to 2021)	Assessment study on the needs, gaps, opportunities and challenges in leveraging private sector resources and investment in community climate resilience building (e.g. agriculture insurance) conducted, with recommendations taken up and partnership models tested.	Facilitation and Finance
34	Design and implement national programme or a system to promote Corporate Social Responsibility (CSR) of the private sector (e.g. Adopt a Community)	Short Term (2018 to 2021)	Assessment study on the needs, gaps, opportunities and challenges of the design and implementation a national programme or a system to promote private sector-CSR (e.g. Adopt a Community) conducted, recommendations accepted and endorsed.	Facilitation and Finance

STRATEGIC OBJECTIVE 11. LEVERAGE PRIVATE SECTOR RESOURCES BY IMPROVING ACCESS TO RESILIENT FINANCIAL AND BUSINESS SUPPORTS AND BEST PRACTICES FOR SCALING UP CROP AND LIVESTOCK PRODUCTION

	Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
35	Improve access to the Climate Change Adaptation Financing Facility and other such initiatives designed to assist farmers (and other vulnerable groups) in building climate resilience and addressing climate change	Short Term (2018 to 2021)	Study to improve the Climate Change Adaptation Financing Facility and the challenges to scale up to a Climate Change Trust Fund in the context of proposed Environmental Trust Fund conducted and endorsed.	Finance
36	Develop a system to support agriculture enterprises that integrate climate change	Short Term (2018 to 2021)	- Feasibility study on the needs, gaps, opportunities and challenges to develop a system to support	Facilitation, Implementation and Finance

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
considerations in their processes through incentives/dis-incentives. Access to competitive financial products and services		enterprises that integrate climate change considerations in their processes through incentives/dis-incentives conducted and endorsed. - Competitive financial products and services to scale up CRA best practices and businesses developed, promoted and scaled up.	
37 Provide assistance for technology and innovation development for the agriculture private and public sectors	Short Term (2018 to 2021)	Study to identify assistance needed to develop new technology and innovation for the private and public sectors conducted and endorsed.	Facilitation
38 Support changes in business processes for increased climate and business resilience (e.g. business continuity planning)	Short Term (2018 to 2021)	Assess the needs, gaps, opportunities and challenges to support changes in business processes for increased climate and business resilience (e.g. business continuity planning) conducted and endorsed.	Facilitation

OUTCOME 4. BUILT ADAPTIVE CAPACITY TO CLIMATE VARIABILITY AND EXTREMES IN THE AGRICULTURE SECTOR

STRATEGIC OBJECTIVE 12. IMPROVE AGRO-METEOROLOGICAL DATA MONITORING, EMERGENCY PLANNING AND INFORMED DECISION-MAKING

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
39 Strengthen existing facilities for soil and water quality testing	Short Term (2018 to 2021)	- Needs of existing facilities for conducting soil and water quality testing studied and analysed. - Existing facilities for conducting soil and water quality testing improved and operational.	Facilitation and implementation
40 Set up agro-meteorological and forecasting system for the planning of farm activities	Short Term (2018 to 2021)	Agro-meteorological and forecasting systems established and operational to enable farmers and	Facilitation and implementation

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
		value chain actors to make informed decisions to adapt to climate change.	

STRATEGIC OBJECTIVE 13. MINIMISE AGRICULTURE-RELATED CLIMATE CHANGE RISKS BY ADOPTING ECOSYSTEM-BASED ADAPTATION SOLUTIONS

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
41 Maintain or restore vegetative buffers (e.g. riverine forests,)	Short Term (2018 to 2021)	<ul style="list-style-type: none"> - Feasibility study to map areas for habitat restoration conducted and endorsed. - Vegetative buffers (e.g. riverine forests, mangroves, sea grapes) maintained or restored to protect agricultural land from flooding, reduce soil erosion and siltation of river courses, and to improve productivity. 	Facilitation and Implementation

STRATEGIC OBJECTIVE 14. SCALE UP CLIMATE RESILIENT AGRICULTURAL INFRASTRUCTURE TO REDUCE CLIMATE RISKS

Prioritised adaptation measures	Period	Indicative outputs	Alignment with the CCAP
42 Establish emergency systems and infrastructure for food storage, packaging, processing and food import and distribution in the event of emergency	Short Term (2018 to 2021)	Emergency systems and infrastructure for food storage, packaging, processing, food import and distribution to cover food shortages during emergencies established and operational.	Facilitation and Implementation
43 Improve systems to reduce post-harvest losses and improve processing, including storage facilities	Short Term (2018 to 2021)	Systems to reduce post-harvest losses assessed, developed/constructed, improved and operational, including storage facilities.	Facilitation and Implementation
44 Improve, strengthen, adapt, relocate agricultural infrastructure to provide for continuity in services during and post extreme conditions	Medium Term (2021 to 2024)	Climate resilient agricultural infrastructure assessed, costed, improved, strengthened, adapted and relocated to suitable location to provide services during and post extreme conditions.	Implementation
45 Develop national database to store all data on the agriculture sector for decision-making	Short Term (2018 to 2021)	National agricultural database designed and established	Facilitation

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

The project concept notes outlined here are a reflection of the prioritised measures contained in Saint Lucia's NAP and Agriculture SASAP. These are also represented, for ease of reference, in *Saint Lucia's Portfolio of Project Concept Notes for the Agriculture 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 Agriculture Sector (Agriculture SASAP) 2018-2028*, is the Department of Agriculture, 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. PRODUCTION AND MARKETING OF ALTERNATIVE AND BIOLOGICAL PESTICIDES FOR THE SCALING UP OF CLIMATE RESILIENT AGRICULTURE IN SAINT LUCIA

CONCEPT NOTE 1

Project title **Production and marketing of alternative and biological pesticides for the scaling up of climate resilient agriculture in Saint Lucia**

Objective(s) To increase the capacity of farmers to protect their agro-ecosystem and businesses from local and exotic insect outbreaks through the development of reliable, competitive and natural pesticides.

Specific objectives:

- Study and preserve the population of entomopathogenic fungi found living in Saint Lucia
- Refine protocols for the production of biological pesticides using these organisms
- Set up a public, private company for the production and marketing of these insecticides
- Increase the benefits of farm agro-biodiversity
- Raise public awareness about the hazards of pesticides

Rationale

Agriculture is an important traditional productive sector in Saint Lucia. It provides 21% of total employment and is dominated by small-scale (less than 3 acres) rain-fed farming operations. However, in recent decades, agriculture has been increasingly affected by climate variability, extreme weather events and pests and disease outbreaks. The damages caused by these events, together with land use change for urban and tourism development and other factors, have led to the abandonment of farming areas and an overall decline in agricultural production and productivity. The Government of Saint Lucia (GoSL) recognises the importance of its agriculture sector and the need for urgent actions to reinvigorate it for reducing the net national food import bill and ensuring long-term food security. The GoSL also recognises that efforts towards increasing agricultural production must take place while protecting agriculture from the impacts of climate change to which it is directly exposed. Most frequent pest and disease outbreaks, resulting from the changing climate conditions is one major climate change impact already affecting farming livelihoods and businesses in Saint Lucia.

Higher temperatures and unseasonal precipitation in the present decade have made farming conditions more difficult in the Caribbean region and led to the observed increase in insect populations and vector borne plant diseases. These are controlled with agrochemicals by the local farming and domestic communities. Unfortunately, these chemicals contaminate the environment and food supplies and are damaging to the health of farm workers. Of further concern is that the insects rapidly adapt to them, which leads to an increasing amount of chemicals being used. An alternative to this health and environmental damaging cycle is the development of natural biological pest control systems.

A team of crop protection officers from the Research and Development Division of the Government agency with responsibility for Agriculture performed a detailed study of the Asian Psyllid (a pest of citrus crop) population and their biological controls during 2012. An interesting group of entomopathogenic fungi

CONCEPT NOTE 1

Project title **Production and marketing of alternative and biological pesticides for the scaling up of climate resilient agriculture in Saint Lucia**

were discovered to be infecting and controlling the psyllids. A field study was performed to identify sites where these fungi were prevalent. Four such sites were located and the coordinates of these were used to prepare a digital map. The sites were surveyed monthly and the best collection times in the wild were identified. The infected insects were taken into the lab where detailed protocols for the fungal isolation, multiplication, production and conversion into pesticides were developed. Two of the fungi produced were then used to infect a wide variety of agricultural pests including white flies, mites, aphids, scales and caterpillars.

This project seeks to produce native entomopathogenic fungi which can serve as biological insecticides. These fungi have been shown to control numerous species globally, and in many countries, have led to a reduction in the usage of conventional agro chemicals, and thus to reduced soil, food and water pollution and to healthier conditions for farm workers.

A major difference with chemical pesticides is that the entomopathogenic fungi have evolved with the insects and possess the ability to adapt to the changing genetic makeup of their hosts; therefore, this natural pest control system does not become obsolete.

The country's dependence on imported agrochemicals not only places a dent on the country's finances, but is also a source of domestic insufficiency. The country will be unable to sustain its agricultural sector, in the face of climate change and its accompanying impacts without the local production of inputs for the sector using local resources. The use of native entomopathogenic fungi to control insect pests proposed here will help reduce the cost of production of agricultural produce, since in many cases, they only require one application for the life of a crop, thereby helping make the local farming sector more competitive.

The project will also raise public awareness of the hazards of chemical pesticides and make it easier to control pests organically and provide a needed tool to the organic, backyard, natural and green farming communities. In addition, it will provide the Saint Lucian farming community and the GoSL with the capacity to better manage the influx of exotic insect pest species that have already reached the island with the changing climate conditions.

Beneficiaries Farmers from Saint Lucia

Activities and Tasks

Study and production of native entomopathogenic fungi species in Saint Lucia for the production of biological insecticides

Main outputs/products

- Protocols and criteria to identify, select, map out and produce native entomopathogenic fungi species developed, tested, endorsed and upgraded
- Native entomopathogenic fungi species identified, screened, targeted and their efficacy evaluated and multiplied at selected Research Stations
- Promising native entomopathogenic fungi species tested and endorsed on selected farmer fields

CONCEPT NOTE 1

Project title **Production and marketing of alternative and biological pesticides for the scaling up of climate resilient agriculture in Saint Lucia**

across geographical zones

- Proven native entomopathogenic fungi species propagated, multiplied, improved and branded for sale to farmers
- Knowledge and communication products and services on proven native entomopathogenic fungi species developed and endorsed for the training and awareness raising of value chain actors
- Awareness raising campaign on the hazards of chemical pesticides

Implementation

Potential partners: Agri Enterprise (lead), Research, Extension and Forestry, Caribbean Agricultural Research and Development Institute (CARDI), Inter-American Institute for Cooperation on Agriculture (IICA).

Responsible agency/partners: Government agency with responsibility for Agriculture, CARDI.

Indicative cost: USD 500,000

Duration: 3 years

Additional information: This project is aligned with adaptation measure 8 in the Agriculture SASAP and can contribute to implementing measures 13,19 and 45

PROJECT CONCEPT 2. STRENGTHENING THE CAPACITY OF THE AGRICULTURE EXTENSION OFFICERS TO PROVIDE TIMELY AND RELIABLE SUPPORT FOR FARMERS TO ADOPT AND SCALE UP CLIMATE RESILIENT AGRICULTURE (CRA) BUSINESSES.

CONCEPT NOTE 2	
Project title	Strengthening the capacity of the agriculture extension officers to provide timely and reliable support for farmers to adopt and scale up Climate Resilient Agriculture (CRA) businesses.
Objective(s)	To strengthen the capacity of the agriculture extension officers to provide timely and reliable support for farmers to adopt and scale up Climate Resilient Agriculture (CRA) businesses.
Rationale	<p>Climate Resilient Agriculture (CRA) is an adaptation approach that seeks to improve the capacity of farming systems to withstand climate shocks and stresses while maintaining production, yields and profitability. The CRA approach is based on the application of best agricultural management practices that, over time and in different contexts, have evolved as simple and effective responses to experienced local climate and farming challenges. CRA also covers the application of farming inputs developed and tested to address local needs such as improved seeds, pest control inputs and irrigation. CRA promotes knowledge sharing and collective action for building resilience at the community level. It uses training and demonstration sites to develop the capacity of farmers in the application of best practices, which include, among others, those for soil organic carbon build up, in-situ moisture conservation, water harvesting and recycling for supplemental irrigation, water saving technologies, growing drought and flood tolerant varieties and improved livestock feed and feeding methods.</p> <p>Lack of access to reliable and up-to date information and training on climate-resilient agriculture, including CRA best practices and business models, hampers the effectiveness of the extension officers of the Government agency with responsibility for Agriculture to provide timely and efficient products and services for farmers to plan and implement climate adaptation actions at their farms.</p> <p>The development of a long-term capacity development programme for extension officers is needed and proposed here to enhance their skills and knowledge on CRA and better support farmers in the adoption and scaling up of CRA best practices and businesses. The programme is proposed as a series of 5 day-training modules, tailored for the local context and involving the active participation of extension workers and the farming communities they work with and which will also be direct beneficiaries of this project. The modules will be delivered in various opportunities during the year, to cover all the extension workers.</p> <p>The syllabus of the long-term capacity building programme will be based on the Climate Smart Agriculture course offered by the Centre for Sustainable Development in Canada (http://www.csd-i.org). The Programme would cover training modules involving both CRA best-practice and business theory and field practice courses, to be complemented with downloadable manuals and field guides for each technique introduced.</p> <p>The training courses would take a participatory approach, with extension officers first collaborating</p>

CONCEPT NOTE 2

Project title **Strengthening the capacity of the agriculture extension officers to provide timely and reliable support for farmers to adopt and scale up Climate Resilient Agriculture (CRA) businesses.**

with the community members with whom they work in the development of a participatory mapping of crop systems, soil and water resources; and then, in consultation with, and guided by, the expert(s) in soil, water and agriculture, the extension workers would develop a participatory training process for a Climate Resilient Agricultural Programme specific to the context of the communities with whom they work.

The following are proposed 5 days training modules:

1. Participatory Mapping of Local Context: Conduct surveys and interviews to collect traditional knowledge on agriculture, changes in agricultural cycles, vulnerabilities and coping strategies. Facilitate the organisation of a community-based Farmer Association. Identify expert specialist/extension agents in soil, water and agriculture to design and facilitate participatory capacity building workshops.
2. Community workshop on participatory mapping of cropping systems, and soil and water resources, uses, challenges and ecosystem services: Identify important soil and water resources and challenges. Prioritise degraded farmlands and resources for protection/restoration based on the mapping exercise. Strengthen community knowledge on adaptation to climate change.
3. Survey of Solution-Oriented Adaptation Techniques: Low input agricultural technologies. Conservation Agriculture.
4. Water conservation techniques: Including: a) mulching for reducing evaporative water loss and increasing organic material in the soil; b) Improving the organic matter of soils; c) Contour levelling: level planting rows across hillside; d) Runoff agriculture: stone and soil bunds to control runoff, increase soil moisture and reduce soil erosion; depressions for runoff capture and infiltration planting grass strips, trees, and hedgerows across the contour to reduce runoff velocity, improve water infiltration, and trap sediment.
5. Coping with unpredictable weather patterns: Buffering against extended dry spells, the late arrival of rain and/or an early end to the rainy season, and from strong tropical rains. Changing cropping cycle and crop mix. Multiple and rotational cropping. Crop diversification. Early maturing. Drought resistant crop varieties.
6. Evaluation of participatory mapping: Evaluate results of participatory mapping of agricultural resources and select appropriate, improved agricultural practices. Propose appropriate techniques to the Farmer Association for feedback.
7. Community Workshop Planning: Prioritise the soil/water conservation/restoration techniques that should be introduced in the first workshop. Contact, if further required, an agricultural extension expert for feedback and input. Develop a workshop lesson plan. Draw a how-to card. Arrange the date and location for the workshop with the community contact person. Arrange for supplies and tools for the workshop with the community contact person.
8. Capacity Building: Organise presentation materials. Arrange for colleagues in facilitating the workshop. Facilitate the capacity building workshop at the demonstration plots.

Beneficiaries Extension officers and farmers

CONCEPT NOTE 2	
Project title	Strengthening the capacity of the agriculture extension officers to provide timely and reliable support for farmers to adopt and scale up Climate Resilient Agriculture (CRA) businesses.
Activities and Tasks	
Rescue the capacity (policy, institutional, technical, financial, business and social knowledge and skills) of the existing and new extension officers enhanced to support farmers and value chain actors to scale up CRA best practices and businesses.	
Main outputs/products	
<ul style="list-style-type: none"> • Needs and gaps analyses conducted to assess the baseline capacity of the existing and new extension officers • Based on international, regional and national best practices and lessons learned, gender responsive and easy to use knowledge materials (leaflets, training manual, guidebooks, toolkits, business models) and communication products (leaflets, TV/radio materials, social media), services and platforms on CRA best practices developed, tested, and approved • Training and awareness raising programmes (e.g. study tours, site visits) planned, organised, conducted and improved to train and raise awareness among value chain actors • Impact of the capacity development programme monitored and evaluated on a bi-annual basis. 	
Implementation	
Responsible agency/partners: Government agency with responsibility for Agriculture, CARDI.	
Cost estimate USD 250,000	
Duration	2 years
Additional information:	
<ul style="list-style-type: none"> • This project is aligned with adaptation measures 19, 20 and 37 in the Agriculture SASAP and can contribute to implementing measures 27, 9, 10, 11, 12, 13, 17, 18, 22, 23, 24, 25, 26, 27, 30, 31, 32 41 and 45 • Climate Smart Agriculture course offered by the Centre for Sustainable Development in Canada, proposed as the basis for the development of this project is available at: http://www.csd-i.org/ol-333-climate-smart-agricult/#SYLLABUS 	

PROJECT CONCEPT 3. CLIMATE RESILIENT AGRICULTURE DEMONSTRATION CENTRE (CRADE): ENABLING THE TRANSFORMATION OF VULNERABLE GROUPS IN 3 SUBSISTENCE FARMING COMMUNITIES INTO COMPETITIVE NATIONAL AGRI-BUSINESS LEADERS UNDER A CHANGING CLIMATE

CONCEPT NOTE 3	
Project title	Climate Resilient Agriculture Demonstration Centre (CRADE): Enabling the transformation of vulnerable groups in 3 subsistence farming communities into competitive national agri-business leaders under a changing climate
Objective(s)	Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions and increased resilience of health and well-being, and food and water security, and strengthened adaptive capacity and reduced exposure to climate risks through the establishment of a Climate Resilient Agriculture Demonstration Centre (CRADE).
Rationale	<p>This programme aims to reduce the vulnerability and food insecurity of three small-scale farming communities threatened by climate variability and change in Saint Lucia. It will run over a period of 60 months and will consist of a series of activities for these communities to shift from a purely subsistence production model towards full national market penetration model. The programme will initiate a climate resilient agricultural demonstration centre (CRADE) through which value chains will be created and strengthened, and research, courses, field demonstrations and knowledge products developed to boost the capacities of local actors in undertaking climate resilient agriculture farming and business. A crop insurance incentive scheme will also be created. It is expected that as result of these two major interventions, the programme sets the basis for diversifying livelihoods and creating climate-resilient businesses and jobs for vulnerable groups, while building capacities for many other actors through demonstration of, and collaboration in, the programme activities.</p> <p>Through the CRADE, the programme will offer institutional, legal, financial, business and capacity building support for farmers to engage in/adopt, use and scale-up a series of Climate Resilient Agriculture (CRA) best-practices targeting the development of value chains. Among these, and of particular relevance are:</p> <ul style="list-style-type: none"> - Conservation agriculture and micro drip irrigation - Off-grid solar energy technologies (for water pumping for small-scale micro horticultural systems, and refrigeration for harvested food) <p>CRADE will also offer the facilities for research and development of CRA products, including organic agricultural inputs.</p>
Beneficiaries:	Farmers

CONCEPT NOTE 3

Project title **Climate Resilient Agriculture Demonstration Centre (CRADE): Enabling the transformation of vulnerable groups in 3 subsistence farming communities into competitive national agri-business leaders under a changing climate**

Activities and Tasks

- Establishment and operation of Saint Lucia Climate Resilient Agriculture Demonstration Centre (CRADE).
- Small-scale farmers adopting, promoting and expanding of CRA best practices and businesses
- Implementation of Farmers' crop insurance scheme
- Farmers and enterprises adopting, promoting and scaling up **off-grid solar energy technologies for reducing costs** and as part of CRA.
- Farmers adopting and promoting diversified livelihoods to improve income
- Enhanced capacity of value chain actors (public, private, business service providers, banks, academia, media and Civil Society Organisation (CSO) partners, consumers) to promote and scale up CRA best practices.

Main outputs/products

- Saint Lucia Climate Resilient Agriculture Demonstration Centre (CRADE) established and operational
- Field research, trial and demonstration sites set-up, research conducted and published; organic fertilisers produced
- Farmer and sites for CRA identified, surveyed, selected and approved
- CRA best practices (solar irrigation; organic farming; beekeeping; composting and organic fertiliser; natural pesticides; mulching, small ruminants) designed, developed, tested in the local context and endorsed
- Viable CRA businesses implemented, scaled up, monitored and evaluated
- Community Project Management Unit established and operational to manage and monitor the project
- Feasibility study on the needs, gaps, opportunities and challenges of crop insurance scheme conducted, analysed and published
- Crop Insurance Scheme developed, tested, improved and rolled out
- Solar technologies for farms and enterprises (e.g. solar irrigation, water pumping to reduce operation cost in greenhouse, hydroponic, aquaponic system) with viable financial and business models (e.g. start-up loan, matching rebate, lease to buy) identified, developed, tested and endorsed
- Solar-energy related businesses promoted and scaled up to implement CRA best practices
- Diversification and Alternative Sustainable Livelihoods Adaptation programmes identified, developed, promoted and scaled up
- Knowledge and communication products, services and platforms developed and tailored to vulnerable groups, to strengthen their capacity to adopt and scale up CRA.

CONCEPT NOTE 3

Project title **Climate Resilient Agriculture Demonstration Centre (CRADE): Enabling the transformation of vulnerable groups in 3 subsistence farming communities into competitive national agri-business leaders under a changing climate**

Implementation

Government agency with responsibility for Agriculture

Indicative Cost: USD 1,000,000

Duration: 5 years

Additional information:

This project is aligned with adaptation measures 18, 19, 20, and 33 in the Agriculture SASAP and can contribute to implementing measures 7, 8, 9 ,10, 11, 12, 13, 17, 21,23, 31, 36, 37, 38 and 45

This program offers mitigation co-benefits

PROJECT CONCEPT 4. ALTERNATIVE WATER SOLUTIONS FOR BUILDING CLIMATE RESILIENCE IN VULNERABLE GROUPS DEPENDENT ON RAINFED FARMING

CONCEPT NOTE 4	
Project title	Alternative water solutions for building climate resilience in vulnerable groups dependent on rainfed farming
Objective(s)	To increase the capacity of small-scale farmers to cope with drought and heatwaves while developing sustainable and climate resilient businesses.
<p>Rationale</p> <p>Saint Lucia’s Climate Change Adaptation Policy recognises the challenge of providing freshwater to the country’s populations and economic activities under a changing climate. Freshwater shortages have already started to be experienced and are expected to increase with time. This will be driven by an increasing demand brought by a growing population, while climate change induces lower annual precipitation and more erratic rainfall, higher evaporation, and saline intrusion into coastal rivers due to sea-level-rise.</p> <p>Agriculture is an important traditional productive sector in Saint Lucia. It provides 21% of total employment and is dominated by small-scale (less than 3 acres) rain-fed farming operations, which are the main source of livelihood for about 532,000 families (Graham, 2015). However, in recent decades, agriculture has been increasingly affected by climate variability, extreme weather events and pests and disease outbreaks. The damages caused by these events, together with land use change for urban and tourism development and other factors, have led to the abandonment of farming areas and an overall decline in agricultural production and yields.</p> <p>Rain-fed agriculture will possibly be the productive sector most affected by climate change in the country, as with climate change, lower annual precipitation, more erratic rainfall leading to longer dry periods and more intense drought and higher evaporation are projected. Freshwater shortages have already started to be experienced and are expected to increase with time, exacerbated by the increasing demand brought by a growing population. Considering these climate projections, the possible of loss of rural livelihoods is of major concern.</p> <p>This programme seeks to enhance the capacity of rainfed agriculture-based communities to prepare for water-related stress, induced by increasing drought and heatwave events. The programme interventions encompass a whole series of activities for increasing the availability and more efficient use of water for rainfed farming households and operations. These include reducing leaks in existing water storage and supply infrastructure, the installation of tube wells and deep tube wells, the introduction and construction of Rainwater Harvesting (RWH) technologies, improved surface water management, building necessary sanitary latrines, providing beneficiaries with stress tolerant crop varieties and management technologies and building skills, through training on income generating activities for vulnerable groups. Additionally, Farmer Schools will be established/strengthened for training farmers on climate-resilient crop and livestock production.</p>	
Beneficiaries Farmers and households	
<p>Activities and Tasks</p> <ul style="list-style-type: none"> • Facilitate the access of small-scale farmers to a reliable supply of water (rain, grey and 	

CONCEPT NOTE 4

Project title **Alternative water solutions for building climate resilience in vulnerable groups dependent on rainfed farming**

ground water) to implement and scale up climate resilient agricultural practices and sustainable businesses

- Implement small-scale farmers’ irrigation schemes tied to measures to increase the water use efficiency of crop and livestock production.
- Develop the capacity of value chain actors (suppliers, installers, farmers, end users) to scale up RWH and grey water harvesting technologies for agricultural production and businesses.

Main outputs/products

- Old, broken, damaged rainwater harvesting systems identified, surveyed, costed, renovated, improved, and operational
- Extension officers and water engineers trained and certified to identify and map new ground water reserve using Proton Magnetic Resonance (PMR) and means of access (e.g. exploratory wells dig in Vieux Fort, Micoud, Castries and Roseau all have yielded water at less than 6 feet of depth).
- New storm-proof rain, grey water and wastewater harvesting systems (swales along contours, gravity feed, storage tanks, geo-membrane ponds, network piping), designed, installed, tested and operational on targeted farms in vulnerable areas
- Business models to promote and expand RWH and grey water harvesting best practices and related enterprises developed, tested and promoted.
- Capacity of small scale farmers enhanced for the production of high quality crop and livestock through soil and water conservation technologies
- Farmers Field Schools established to demonstrate how to balance demand for water with efficient supply to produce high quality crops and livestock in small farms
- Baseline surveys of all targeted areas, value chain actors and beneficiaries conducted and endorsed
- Knowledge and communication products, services and platforms on efficient water supply and demand side management developed, tested, and approved
- Training and awareness raising programmes organised and conducted to train value chain actors in the design, installation, maintenance and improvement of RWH and grey water harvesting systems for agribusiness operations

Implementation: Government agency with responsibility for Agriculture

Cost estimate USD 1,000,000

Duration: 5 years

Additional information:

This project is aligned with adaptation measures 18, 20, 29, 30 and 31 in the Agriculture SASAP and can contribute to implementing measures 10, 19, 24, 37, 38 and 45. The project also contributes to the achievement of several strategic objectives of the Water SASAP.

PROJECT CONCEPT 5. PUBLIC SENSITISATION TOWARDS IMPROVING THE MANAGEMENT, CONSERVATION AND PROTECTION OF WATER RESOURCES UNDER A CHANGING CLIMATE

PROJECT CONCEPT 5	
Project title	Public sensitisation towards improving the management, conservation and protection of water resources under a changing climate
Objectives	<ul style="list-style-type: none"> • To increase public awareness of the role played by each individual in causing and solving water resource management problems. • To increase public participation in improving water resource management. • To jump-start the public education/sensitisation activities within the water sector and establish a product which would be able to draw corporate sponsorship.
Rationale	<p>Saint Lucia relies heavily on the abstraction of surface water to meet water consumption demands. However, poor land use and conservation practices have exacerbated soil erosion and increased the risk of landslides, which result in large sediment loads reaching the country's rivers, particularly during heavy rainfall events and tropical storms preceded by dry periods. This affects river water quality, reduces the capacity of freshwater reservoirs and ultimately, compromises water supply on the island. This situation could worsen in the future if no action to improve farming and other land-use practices is undertaken, as with climate change, Saint Lucia is expected to experience an overall reduction in annual precipitation, more frequent and intense dry spells and more intense and unpredictable rainfall events in the coming decades.</p> <p>In view of the above considerations, it is crucial to raise public awareness on the role that farmers and citizens in general play in securing the quality and provision of water in the future and to spark changes in the attitudes and unsustainable practices that currently compromise land and surface water resources. This project focuses on exposing Saint Lucians to sustainable land use and water conservation practices and encouraging to adopt them, in order to reduce river sedimentation and to better manage water supplies during periods of water scarcity.</p>
Proposed location/site(s):	Island-wide
Beneficiaries	The entire Saint Lucian population
Activities and Tasks	<ul style="list-style-type: none"> • Organise an annual exhibition during the week of World Water Day. • Conduct water-themed school competitions. • Design and conduct conservation activities (tree planting, river/wetland clean ups) • Conduct panel discussions
Main outputs/products	<ul style="list-style-type: none"> • Quarterly News Bulletin (electronic publication) highlighting local actions (success stories). • Informational video productions • Jingles and animated comic series

PROJECT CONCEPT 5

Project title **Public sensitisation towards improving the management, conservation and protection of water resources under a changing climate**

- Population behavioural change

Implementation:

Leading agency: Water Resources Management Agency

Financing: Government of Saint Lucia and development partners

Indicative cost: USD 120,000

Duration: 36 months

Additional information

- This project contributes to implementing measures 9, 19 and 20 in the Agriculture SASAP's
- The project is also aligned with and contributes to the implementation of Saint Lucia's Climate Change Communications Strategy (2018)
- This project is also of relevance for the Water SASAP and thus, this concept note is also included in it.

PROJECT CONCEPT 6. BUILDING CLIMATE RESILIENCE IN SAINT LUCIA THROUGH THE DOCUMENTATION OF EFFECTIVE INDIGENOUS PRACTICES FOR REPLICATION AND SCALE-UP, WITH A FOCUS ON SUSTAINABLE LAND MANAGEMENT, SEED STORAGE, PEST AND DISEASE MANAGEMENT

PROJECT CONCEPT 6	
Project title	Building climate resilience in Saint Lucia through the documentation of effective indigenous practices for replication and scale-up, with a focus on sustainable land management, seed storage, pest and disease management
Objectives	<ul style="list-style-type: none"> To identify and document soil and water conservation measures used in Dennery and Mabouya Valley. To assess the effectiveness of indigenous soil and water conservation measures under current and expected future climate conditions.
Rationale	<p>The Saint Lucia Climate Change Adaptation Policy (2015) calls for close attention to be paid to the traditional technologies and skills that have allowed the country’s communities to cope successfully with climate variability in the past and to combine these with modern knowledge and technologies, where appropriate. While there are several examples of indigenous adaptation and coping strategies in the country’s agricultural sector, these have not been rigorously documented or assessed, missing the opportunity of utilising the local knowledge in planning and implementing adaptation responses for the sector at the national level.</p> <p>This project seeks to identify and assess the effectiveness of local and traditional soil and water conservation practices applied in some areas of the Dennery Mabouya valley, an area inhabited by many small-scale farmers and where agriculture often takes place over the surrounding steep slopes. In this region, soil erosion has become a very serious problem, triggered by the recent shift in cultivation from bananas to cash crops not suitable for the local conditions. Documenting effective local strategies to address this problem is highly relevant now and not only for this area, but also for all agricultural regions in the country, as with climate change, more frequent and extended dry periods and more intense rainfall events are projected. These are expected to exacerbate land degradation processes and to reduce water availability for agriculture. This initiative is proposed as the first of a series of projects to document and map local effective strategies to respond to environmental and climate change in Saint Lucia.</p> <p>Proposed location/site(s): Pilot in the Dennery Mabouya valley area and application island-wide</p>
Beneficiaries	<ul style="list-style-type: none"> Farming community (hillside farmers) Extension officers, NGOs, schools and Government agency with responsibility for Agriculture
Activities and Tasks	<ul style="list-style-type: none"> Select sites for information collection Collect local information and farmers’ perspectives Collect socio-economic information

PROJECT CONCEPT 6	
Project title	Building climate resilience in Saint Lucia through the documentation of effective indigenous practices for replication and scale-up, with a focus on sustainable land management, seed storage, pest and disease management
	<ul style="list-style-type: none"> • Document measures • Establish database of traditional and effective land and water conservation measures • Documentation of information
Main outputs/products	<ul style="list-style-type: none"> • Description of measures • Identification of soil and water conservation measures • Description of the environmental conditions where the measures have been applied • Assessment of indigenous soil and water conservation measures
Implementation:	<p>Leading agency: Government agency with responsibility for Agriculture (Extension Department)</p> <p>Support: Engineering Department, Research Department</p> <p>Financing: Government of Saint Lucia and development partners</p>
Indicative cost: USD 60,000	
Duration: 2 years	
Additional information	<ul style="list-style-type: none"> • This project is aligned with measure 19 in the Agriculture SASAP and can contribute to implementing measure 7, 9, 11, 18, 20,22, 23 and 45 • This project is also of relevance for the Water SASAP and thus, this concept note is also included in it.

PROJECT CONCEPT 7. CLIMATE RESILIENT AGRICULTURE (CRA) DEMONSTRATION FARMS: KEY MEANS TO DISSEMINATE INFORMATION FOR PROMOTING AND EXPANDING EFFECTIVE AND SIMPLE FARMING SOLUTIONS TO CLIMATE-INDUCED CHALLENGES

CONCEPT NOTE 7	
Project title	Climate Resilient Agriculture (CRA) Demonstration Farms: Key means to disseminate information for promoting and expanding effective and simple farming solutions to climate-induced challenges
Objective(s)	To establish CRA demonstration farms for generating and disseminating simple, effective and no-regret solutions to climate-induced agricultural challenges.
Rationale	<p>Climate Resilient Agriculture (CRA) is an adaptation approach that seeks to improve the capacity of farming systems to withstand climate shocks and stresses while maintaining production, yields and profitability. The CRA approach is based on the application of best agricultural management practices that, over time and in different contexts, have evolved as simple and effective responses to experienced local climate and farming challenges. CRA also covers the application of farming inputs developed and tested to address local needs such as improved seeds, pest control inputs and irrigation. CRA promotes knowledge sharing and collective action for building resilience at the community level. It uses training and demonstration sites to develop the capacity of farmers in the application of best practices, which include, among others, those for soil organic carbon build up, in-situ moisture conservation, water harvesting and recycling for supplemental irrigation, water saving technologies, growing drought and flood tolerant varieties and improved livestock feed and feeding methods.</p> <p>In Saint Lucia, extension workers and farmers often lack access to information on CRA best practices and inputs. This reduces their potential to test and implement simple, cost-effective and environmentally sound solutions to the problems posed by climate variability and change and thus, limits their adaptive capacity. Helping farmers adapt to climate change is a priority as the damages caused by frequent tropical storms and recurrent drought and pests and diseases are amongst the most important factors leading to the overall decline in Saint Lucian agriculture and the increasing national food import bill.</p> <p>This project proposes to address the above problem by establishing a series of CRA demonstration farms to promote improved technologies. The project also includes a series of actions to communicate existing and generate new field-level CRA knowledge in Saint Lucia. These actions will be undertaken to:</p> <ul style="list-style-type: none"> • Promote the use of protected cultivation, including greenhouse technologies for specific crops • Research, develop and implement appropriate Integrated Pest Management (IPM) practices • Strengthen existing programmes providing training to farmers in Good Agricultural Practices (GAP) • Develop and expand drainage and irrigation infrastructure in key agricultural regions

CONCEPT NOTE 7

Project title **Climate Resilient Agriculture (CRA) Demonstration Farms: Key means to disseminate information for promoting and expanding effective and simple farming solutions to climate-induced challenges**

- Provide training on appropriate technologies including small/medium scale hydroponics and Aquaponics production.

The CRA demonstration farms and the implementation of a comprehensive programme of activities will therefore allow for the identification and testing of best practices, as well as hands-on training for replication. Further, the demonstration farms will permit growing and developing climate-adapted material (seeds, livestock, natural pesticides) for the country's farming communities to use and increase yields and income. The sales from these materials will contribute to sustaining the farm's activities.

Beneficiaries Research and Development (R&D) officers and farmers

Activities and Tasks

- Identify / select private farms interested in CRA demonstrations
- Setting up facilities at the CRA demonstration farms
- Identify, test, develop, produce and promote drought and salt-tolerant crops and pastures
- Implement germplasm conservation measures (In-situ and ex-situ/on farm) for identified hardy/unutilised crop native species (herbal/medicinal) and livestock varieties
- Identify, monitor and control existing and new Invasive species.
- Identify, observe and quantify the benefits of agro-biodiversity in strengthening the resilience of farms

Main outputs/products

- Protocols to select and screen drought and salt tolerant varieties
- Drought and salt tolerant crops and pastures identified, screened and evaluated
- Promising varieties tested at the farm and cultivated at selected farmer fields across geographical zones
- Proven climate resilient seeds and clonal materials propagated and multiplied for sale to farmers
- Knowledge and communication products and training services developed for scaling up the cultivation of proven climate-resilient species
- Training delivered to public, private and Civil Society Organisation (CSO) partners and climate resilient agriculture value chain actors
- Germplasm protocols and criteria to select, identify and conserve underutilised, hardy and native crop and livestock species
- Underutilised, hardy and native crop and livestock species identified, screened, selected and evaluated
- Protocols to identify, map, monitor and control invasive species developed
- Knowledge and communication products and services on invasive species
- Studies on how the best practical (traditional and modern) ways to increase agro-biodiversity for strengthening the resilience of farmers, crops, soils and livestock
- Knowledge and communication products and services on the benefits of agro-diversity

CONCEPT NOTE 7

Project title **Climate Resilient Agriculture (CRA) Demonstration Farms: Key means to disseminate information for promoting and expanding effective and simple farming solutions to climate-induced challenges**

Implementation

Responsible agency/partners: Government agency with responsibility for Agriculture, CARDI.

Indicative cost: USD 1,500,000

Duration: 5 years

Additional information

- This project is aligned with measures 6, 7, 9 10, 11, 12, 13, 14, 15, 18 and 37 in the Agriculture SASAP and can contribute to implementing measures 19, 20, 21, 23 and 45.
- The project is aligned with and supports the implementation of the Draft Agriculture Policy (2016 to 2021).

PROJECT CONCEPT 8. ESTABLISHMENT OF THE BEAUSEJOUR AGRICULTURE STATION AS NATIONAL CENTRE OF EXCELLENCE FOR CLIMATE RESILIENT LIVESTOCK PRODUCTION

CONCEPT NOTE 8	
Project title	Establishment of the Beausejour Agriculture Station as National Centre of Excellence for Climate Resilient Livestock Production
Objective(s)	To strengthen livestock production in Saint Lucia under a changing climate
Rationale	
<p>Climate Resilient Agriculture (CRA) is an adaptation approach that seeks to improve the capacity of agricultural systems to withstand climate shocks and stresses while maintaining production, productivity and profitability. The CRA approach is based on the application of best agricultural management practices that, over time and in different contexts, have evolved as simple and effective responses to experienced local climate and agricultural challenges. CRA also covers the application of agricultural inputs developed and tested to address local needs such as improved seeds, pest control inputs, irrigation and improved livestock breeds. CRA promotes knowledge sharing and collective action for building resilience at the community level. It uses training and demonstration sites to develop the capacity of farmers in the application of best practices, which include, among many others, practices for improving livestock feed and feeding methods.</p> <p>With climate change, sea-level rise, lower annual rainfall amounts, but more intense rains and tropical storms in the Caribbean and associated flooding episodes, are expected to increasingly affect Saint Lucia’s populations, economic activities and environment in the coming decades. The island’s agriculture sector has already started to suffer from the anticipated impacts of climate change, with damages caused by recent hurricanes, recurrent droughts, pests and diseases contributing to the abandonment of farming activities and to the overall national net food import bill.</p> <p>A sharp reduction in grazing livestock numbers in the past decades is one of the most conspicuous effects of declining agricultural activities in the country. This is of concern as fish stocks are also declining, thus reducing the prospects of Saint Lucia being protein self-sufficient in the future, compounded by the impact of climate change on livestock production. Direct impacts will be manifested through increased heat stress and reduced water availability, and indirect impacts will be experienced through decreasing pasture productivity and nutrient content and through the more frequent outbreaks of disease, including new types of disease.</p> <p>This project seeks to convert the Beausejour Agriculture Station into a National Centre of Excellence for Climate Resilient Livestock Production. The Centre will enable research for the application of existing and generation of new CRA best practices to strengthen livestock production in Saint Lucia. The Centre will also work to build capacities of livestock farmers, extension officers and all stakeholders of the livestock value chain in the country. Further, the Centre proposed will be focused on supporting national livestock systems to better withstand climate shocks while reducing greenhouse emissions.</p>	
Beneficiaries: Livestock farmers, other livestock value chain actors, extension officers	
Activities and Tasks	
<ul style="list-style-type: none"> • Make the necessary administrative and programmatic arrangements for converting the 	

CONCEPT NOTE 8**Project title Establishment of the Beausejour Agriculture Station as National Centre of Excellence for Climate Resilient Livestock Production**

Beausejour Agriculture Station into a National Centre of Excellence for Climate Resilient Livestock Production

- Design a programme of work for the Centre including research, development, demonstration and capacity building activities on CRA best practices for the following thematic areas:
 - Sustainable feed, pasture and grazing management
 - Climate resilient livestock facilities to reduce heat stress developed and promoted
 - Sustainable livestock waste management
 - Resilient livestock value chains

Main outputs/products

- Beausejour Agriculture Station relocated and enhanced to become a National Centre of Excellence for Climate Resilient Livestock Production
- Research on and testing of best CRA practices for sustainable livestock production conducted
- Best CRA practices demonstrated, promoted and transferred to farmers and other livestock value chain actors through capacity building activities (trainings -including peer-to-peer farmer trainings-, study tours, awareness raising campaigns, etc.)
- Communication products elaborated for each CRA best practice promoted
- Best CRA practices promoted by the Centre replicated and strengthened

Implementation

Government agency with responsibility for Agriculture

Indicative cost: USD 2,000,000 (Beausejour Agricultural Station will be relocated and funding will be required for this activity to ensure success)

Duration: 3 years

Additional information

- This project is aligned with measures 6, 9, 25, 26, 27, 32 and 37 in the Agriculture SASAP and can contribute to implementing measures 8, 12, 18, 19, 24, 32 and 45.
- This project supports the implementation of the Draft Agriculture Policy (2016 to 2021), which under Priority Area 1 calls for improving the livestock sector through a series of activities which are perfectly aligned with those proposed here, including among others, the following: the establishment of the Beausejour Agriculture Station as a national centre of excellence; disseminating good agricultural practices for sustainable livestock production; providing training to farmers on appropriate technologies in livestock production; encouraging the establishment of commercial farms for small ruminants.
- The CRA best practices for sustainable livestock production to be tested and if successful demonstrated at the Centre and promoted will include, but not be limited to:
 - Use of heat tolerant pastures and livestock breeds.

CONCEPT NOTE 8

Project title **Establishment of the Beausejour Agriculture Station as National Centre of Excellence for Climate Resilient Livestock Production**

- Improved pasture management techniques (e.g. rotational grazing, appropriate stocking rate and enhanced access to safe water -to reduce Amblyomma tick populations-).
- Climate resilient livestock housing facilities (e.g. well-ventilated shelters for cut and carry systems) and technologies (passive water cooling systems)
- Improved livestock waste management techniques and technologies (e.g. vermin-compost; geo-membrane biodigesters).

PROJECT CONCEPT 9. UNDERTAKING KEY POLICY AND REGULATION UPDATES TO ENABLE CLIMATE CHANGE ADAPTATION PLANNING IN THE AGRICULTURE SECTOR

CONCEPT NOTE 9	
Project title	Undertaking key policy and regulation updates to enable climate change adaptation planning in the agriculture sector
Objective(s)	To integrate Sea Level Rise (SLR) considerations into the Agriculture Policy and Strategy, implement land use policy and zoning and update regulatory standards for enabling climate adaptation planning in Agriculture and other key productive sectors in Saint Lucia
Rationale	<p>Saint Lucia is highly vulnerable to climate change and has already started experiencing some of its anticipated impacts, such as, recurrent drought and more intense and unpredictable rainfall events triggering landslides and flooding. The country is also often in the path of Caribbean tropical storms, expected to increase in intensity in the coming years and, as with other Small Island Developing States, it is highly vulnerable to Sea Level Rise (SLR).</p> <p>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. The GoSL has also started a comprehensive National Adaptation Planning process. However, planning adaptation at the sectoral level is hampered by the fact that some key policies lack the integration of pertinent climate change considerations or have not been implemented. In this regard, notable are the absence of implemented climate change-informed land use policies and land zoning and the lack of inclusion of SLR considerations into the Draft Agriculture Policy Framework and Strategy (2016 to 2021). Regulatory standards should also be updated to include the promotion of Climate Resilient Agriculture (CRA) best practices.</p> <p>This project proposes to address the above-mentioned gaps by conducting all the necessary background studies for including SLR, salinity intrusion, and land use considerations into the Draft Agriculture Policy and Strategy and for enabling the development and implementation of land use planning and zoning regulations, crucial for national development and adaptation.</p> <p>The results of the project will allow clarifying land tenure issues and solve conflicts related to squatting of abandoned agricultural lands and access to land by livestock farmers. The project will also offer instruments for planning and enforcing regulations to improve environmental conditions, reduce land degradation, safeguard prime agricultural land, protect water resources and minimise climate change-related risks to lives and property in the country (e.g. by preventing settlements or agricultural activities in areas zoned as prone to SLR-submersion or landslides or as priority conservation areas).</p>
Beneficiaries:	All Saint Lucians
Activities and Tasks	<ul style="list-style-type: none"> Conduct analysis of gaps and opportunities to incorporate SLR-related impacts in the Agriculture Policy

CONCEPT NOTE 9

Project title **Undertaking key policy and regulation updates to enable climate change adaptation planning in the agriculture sector**

- Develop SLR-related land use strategies to be integrated into the Agriculture Policy
- Conduct analysis of gaps and opportunities for the Land Policy to safeguard quality agricultural lands
- Land Policy to enable land spatial planning to safeguard quality agricultural lands implemented, monitored and improved and operational
- Identify, survey and cost the restoration of abandoned agricultural lands
- Identify current production areas/farms at risk of SLR impacts and define potential relocation areas
- Integrate the SLR-related land use strategies developed into the Agriculture Policy (2016 to 2021)
- Develop Legislation to implement and enforce SLR-related land use strategies
- Update and enforce Regulatory standards to promote best practices in Climate Resilient Agriculture

Main outputs/products

- SLR and land use strategies incorporated into the Agriculture Policy (2016 to 2021)
- Land Policy (and zoning) safeguarding quality agricultural lands implemented, monitored and improved
- Regulatory standards governing productive activities in rural areas updated to promote CRA best practices
- Abandoned agricultural lands identified, surveyed and costed (land and restoration work)
- Farms in areas prone to landslides, SLR or in areas zoned for conservation and thus in need of relocation and potential areas for relocation identified.

Implementation

Government agency with responsibility for Agriculture Department of Physical planning (Crown Lands)

Invest Saint Lucia

Attorney Generals (Legislative Drafting Department)

Other partners: Ministry of Tourism, Housing

Indicative cost: USD 800,000

Duration 3 years

Additional information

- This project is aligned with measures 1, 2, 3 and 4 in the Agriculture SASAP and can contribute to implementing measure 5, 12, 28, 39 and 41
- The project will contribute to the implementation of the Government agency with responsibility for Agriculture's Land Bank project which aims at identifying, mapping and managing existing crown lands and abandoned farmlands suitable for agriculture for the GoSL to acquire/ access and operate.

PROJECT CONCEPT 10. IMPROVING CLIMATE SERVICES IN SAINT LUCIA THROUGH THE DEVELOPMENT OF A FREE AGRO-MET MOBILE APP FOR THE COUNTRY'S FARMING COMMUNITY

CONCEPT NOTE 10

Project title: Improving climate services in Saint Lucia through the development of a free agro-met mobile app for the country's farming community

Objective: To develop a free Agromet mobile app able to guide activities and reduce losses due to extreme weather events

Rationale

Agriculture is an important traditional productive sector in Saint Lucia. It provides 21% of total employment and is dominated by small-scale (less than 3 acres) rain-fed farming operations. However, in recent decades, agriculture has been increasingly affected by climate variability, extreme weather events and pests and disease outbreaks. The damages caused by these events have greatly contributed to the abandonment of farming areas and an overall decline in agricultural production and productivity.

The development of climate services, providing real-time information tailored to address Saint Lucian farmers' needs would provide them with the information they need to make decisions and act to reduce damages and losses in the face of weather events, resulting in more profitable agriculture. However, no adequate agricultural climate services are available in the island.

Climate services in the Caribbean play a key role in reducing tropical storm-related damage. These services are provided by the Caribbean Institute for Meteorology and Hydrology (CIMH) and the information is locally transmitted by national meteorological offices. In Saint Lucia, climate information used to be shared with the farming community through an Agro-met bulletin published quarterly. This publication was difficult to sustain, and the data shared was static; allowing for long term planning, but ineffective for the day-to-day running of a farm, as often, the information reached farmers only after they had experienced the extreme weather events.

There have been some attempts to share climate information with farmers via mobile phones (SMS messages) but this is expensive, the number of characters that can be sent through SMS is limited and graphs cannot be sent, although graphs could ease the interpretation of the information transmitted. Currently, Saint Lucians can access local weather data via various websites, but these are prepared for the general public and may not contain the interpretation of the data needed for the farming community. A mobile app tailored to address climate information needs of Saint Lucian farmers could help solve this situation.

This project proposes the design and implementation of the mobile data app, seen as a feasible climate service for the country as there is mobile coverage in most of the island and the large majority of phones presently sold in the country are smart phones. It is expected that the app will strengthen Saint Lucian farmers' ability to timely respond to extreme weather events, thus reducing losses, and allowing them to more easily plan their farm activities using up-to-date weather forecasts. The mobile app proposed can also be used to help the Government agency

CONCEPT NOTE 10**Project title: Improving climate services in Saint Lucia through the development of a free agromet mobile app for the country's farming community**

with responsibility for Agriculture in giving real-time agronomic guidance to the farming community, contributing to improve the productivity of the sector.

The mobile app will be managed by the Government agency with responsibility for Agriculture and in close collaboration with the Meteorological Office, with each institution being responsible for the population of the relevant daily data sets and their analysis. Some aspects of the app can be automated with the compiler generating a prediction of forecasted weather effects and guidance on action for various crops and livestock.

Beneficiaries: All farmers in Saint Lucia

Activities and Tasks

- Design and develop the ICT platform for the mobile app to share climate data and agronomic guidance. The platform should contain a simulator able to predict the potential effects of weather events on the island major crops and livestock breeds.
- Conduct awareness raising campaigns on the app service and utilisation
- Improve Agromet and early warning infrastructure
- Enhance service delivery and warnings to communities

Main outputs/products

Improved early warning and community preparedness, including: (i) strengthening “last mile” connectivity to ensure appropriate understanding and use of information, and (ii) mobilisation and sensitization of community and establishing effective feedback mechanisms for communities at risk

Implementation: Government agency with responsibility for Agriculture and Met Office

Cost estimate USD 300,000

Duration 2 years

Additional information

- This project is aligned with measure 40 in the Agriculture SASAP and can contribute to implementing measures 2, 5, 42 and 45
- The project also supports the implementation of Priority Area 11 of the Draft Agriculture Policy (2016-2021).
- With additional funding this project could be extended to fulfil the needs of fisherfolk.

PROJECT CONCEPT 11. AGRICULTURAL DIVERSIFICATION AND AGRO-PROCESSING FOR INCREASING CLIMATE RESILIENCE IN VULNERABLE FARMING COMMUNITIES

CONCEPT NOTE 11	
Project title	Agricultural diversification and agro-processing for increasing climate resilience in vulnerable farming communities
Objective(s)	<ul style="list-style-type: none"> • To diversify agricultural products and create value chains for empowering youth in vulnerable communities to lead sustainable and climate resilient agri-businesses • To collect and preserve germplasm and biological resources • To increase the range of local and marketable food products
Rationale	<p>With climate change, sea-level rise, lower annual rainfall amounts, but more intense rainfall and tropical storms in the Caribbean and associated flooding episodes, are expected to increasingly affect Saint Lucia’s populations, economic activities and environment in the coming decades. The island’s agriculture sector has already started to suffer from the anticipated impacts of climate change, with damages caused by recent hurricanes, recurrent droughts, pests and diseases contributing to the rapid abandonment of farming activities and to the overall national net import food bill. While banana production for export dominates Saint Lucian farming, it has also declined in the past decades. The diversification of Saint Lucia’s crop production has been repeatedly presented as a logical strategy for adaptation in this sector. In fact, it is promoted in various policies, including the national Climate Change Adaptation Policy of 2015.</p> <p>This project proposes the diversification of food crop cultivation and use and the establishment of sustainable agro businesses in the communities of Mon Du Don and Babonneau, vulnerable to climate variability and change and currently suffering from high levels of youth unemployment.</p> <p>The project focuses on the establishment of a public-private investment venture for agro-processing Saint Lucian aromatic herbs and native fruits. Agro-processing will add value and extend the shelf life of local (including native) fruits which are produced in excess and often lost during the harvesting seasons. The project will also promote the cultivation of aromatic herbs to produce oils and teabags. Young farmers will participate as shareholders in this venture.</p> <p>To identify the products with the greatest potential for the venture, a detailed market study will be conducted within the Organisation of Eastern Caribbean States (OECS) islands. The identified products will be produced and the markets within the OECS tested.</p>
Beneficiaries:	Youth from Mon Du Don and Babonneau and other vulnerable groups. 20 – 50 direct beneficiaries; 80 – 200 indirect beneficiaries.
Activities and Tasks	<ul style="list-style-type: none"> • Identify fruit species to be collected and herbs to be cultivated • Identify the agro-products of the venture through an OECS market study • Establish (acquire if necessary) the production facilities • Introduce the project to unemployed farming youth and identify the participants in the venture

CONCEPT NOTE 11

Project title **Agricultural diversification and agro-processing for increasing climate resilience in vulnerable farming communities**

- Set up of production centres for the products identified as with highest market potential (e.g. oils, tea bags, dry fruit, vinegars, juice wines, etc.)
- Establish gen banks for the species of interest (life of the project)
- Conduct training workshops on material collection/cultivation, agro-processing and business concepts for the youth
- Cultivate herbs, collect fruits and run the agro-processing systems
- Pilot the products locally
- Produce a manual for each successful agro-processing system established
- Conduct a market test at the identified OECS markets.

Main outputs/products

- Germplasm bank
- Agro-processing facilities established
- Company formed and registered
- Market study
- First 6 products elaborated and tested
- Range of products for local consumption

Implementation

Marketing Unit, Government agency with responsibility for Agriculture
Biodiversity, Sustainable Development and Environment Division

Indicative cost: USD 150,000

Duration: 2 years

Additional information

- This project is aligned with the Agriculture SASAP's measures 9, 14, 22 and 43 and can contribute to implementing measures 6,7,18,20,21,34,35,36,37,38 and 45
- This project can build on the experience gained previously by Government agency with responsibility for Agriculture in the implementation of the development of the fruits, vegetables, and roots and tubers value-chains in Saint Lucia

12. CONCLUSION

As Saint Lucia is highly vulnerable to climate change, securing long-term sustainable production and availability of nutritious food that is affordable to Saint Lucians and competitive in national and international markets, requires urgent action. The Agriculture 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 agriculture sector. This SASAP seeks to facilitate the development and scaling up of climate resilient agricultural best practices and inclusive businesses by establishing means to overcome existing policy, legal, regulatory, institutional, technical, financial, business and social barriers.

The implementation of the SASAP will entail a concerted effort by 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 agriculture-specific or -relevant policies, strategies and plans.

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ANNEX 1. POTENTIAL CLIMATE CHANGE IMPACTS ON SAINT LUCIA'S AGRICULTURE SECTOR

Impacts	Repercussions
<p>Impacts of more frequent extreme weather events (intense rainfall events, hurricanes, high winds, storm surges)</p>	<ul style="list-style-type: none"> • Decreased food availability and security.
<ul style="list-style-type: none"> • Widespread crop damage and destruction. • Reduced crop yields • Production, harvesting and post-harvesting operations affected. 	<ul style="list-style-type: none"> • Dislocation of food supply.
<ul style="list-style-type: none"> • Livestock losses. Poultry and small ruminants suffer more extensively and may succumb to the battering of high winds, intense wetting, and drowning. 	
<ul style="list-style-type: none"> • Intense rains and flooding reduced drainage capacity giving rise to waterlogging and saline/sodic soil conditions. • Increased landslide risk. 	<ul style="list-style-type: none"> • Reduction in exports of traditional agricultural products.
<ul style="list-style-type: none"> • Property losses. • Destruction of or damage to agriculture-related infrastructure (irrigation systems, feeder roads, etc.). 	<ul style="list-style-type: none"> • Loss of farmers' income.
<ul style="list-style-type: none"> • Loss of agricultural land: in low lying areas primarily because of flooding; and in slopes because of landslides. 	<ul style="list-style-type: none"> • Weakened farming livelihoods
<ul style="list-style-type: none"> • Increased soil erosion with intense rainfall and runoff, particularly after dry periods, leading to: • Soil nutrient losses and yield declines. • Siltation and contamination of water courses (with residual agrochemicals). • Interruption of potable water supplies. 	<ul style="list-style-type: none"> • Increasing rural unemployment.
<ul style="list-style-type: none"> • Decreased reliability of traditional planting and harvesting schedules based on weather patterns. 	<ul style="list-style-type: none"> • Decline in human and animal health due to reduced food availability/shortages
<p>Impacts of higher temperatures, prolonged and intense dry episodes and drought</p>	
<ul style="list-style-type: none"> • Hot, dry conditions causing heat stress on plants, retarding growth and development and potentially shortening life cycles (earlier senescence), all affecting productivity and yields 	<ul style="list-style-type: none"> • Higher cost of living due to food imports.
<ul style="list-style-type: none"> • Increased demand of water for irrigation to compensate higher evapotranspiration losses and maintain yields (this will vary with crop stage) • Increased water abstraction for irrigation 	<ul style="list-style-type: none"> • Increasing rural-urban migration.
<ul style="list-style-type: none"> • Crop losses with increase pest infestation and disease outbreaks. • Increased incidence or introduction of new agricultural pests. 	<ul style="list-style-type: none"> • Abandoned and lost agricultural lands.
<ul style="list-style-type: none"> • Changes in soil fertility (e.g. soil organic matter content). • Loss of soil nitrogen due to high ambient temperatures, while there is a chance of increased storage of nitrogen as nitrates in soils provide higher fertilising elements for plants. • Diminished land quality from poor soil conditions. • Changes (increase) in agriculture input use (fertiliser and pesticides), increasing the risk of soil salinisation and water contamination. 	
<ul style="list-style-type: none"> • Significant increase in both external and internal livestock parasites • Predisposition to, an increase in, livestock disease. • Reduced livestock fertility and reproductive rates. 	

Impacts	Repercussions
<ul style="list-style-type: none"> • Late maturation of livestock offspring and increase in calf mortality. • Reduction in livestock bodyweight. 	
<ul style="list-style-type: none"> • Decreased productivity of farm labour 	
Sea level rise impacts	
<ul style="list-style-type: none"> • Inundation of coastal land areas leading to high (saline) water tables. • Reduced drainage capacity in low lying areas. • Increased soil salinity due to both, high saline water tables in low lying areas and to increased salinity of river water (due to seawater intrusion into coastal rivers). • Elevated soil salinity levels could lead to the marginalisation, loss and abandonment of agricultural land in low lying areas. • Decline in soil productivity and land quality. • Reduction of crop yields due to both salinised soils and irrigation with brackish water. • Reduction of livestock production with reduced pastures and higher water salinity levels. • Decline in the quality of crop and livestock products. • Increased need for freshwater for irrigation to flush out soil salinity. • Increased cost of production due to increased pressure/competing demands for available water supply. 	

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

Project	Total Investment Cost	Donor/Sponsor	Responsible Institutions	Direct Beneficiaries Targeted	Lessons Learned and Key Success Factors
Enhancing Management of the Water Network and Capacity in the use of GIS Related Technologies to Build Resilience to Climate Change and Climate Variability: Reducing the Risks to Human and Natural Assets Resulting from Climate Change (RRACC) Regional project Period: 2013-2014 Status: Completed	80,000 USD	GEF	DSD, WASCO, WRMA	Targeted beneficiaries in all districts	The equipment provided/procured must be compatible with existing network.
Post-Hurricane Tomas Vegetable Crop Rehabilitation Programme National project Period: 2015 Status: Completed	321,151 XCD (approx. 118,825 USD)	GoSL	DoA	Farmers	Boosted the cultivation and enhancing disaster risk management in order to increase the resilience of the sector, along with private sector interventions geared towards supporting local vegetable cultivation.
Roots and Tubers Programme National project Period: 2015-2017 Status: ongoing	491,000 USD	FAO	DoA	Farmers and families	<ul style="list-style-type: none"> - A successful public-private partnership that provided incentives to farmers in order to increase their production of vegetable crops, including but not limited to, sweet potatoes, yams, cassava, dasheen, banja, carrots, onions, radishes, ginger, cush cush and turmeric. - The volume of these crops purchased by supermarkets has increased. The higher quantity of produce supplied to the

Project	Total Investment Cost	Donor/ Sponsor	Responsible Institutions	Direct Beneficiaries Targeted	Lessons Learned and Key Success Factors
					supermarkets can be linked to the Consolidated Foods Limited (CFL) support programme for farmers, which has contributed to an increased number of farmers supplying produce to the supermarket chain. - Hotel purchases have also risen as a result of improved farmer relations with the hotels and supermarkets.
Development of the Fruits, Vegetables, and Roots and Tubers Value-chains in Saint Lucia National project Period: 2015-2017 Status: Completed	300,000 USD	FAO	DoA, Ministry of Health, Ministry of Education and representatives from the agricultural cooperatives	Families, small scale farmers and overall all the inhabitants of Saint Lucia	- Business models for linking family farms and farmers groups to government food procurement schemes (schools and institutions) and hotels developed, tested and implemented. - Increased volumes of marketable food produced by family farms, small farmers groups and school gardens. - Improved nutritional quality of meals served by the school feeding program, government run institutions and selected hotels, utilising locally produced foods.
Regional Climate Smart Agriculture Competition Regional project Period: 2016 Status: completed	3,000 USD	IICA	DoA	Farmers, NGOs and schools	- Winner from Saint Lucia was Belle Vue Farmers' Cooperative by submitting the project on "The path to sustainability and stability of growth in a changing climate"
Technical assistance for optimisation of meteorological and hydrological monitoring network National project Period: 2016-2017 Status: Completed	40,000 USD	World Bank	WRMA/Project Coordination Unit	Entire country	A road map for strengthening operational weather, water, and climate services was developed. This project feeds into the implementation of the following project: Optimisation of meteorological and hydrological monitoring network through procurement of hydrological and meteorological equipment.

Project	Total Investment Cost	Donor/ Sponsor	Responsible Institutions	Direct Beneficiaries Targeted	Lessons Learned and Key Success Factors
Development of guidelines for watershed management plan preparation and development of one watershed management plan for a critical watershed. National Project End date: 2017 Status: Completed	350,277 USD	World Bank	WRMA	Entire Population	Project was completed recently. Lessons learnt will be provided at a later date.
Lyanola natural resource management of North East Coast Project. National Project Period: February 2015 -2019 Status: Ongoing	Approx. 7,513,426 USD	GEF / GoSL	Forestry Department	North East Coast	Development of management options for the North East Coast of Saint Lucia. The project involves the quantification of ecosystem services, land use planning and bio-physical assessments to determine the best management regimes for the North East Coast.
Climate Change Adaptation (CCA) and Sustainable Land Management (SLM) in the Eastern Caribbean Regional project Period: 2014-2020 Status: Ongoing	149,643 Euro	EU GCCA/OECS	Forestry Department	Farmers	GCCA Mango Project for rehabilitation of degraded lands and riverbank stabilisation. Also, to re-introduce rare native species of mangoes.
Cocoa Revitalization Project National project Period: 2008-2009 Status: completed		5Cs	DoA	Farmers	- Partially responsible for an expansion of the area under cocoa production in Saint Lucia by 300 acres, particularly in Soufrière, Errad, Anse la Raye, Canaries, Micoud, Castries Rural and Vieux Fort Rural.
Cocoa Agro Forestry Project National project	214,250 USD	European Union Global	5Cs and implemented by the	Farmers	- Initiated to implement sustainable adaptation activities related to cocoa cultivation.

Project	Total Investment Cost	Donor/ Sponsor	Responsible Institutions	Direct Beneficiaries Targeted	Lessons Learned and Key Success Factors
Period: 2013-2014 Status: Completed		Climate Change Alliance (GCCA)	Ministry of Sustainable Development, Energy, Science and Technology		- Cocoa, mango and citrus plants were used for slope stabilisation and to replace non-productive banana fields with cocoa plants.
The Disaster Vulnerability Reduction Project (DVRP) National project Period: 2014-2018 Status: Ongoing	68 million USD	World Bank	SLDB	Households and farmers	- Aims to considerably reduce Saint Lucia's risk to natural disasters in an era of climate change. - A critical component of the DVRP is a Climate Adaptation Financing Facility (CAFF). The USD 5 million facility is managed by the Saint Lucia Development Bank, SLDB. - The CAFF's main goal is to provide loans at concessional interest rates to Saint Lucian households and businesses to undertake risk reduction projects and initiatives.
Mainstreaming water harvesting in Saint Lucia National Project Period: 2017 – 2018 Status: Ongoing	22,500 USD	World Bank	WRMA	Island Wide	
Integrating water, land and ecosystems management in Caribbean Small Island Developing States (IWECS)	2,205,446 USD	GEF / GoSL	Forestry Department	Soufriere	
National Project Status: Ongoing					
Optimisation of meteorological and hydrological monitoring network through procurement of hydrological and meteorological equipment.	1,077,689 USD	World Bank	WRMA	Island Wide	

Project	Total Investment Cost	Donor/ Sponsor	Responsible Institutions	Direct Beneficiaries Targeted	Lessons Learned and Key Success Factors
National Project Period: 2017 – 2019 (18 months) Status: Has not started yet					
Consultancy to develop a watershed management plan for Vieux Fort. National Project Period: March 2018 – November 2018 Status: Approved	150,000 USD	CDB / GoSL	WASCO	Vieux Fort and environs	
Strengthening of flood early warning systems and hydrological data collection systems in Saint Lucia National Project Status: Approved	100,000 USD	Korean Government	WRMA	At least 3 communities	