ADAPTATION FUND

ADAPTATION FUND ID
(For Adaptation Fund Board Secretariat Use Only)
Date of Receipt

PROJECT PROPOSAL

PART I: PROJECT INFORMATION

PROJECT CATEGORY:	**REGULAR**
COUNTRY:	**SAINT LUCIA**
TITLE OF PROJECT:	**BUILDING RESILIENCE FOR ADAPTATION TO CC AND CV IN AGRICULTURE - SAINT LUCIA**
TYPE OF IMPLEMENTING ENTITY:	**REGIONAL IMPLEMENTING ENTITY**
IMPLEMENTING ENTITY:	**CARIBBEAN DEVELOPMENT BANK**
NDA:	**DEPARTMENT OF SUSTAINABLE DEVELOPMENT, MINISTRY OF EDUCATION INNOVATION, GENDER RELATIONS AND SUSTAINABLE DEVELOPMENT**
EXECUTING ENTITY:	**MINISTRY OF AGRICULTURE, FISHERIES PHYSICAL PLANNING, NATURAL RESOURCES AND COOPERATIVES**
FINANCING REQUESTED:	**US$9,858,570**

LIST OF ACRONYMS

AF	Adaptation Fund
AESD	Agriculture Engineering and Soils Department
ARS	Agriculture Resource Systems
CARDI	Caribbean Agriculture Research and Development Institute
CARPHA	Caribbean Public Health Agency
CBO	Community-based Organisation
CC	Climate Chance
CCA	Climate Change Adaptation
CCADF	CC Adaptation Fund Facility
CCCCC	Caribbean Community CC Centre
CCMDG	CC Multidisciplinary Group
CCILLC	CC Interpretation and Learning Laboratory Centre
CV	Climate Variability
CDB	Caribbean Development Bank
CDEMA	Caribbean Disaster Emergency Management Agency
CDERA	Caribbean Disaster Emergency Response Agency
CBDRM	Community Based Disaster Risk Management
CPA	Country Poverty Assessment
DAFNC	Department of Agriculture Fisheries Natural Resources and Cooperatives
DEAS	Department of Extension and Advisory Services
DOF	Department of Forestry
DRR	Disaster Risk Reduction
DRM	Disaster Risk Management
DRRM	Disaster Risk Reduction Management
DMS	Department of Meteorological Services
ECHAM5	European Centre Hamburg Model
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESPAF	Environmental and Social Policy of the Adaptation Fund
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
FFS	Farmer Field School
GAPs	Good Agriculture Practices
GCCA-GoSL	Global CC Alliance- Government of Saint Lucia
GCMs	Global Climate Models
GDP	Gross Domestic Product
GDI	Gender Development Index
GEF-UNDP-SGP	Global Environment Facility United Nations Development Programme Small Grants Program- Saint Lucia
GHGs	Greenhouse Gases
GII	Gender Inequality Index
GIS	Geographic Information Systems
GNI	Gross National Income
GoSL	Government of Saint Lucia
HACCP	Hazard Analysis Critical Control Points
Had CM 3	Hadley Centre Climate Model
HDI	Human Development Index
IICA	Inter-American Institute for Cooperation on Agriculture
IPCC	Intergovernmental Panel on CC
IPM	Integrated Pest Management
IPRSAP	Interim Poverty Reduction Strategy and Action Plan
ITT	Informal Technical Team

km	kilometres
kW	kilowatt
LUCELEC	Saint Lucia Electricity Services Ltd.
M&E	Monitoring and Evaluation
MIPEL	Ministry of Infrastructure, Ports, Energy and Labour
MIPST	Ministry of Infrastructure, Port Services and Transport
mm	millimetres
mn	million
MSJEEY	Ministry of Social Justice, Equity, Empowerment and Youth
MOA	Ministry of Agriculture
MOH	Ministry of Health
MOU	Memorandum of Understanding
MTDSP	Medium–Term Development and Strategic Plan
NAP	National Agriculture Policy
NEP-NEMS	National Environmental Policy-National Environmental Management Strategy
NASAP	National Adaptation Strategy and Action Plan for Tourism
NCCAP	National CC Adaptation Plan
NCCPAP	National CC Policy and Adaptation Plan
NCD	Non Communicable Diseases
NEMO	National Emergency Management Organisation
NETS	National Energy Transition Strategy
NGO	Non-Government Organisation
NLP	National Land Policy
NSPP	National Social Protection Policy
NURC	National Utilities Regulatory Commission
NWA	National Water Policy
OAS	Organisation of American States
OECS	Organisation of Eastern Caribbean States
PAS	Protected Agriculture Systems
PMU	Project Management Unit
POPs	Persistent Organic Pollutants
PROPEL	Promotion of Regional Opportunities for Produce Through Enterprises and Linkages
PRA	Participatory Rural Appraisal
PSC	Project Steering Committee
RE	Renewable Energy
RWHS	Rainwater Harvesting System
SALCC	Sir Arthur Lewis Community College
SASAPs	Sectoral Adaptation Strategies and Action Plans
SDED	Department of Sustainable Development
SDS	Saint Lucia Development Strategy
SIDS	Small Island Developing States
SLAFY	Saint Lucia Agriculture Forum for Youth
SLBS	Saint Lucia Bureau of Standards
SLC-HBS	Survey of Living Conditions and Household Budgets
SLDB	Saint Lucia Development Bank
SLRNWP	Saint Lucia Network of Rural Women Producers
SLHTA	Saint Lucia Hotel and Tourism Association
SMB	Saint Lucia Marketing Board
SNC	Second National Communication
TNC	Third National Communication
VALIRI	Vaughn Arthur Lewis Innovation and Research Institute
UNDP	United Nations Development Programme
UNECLAC	United Nations Economic Commission for Latin America and the Caribbean
UNFCCC	United Nations Framework Convention on CC

WASCO	Water and Sewerage Company Inc.
WMPDC	Water Management Plan for Drought Conditions
WRMA	Water Resources Management Agency
YAEP	Youth Agriculture Entrepreneurship Project

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1. PROJECT/PROGRAMME BACKGROUND

Project Context

Geography and Environmental Context

1.01 Saint Lucia is located at latitude 13N 59W within the Lesser Antillean Arc of the Caribbean Archipelago. The island is 42 kilometres (km) long and 22 km wide, at its widest point with coastline of approximately 158 km. The land area is approximately 61,600 hectares of which 22% is under agriculture. Like many small islands and low-lying states of the Caribbean, the country is highly vulnerable to the adverse effects of climate variability (CV) and climate change (CC). Saint Lucia is already experiencing the impacts from CC, which are expected to intensify over the next several decades. Current and future impacts include saltwater intrusion into already stressed ground water sources due to sea-level rise, reef degradation, loss and bleaching arising from elevated sea temperatures, reduced agriculture production from declining and unpredictable precipitation and elevated temperatures, the spread of water and vector borne diseases such as malaria and dengue, and increased damage due to the intensification of hurricanes, high intensity rainfall events which also trigger physical hazards such as landslides.

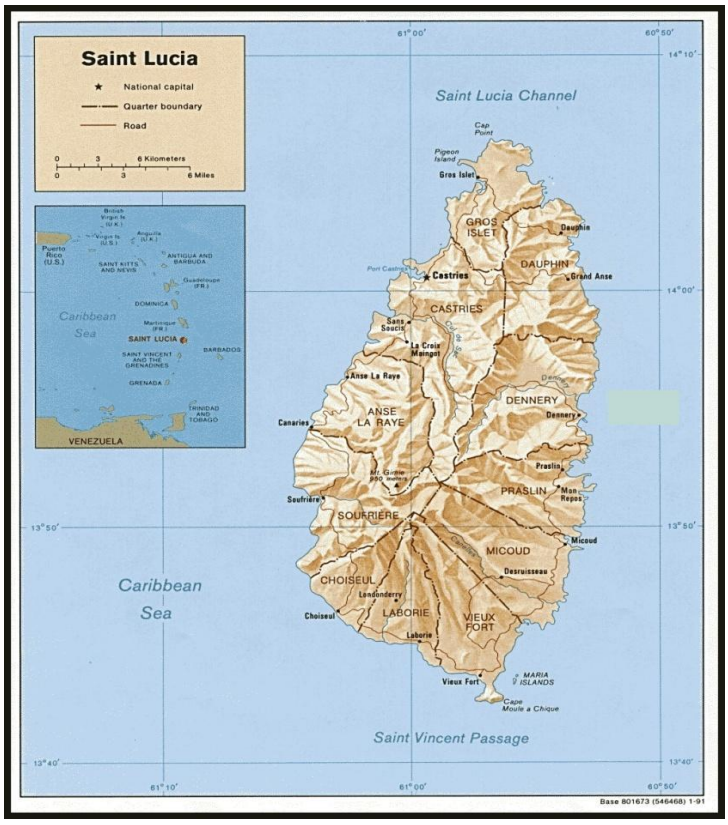

Figure A. Map Showing Location of Saint Lucia

1.02 Saint Lucia also exhibits many other characteristics which typify Small Island Developing States (SIDS), such as small open economy, vulnerable to external shocks, relatively weak administrative and governance systems to plan and implement climate actions. Therefore the country faces[1] disproportionately high CC impacts and has low capacity to respond appropriately to reduce its vulnerability to CC at all spatial and sectoral levels.

1.03 The country lies within the north-east trade wind belt and is normally under an easterly flow of moist warm air. Ambient sea surface temperatures deviate minimally from 26.7°C at any given time, rarely rising above 32°C or falling below 21°C. There is an almost constant amount of surface solar radiation over time. Together, these factors combine to give the island a tropical maritime climate, characterised by warm air temperature.

1.04 Weather is influenced by synoptic weather systems such as the Atlantic High-Pressure System (Bermuda Azores), surface, mid and upper level low pressure systems, the Inter-Tropical Convergence Zone, tropical waves and cyclones and the occasional frontal system. Mesoscale and microscale weather features also affect the island. Compared to the interior lands, the coastal areas are more exposed and vulnerable to the potential impacts of tropical storms and hurricanes. These events are becoming more intense and can have devastating impact, on climate sensitive sectors such as agriculture.

1.05 There are 37 watersheds, characterised by volcanic soils with a topography dominantly of steep and unprotected slopes (Figure B). As a result, most of the surface overflows and river channels flow quickly to

[1] UNECLAC: An assessment of the economic impact of CC on agriculture sector in Saint Lucia (2011); Building Climate Resilience in the Agriculture Sector in Saint Lucia (2015); Third National Communication on CC in Saint Lucia (2017).

Figure B. Map of Topography

the sea and cause severe soil erosion. This poses significant long-term challenges to the availability of water for economic productivity, particularly in the agriculture sector. Research is ongoing on groundwater resources and the potential contribution to sustainable economic activity, including availability for the agriculture sector.

Rainfall and Frequency in Droughts:

1.06 The country's geographic location and topography substantially influence rainfall patterns. Annual rainfall amounts vary from 1,265 millimetres (mm) in the relatively flat coastal regions to 3,420 mm in the elevated interior region. There is a distinct rainfall climatic season; a wet season of six months from June to December, during which 70 % of total annual rainfall is received and a dry season from January to May/June. Thirty-year series rainfall data provided by the Department of Meteorological Services (DMS), (Figure C) below, show average annual rainfall of 1,534.8 mm over the period 1987-2017.

There is a significant variation in annual dry months across the country ranging from one month to nine months, with annual cumulative moisture concentrated in the interior as shown in Figure D.

1.07 The DMS declared ten years of drought between 1987-2017 with six of these occurring between 2001-2015. During the drought years, annual rainfall amounts ranged from between 1,040 – 1,381 mm. This data suggests a trend towards an increase in drought frequency.

1.08 Concerns regarding the extent of drought events in 2001 through 2004, triggered the preparation of a Water Management Plan for Drought Conditions (WMPDC) approved in 2009. Additionally, a Water Resources Management Agency (WRMA) was established in 2010. The WMPDC (2009) suggests that, with CC, the trend in the annual drought pattern susceptibility, coupled with the geographic distribution, could result in expansion of water deficit zones in the east and interior of the country. This in turn could have serious implications for rain fed agriculture, with adverse impacts on livelihoods, income generation, employment and food security.

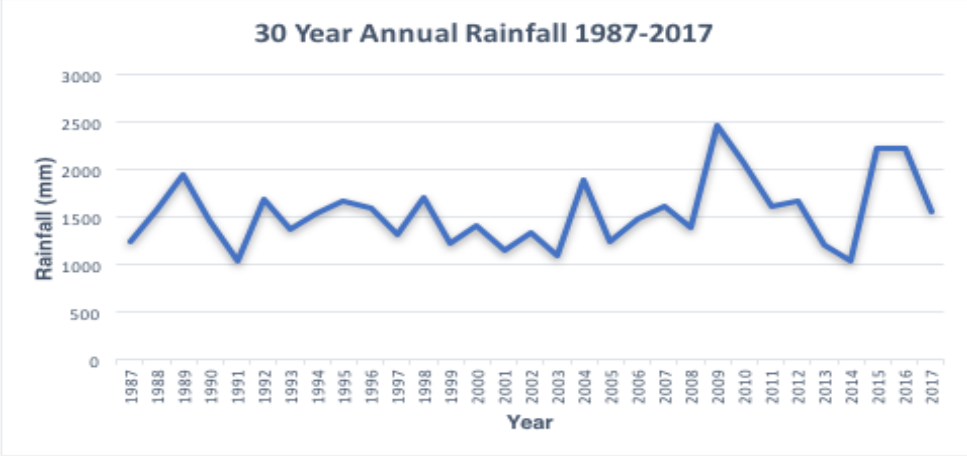

Figure C: Total Rainfall 1987-2017 -Saint Lucia -Source: (DMS).

1.09 One of the weaknesses of the WMPDC is that it makes no special considerations for preparations in the agriculture sector, further drought alerts do not include advisories for the agriculture sector. There is no

forecasting for agricultural droughts, neither are official provisions made for this sector from the public water supply during drought conditions.

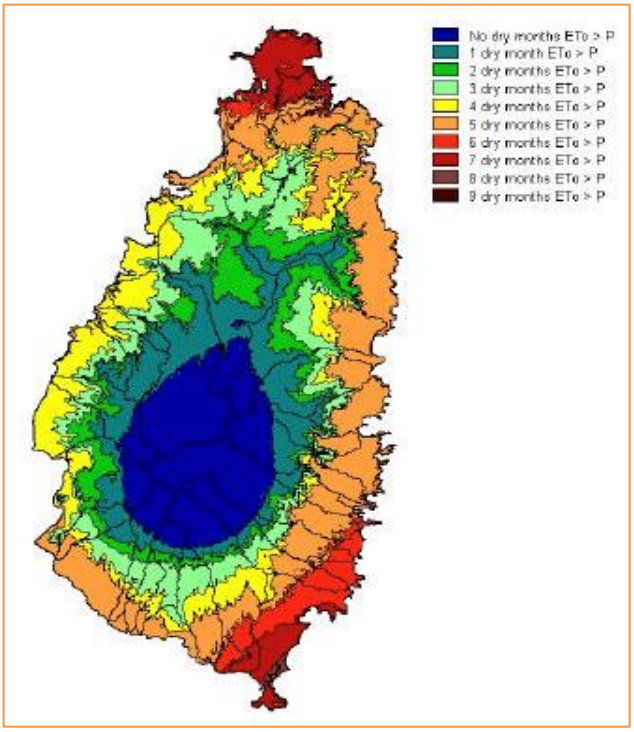

Figure D: Spatial Distribution of Annual Dry Months and Cumulative Moisture in the Interior

1.10 With no official agricultural production data, it is difficult to assess the impact of declared drought years on the sector. There is however, a well-established hydro-meteorological network, including 18 rainfall stations. The agriculture sector could benefit from this network as well as from a strategy to incorporate agriculture drought alerts. This will assist in tracking the impact of CC and CV on rainfall; agricultural production and productivity; and by extension, the livelihoods of those populations, highly dependent on farming.

1.11 The challenges of the water sector are more severe for agriculture since holdings operated by 70 % of the farmers are wholly rain fed. These holdings are located mainly on slopes and mainly shallow rooted vegetable, root crops and vine fruits. The increasing length of the normal seasonal droughts and the evidence of unexpected country-wide droughts during the wet season, are strong indicators of expected new challenges and represent potentially major obstacles for resilient farming.

Hurricanes and Related Events

1.12 Saint Lucia's geographic location exposes the island to hurricanes and tropical storms that can be particularly damaging to the agriculture sector. During the period 1960 to 2016 the impacts on the sector, and in particular the farming communities resulted in the loss of 41 lives, 13 persons missing and 370 injured. Damage and losses were estimated at US$562[2] million (mn) dollars to the sector (Appendix 1). The increasingly devastating nature of extreme hydro-meteorological events was evident with the passage of Tropical Storm Tomas over the island in 2010. During this event, the agriculture sector suffered losses and damages in the amount of US$336 mn or 60 % of total recorded losses and damage for the period 1960-2016. The damage was extensive, due primarily to landslips and extensive soil erosion resulted in loss of thousands of hectares of open-field crops, sedimentation in rivers and coastal areas, flooding and loss of seven lives. The extent of landslips in numbers and sizes, were reportedly due to the cracked and loose volcanic soils from the prolonged drought period. Between 2009-2010 major damage was experienced in the west, south-west part of the country. This is also the geographic area of the proposed project.

[2] Rounded cost of loss and damage.

TABLE 1: HYDRO-METEOROLOGICAL EVENTS IN SAINT LUCIA AND IMPACTS ON THE AGRICULTURE SECTOR

Year	Events	Total Damage & Loss (USD)	Types of Damage
2010 - 2016	3	358,156,399	Loss of crops, livestock fishing boats sank with damages to engine; landslips taking irrigation systems and other farm assets, siltation and sedimentation, destruction of river banks due to siltation and flooding, damage to nearshore fisheries affecting coral reefs, seagrass and fisheries
2000-2009	5	17,872,127	Many landslides and extensive soil erosion
1990-1999	3	90,024,424	Many landslides extensive soil erosion
1980- 1989	1	92,592,593	Landslides and soil erosion
1970-1979	0	0	Landslides and soil erosion with much loss of crops
1960-1969	4	2,549,630	Landslides
GRAND TOTAL		**US$561,195,169**	Landslides

Source: Ministry of Agriculture, Fisheries, Physical Planning, Natural Resources and Cooperatives

1.13 The Rapid Damage and Loss Assessment of a flood event of December 2013, jointly undertaken by the Government of Saint Lucia (GOSL) and the World Bank in 2014, provides further worrying information on the likely impact of future CC and CV on Saint Lucia due to the country's natural susceptibility to landslides (Figure E) below. The Report describes the most common type of landslips in Saint Lucia as debris flow; a rapid movement of a mass of soil, water and air that can travel long distances, and approaches rapidly with considerably destructive force. The document concludes that for the agriculture sector, over time, the frequency and intensity of damaging events from landslips and flooding will affect the most vulnerable among the population including the rural poor. It indicates that agriculturists are expected to be especially impacted. The landslide susceptibility map at Figure E and Table 1, show landslips as a major source of destruction to farm assets during high rainfall events. If continued, poor agricultural practices will increase the risk of landslides with deleterious impacts on the sector and livelihoods in rural communities.

Temperature, Wind and Relative Humidity

1.14 The small size and geographic location of the country, results in very little annual variation in air temperatures over the island. However due to the hilly topography, temperature varies between high and low lying regions, ranging from 2°C to 5°C. Wind speeds and relative humidity are on average highest during the months of January to July, corresponding roughly with the dry season. Evaporation rates are highest during the dry months, but the difference is not significant throughout the year.

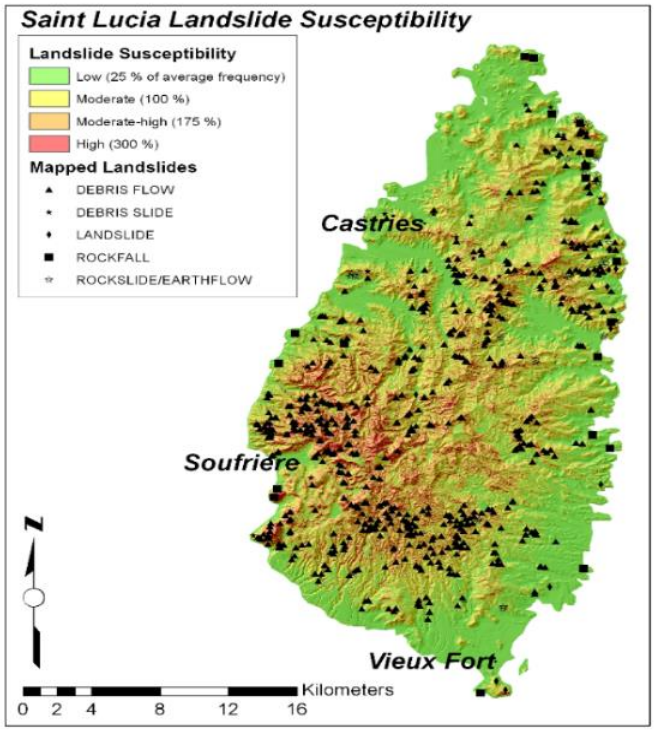

Figure E: Map of Landslide Susceptibility

Predictions for Future Climate Change and Climate Variability and Impacts

1.15 Regional downscaled scenarios based on the PRECIS version of the HadCM3 and ECHAM5 climate models provide information on future temperature and rainfall are documented in the Saint Lucia's Third National Communication (TNC-2017) and summarized in Table 2. Predictions show a significant decrease in rainfall over the same periods, beyond the 2020s. Saint Lucia could continue to experience decreasing rainfall over the entire country. Furthermore, the data suggests decreases will be persistent on the east coast, but more significant over the west and central areas during the period 2081-2100. Greater declines will be experienced in the seasonal dry months (January to May/June) especially on the west and south-west and in the interior.

1.17 Of importance to the project's strategic approach to CC adaptation, is that the declines in rainfall will predictably, be slower during the wet season on the west of the island. This will provide opportunity to continue to build adaptive capacities in water saving methods and soil-water conservation practices. These will allow the crop sector in particular, to remain resilient with the predictions for significant declines during the seasonal dry months. Temperature changes predicted for the period 2040-2069 and 2081-2100 are below 1°C. However, this small temperature difference can have lasting and impactful consequences on agricultural biodiversity.

TABLE 2: RESULTS OF CLIMATE SCENARIO ON FUTURE RAINFALL AND TEMPERATURE (2040-2100)[3]

Rainfall Season	HadCM3		ECHAM5	
	Period in years		Period in years	
	2040-2069	2081-2100	2040-2069	2081-2100
Wet season June to December	- 25 mm/season on west coast and - 60mm/ season for the rest of the island	-350 mm /season to -400 mm /season	General decrease to -75mm/season for most of the island	+65mm/season to +75 mm for most of the island
Dry season January to May	-25mm/ season on the east coast; for the rest of the island -100 to -125 mm/season	-75 mm/season over most of the island	General decrease over most of the island to -75mm by season	-75 mm over most of the island
Temperature	Period in years		Period in years	
	2040-2069	2081-2100	2040-2069	2081-2100
Air temperature Wet season	1.75° C.	2.75 to 3.0° C.	1.25 to 1.75° C.	3.0 to 3.25° C.
Air temperature Dry season	2.5° C.	2.75 to 3.0° C.	1.251° C.	3.0 to 3.25 ° C.

Predictions on Agriculture and Future Climate Change and Climate Variability

1.18 The TNC (2017) reports that future CC and CV on agriculture is predicted to cause severe water shortages, which could result in reduced acreages suitable for agriculture. Further, there could be cascading effect with negative impacts on household food security, loss of rural livelihoods, dislocation of populations and challenges to sustainable development in rural areas. Sectors such as forestry, marine biodiversity, tourism and health, linked directly or indirectly to agriculture through food production and ecosystem sustainability, would also be adversely affected.

1.19 United Nations Economic Commission for Latin America and the Caribbean (UNECLAC)[4] (2011) and TNC (2017) document specific findings from rising temperatures on farming systems and possible threats to production, including lower yields in tomatoes, peanuts and other legumes. They also predict a shorter growing season or cooler growing conditions for leafy vegetables such as lettuce, broccoli and spinach, while other crops such as melons and okras will do well. Leafy vegetables will be under serious threat with increasing intensity of hurricanes and the increased frequency and duration of droughts. However, the level of risk for vegetables will be lower than for other crop types due to the quicker restoration of vegetables. There is the potential for higher levels of productivity and the range of climate adaptation options for Protected Agriculture Systems (PAS) with CC and CV. Some crops specifically, cabbage *(Brasssica spp.*), lettuce (*Cruciferous*), cucumber (*Cucumis spp.*), sweet pepper, hot peppers (*Capsicum spp.)*, carrot (*Daucus spp.*), okra, (*Abelmoschus spp.*) and pumpkin (*Cucurbita spp.*), will be less threatened if temperature variations are short term. However, with any rise in temperature, tomatoes– the lead crop grown by small farmers, could require cooler ground, and soil-water conditions, from rainfall above an annual mean of 1,568.52 mm in rain fed systems.

1.20 Fruits and grains could be affected even under well-watered conditions, if temperatures exceed maximum i.e. above 2°C rise. Root crops, including sweet potato, yams, taro, dasheen and ginger would be able to adapt to short-term variations in temperature, but would be threatened by long-term variation in temperature rise and rainfall below the mean baseline, (1,658 mm) based on the ten-year series of rainfall.

1.21 Tree crops will be affected by temperature increases but to a lesser extent than the vegetable group. Rainfall is already at the lower range for some important tree crops. Therefore, tree crops will show negative and perhaps significant levels of declines in yield with a decrease in rainfall. These include breadfruit which is already at the lower level for economic crop yields; avocado for which the average annual rainfall is well below desired crop yields; and soursop, mango and pineapple which are just within the range for sufficient

[3] Climate scenario results are also captured at Appendix IX.
[4] An Assessment of the Economic Impact of Climate Change on the Agriculture in Saint Lucia (UNECLAC-2011).

water for optimal yields. In general, tree crops in the absence of CC adaptation practices to ensure water security in farming systems will not do well.

1.22 Direct impacts on livestock, will be related mainly to heat stress, and cooler weather associated with prolonged rainfall periods. Indirect impacts will be related to the deterioration of pasture for grazing, and tree species, used for cut-and-carry feed, that are susceptible to drought conditions. There will also be reduced access to water for drinking.

Predictions of Future Scenarios of Climate Change and Climate Variability on the Marine Ecosystems, Nearshore and Coastline Activities

1.23 The TNC (2017) reported, that future CC and CV, will also threaten coastal and marine ecosystems, fish harvest and physical infrastructure on the coastline. These will indirectly impact the agriculture sector, and all are likely to have further negative impacts on vulnerable populations in rural farming communities. Threats to coastal and marine ecosystems will include sea level rise, storm surges, elevated sea temperatures and ocean acidity. Increased sedimentation and pollution from industrial waste will also be a problem given the small size and topography of the country. Mangroves, sea grass, coral reefs and other marine ecosystems which support the tourism sector, could be threatened. Infrastructure including hotels, ports, seaside restaurants and marine sports could be significantly affected reducing the attractiveness of Saint Lucia as a tourist destination. These impacts presents serious threats to employment and income generation including in rural communities and agriculture estates that are heavily involved in agri-tourism activities. In turn, this could result in adverse impacts on poor households in rural communities that depend on agri-tourism activities for livelihoods, as well as to supporting services such as taxi-operators and tour guides.

1.24 Studies on the fisheries[5] sector, report that fishing villages and low lying agricultural lands are also at risk. Predictions are, that fisheries productivity would shift largely away from tropical regions to regions of higher altitudes. A decrease in catch potential of 10-20% by 2050, relative to the 2005 catch potential, is foreseen for Saint Lucia. Low lying agriculture lands will be challenged by poor drainage and salt water intrusion, requiring a need to search for salt tolerant food and feed species.

Characteristics of Agriculture Sector

1.25 The total land area under agriculture production is 13,771.2[6] hectares of which only an estimated 3,449.6[7] hectares (5.6 % of total land area) is suited to cultivation due largely to the extent of steep slopes and to soil type. The country's land capability map shows most of the land is technically unsuitable for conventional cultivation. Farm size varies from less than one quarter of a hectare to just over 55 hectares with 11,000 holders, providing livelihood security for a farm population of 32,919 persons (Census of Agriculture -2007). An estimated 74% of holders operate on land under 2.5 hectares and 45% of these holdings are less than one hectare. These farms are mostly located in clusters scattered across hillsides. The 2007 data also show that 30% of the holdings were owned by female farmers.

1.26 The farm holders make up 22% of the national population (Census of Agriculture 2007). The average age of farmers is 55 years and the most productive farmers are between the age of 45 years and 55 years. Female farmers are normally above 30 years of age, with the average age estimated at 55 years. The crop subsector is the largest and the most productive with most farmers growing leafy vegetables, vine fruits, root crops, and tree crops to the lesser extent. There are 300 listed livestock farmers of which an estimated 52% are females. Most of these farmers husband small ruminants and pigs and nearly all grow crops. Registered small scale fisherfolk number 1,700. There is a smaller number of inland fisheries or aquaculture farmers. Many farmers are involved in all three subsectors.

1.27 In general, the sector has largely small farmers practicing subsistence to semi-commercial rain fed farming, except for a small number of farms which access water directly from the river. Only about 2% of

[5] Pauly 2010- Restructured Total Catches by the Marine Fisheries of Small Island States in the Wider Caribbean (Robin Ramdeen; Daniel Pauly, et al (2010).
[6] Census of Agriculture (2007).
[7] Toward the Establishment of Agriculture Land Bank in Saint Lucia (2017).

the total number of farmers have access to water from established irrigation systems. Most small-scale livestock farmers carry water to their animals. Farmers with access to water from a river or from established irrigation systems are eligible for registration by the major local, fresh produce buyers. Buyers in Saint Lucia however, do not establish binding contractual arrangements with farmers.

1.28 There is a general[8] lack of capital, technical assistance, business focus and ability to respond to value-added fresh produce and processed foods, in the domestic and regional marketing of farm produce. A review of the land tenure system (The Brown and Company Review, 2009) concluded that opportunities to respond to growth[9] in the tourism and hospitality sectors and a growing demand for food security, have not been fully exploited. Export and import data for the period 2010 to 2017 (Figure I below) provides further evidence of this.

1.29 There are three well established farmers' organisations comprising an estimated 450 males and females across the project areas. These organisations are involved in crops, livestock, as well as integrated farming systems. The Saint Lucia Rural Network of Women Producers (SLRNWP), a group comprising 70 rural women is a member of the Caribbean Network of Rural Women Producers. They are mostly involved in small scale agri-processing. There is also the Youth Agri-Entrepreneurial Program (YAEP) comprising 150 young people focused on integrated farm production including crops, livestock, poultry, aquaculture and greenhouses. Another youth group, active in the project area, the Saint Lucia Agriculture Forum for Youth (SLAFY), focuses on facilitating agri-business development and modern climate smart technology.

1.30 Capacity building for farmers is largely the function of the Department of Extension and Advisory Services (DEAS). It has over the last decade, institutionalised the Farmer Field School (FFS) approach to extension and training in each of the eight Agricultural Regions. Women and youth are actively engaged in the programme. Currently there is no focus on capacity building for improved CC adaptation practices in agriculture.

Observed Impacts of Changes in Rainfall at the Farm Level

1.31 Incomplete data shows reduced flows from rivers. Farmers complain of difficulties in satisfying farm water needs for irrigation by pumping from the rivers. Specifically, farmers describe variability in rainfall as unexpected dry spells and higher rainfall peaks during the normal wet period, with annual monthly variation. These changes have resulted in delays in planting dates. In severe cases, farmers have moved to more favourable conditions in the wet interior. Farmers also perceive an increase in insect pest infestation in some root crops and increasingly higher labour costs for control of weed infestation. Other observations include warming of rivers, a change in the type of freshwater fish, poor drainage, and salt water intrusion into the low-lying farms on the west coast.

1.32 The observations cited by farmers align with the findings of SNC (2015) and TNC (2017). These report that the agriculture sector and particularly the largely rain fed small farming communities will likely be the first populations to experience the adverse impacts of CC and CV on the country. The outlook suggests that the agriculture sector could become increasingly dependent on harvested water from direct rainfall, resulting in serious challenges for the survival or regeneration and protection of food, feed species, and plant varieties. As a consequence food security, incomes and employment generation, will be directly affected. The population most sensitive to these changes are the 32,919 persons within the small farm family population, which has the higher concentration of the poor and marginalised.

[8] Legal Review of the Land Tenure System in Saint Lucia (Brown and Company-2009).
[9] ESR 2017 reports the stay over tourists grew by 25.6 percent during 2007-2017.

Socio-Economic Context

Social

Demography and Human Development

1.33 In 2017, the population of Saint Lucia was 174,417 (Economic and Social Review -2017) with 33% between 15 years and 34 years and 50% of the population being female. The size of the labour force declined by 2.3% in 2017 to 102,300 with labour force participation rate estimated at 71.4%. Women account for 48.7% of the employed labour force. Youth unemployment in 2017 was 38.5% showing no change from 2016.

1.34 Saint Lucia's Human Development Index (HDI) value[10] for 2017 was 0.747 placing the country in the high human development category and positioning it at 90 out of 189 countries and territories. Progress in each of the HDI indicators showed that between 1990 and 2017, life expectancy at birth increased by 4.6 years. Mean years of schooling increased by 1.9 years and expected years of schooling increased by one year. Saint Lucia's gross national income (GNI), per capita increased by about 23.5% between 1990 and 2017. The country's Gender Development Index in 2015 was 0.993 and in the same year its Gender Inequality Index value was 0.333 ranking it at 74 out of 160 countries.

Gender, Youth and Poverty

1.35 The Population Census (2010) recorded an estimated 28.8% of the population living below the poverty line and 40.3 % of the population as being vulnerable to poverty. However, Saint Lucia recorded a reduction in poverty over the period 2006 and 2016 from 28.8% to 25.0%.[11] This decline was most pronounced in the rural areas of the country with a reduction from 41% to 32.9%. Despite this reduction, poverty in rural Saint Lucia remains high in the context of agro-ecological zones, and is manifested in agricultural communities. The poverty gap fell nationally by 1.5 % between 2006 and 2016 to 7.5 %. On the basis of the Labour Force Survey (LFS) Multidimensional Poverty Index (MPI)[12], in 2017, 45% of persons were deprived in at least 25% or more of the 11 deprivation indicators. On the basis of the 2016 Survey of Living Conditions and Household Budgets (SLC-HBS), the level of multidimensional poverty was computed to be 28%. The MPI included dimensions of citizen security, food security and health insurance along with three indicators on CC vulnerability[13]. In addition to high levels of income and multidimensional poverty, inequality[14] continues to be an ongoing concern, and is influenced by access to resources and the disconcertingly high level of unemployment across population groups, particularly among females, many of whom are heads of poor and/or vulnerable households.

1.36 Against this background poverty is predominantly and persistently a rural phenomenon. Figure F shows the high concentration of poverty in districts. In some of these communities, head counts are as high as 35-43.6%. There are higher concentration of the poor living on the west, south-west and parts of the east of the country. The high levels of poverty have been attributed to declines in the agriculture sector, starting at the beginning of 1990's with the loss of the banana industry which was then the primary economic activity in the country. Based on the more recent survey data, the poverty level fell over the period 2006 and 2016 from 28.8% to 25.0%. This decline was most pronounced in the rural areas of Saint Lucia with a reduction in

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[10] http://hdr.undp.org/en/content/human-development-index-hdi
http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/LCA.pdf.

[11] Saint Lucia National Report of Living Conditions - Summary Report (2016:2). This Report was prepared with CDB's support under the Enhanced Country Poverty Assessment (CPA) Programme.

[12] The MPI is an index designed to measure poverty through the measurement of deprivations. Multidimensional poverty refers to two main characteristics. Firstly, it includes people living under conditions where they do not reach the minimally nationally agreed standards in indicators of basic functioning, such as being healthy, or being vulnerable to health risk, and being educated and informed. Secondly, it refers to people living under conditions where they do not reach the minimum standards in several aspects at the same time. In this regard, the MPI combines two key pieces of information to measure acute poverty, the incidence of poverty, or the proportion of people (within a given population) who experience multiple deprivations and the intensity of their deprivation – the average proportion of (weighted) deprivations they experience.

[13] Enhanced CPA Report (2016: 209).

[14] CPA (2006) and the Enhanced CPA (2016) reported a Gini Coefficient of 0.4 which translated to the poorest 20% of the population enjoying 5.7% of expenditure compared to almost 50% enjoyed by the richest 20%.

poverty levels from 41% to 32.9%. Indigence or food poverty – not having adequate food to maintain bodily health – fell to 1.3 percent in 2016 from 1.6 percent in 2006: it was 7.1 percent in 1995. The poverty gap fell nationally by 1.5 percent between 2006 and 2016 to 7.5%. Poverty in 2016 was almost half of the level in urban areas compared to rural areas.

1.37 More[15] than 50% of the poor are under the age of 20 years and poverty is slightly higher among men than women: 29% and 25%, respectively. Twenty four percent of the households are headed by females and 17.4% headed by males are poor. The largest percentage of poor males are engaged in agriculture and forestry.

1.38 Sex disaggregated data for the agriculture sector is unavailable or outdated. The most recent information available comes from the Census of Agriculture St. Lucia 2007[16] which provides some insights. An analysis of farm holdings by sex showed a disparity between male and female holders, with females at 30% and male holders 70%. Low levels of female ownership and tenancy becomes important in matters of accessing credit and finance as documentation (land deed/title) of ownership for purposes of collateral is usually a requirement of lending institutions. Further, more men owned agriculture equipment which supports improved efficiency and productivity such as: trucks/vans, water tanks, pumps and sprinklers, than their female counterparts. The analysis of income data points to a tendency for women to mitigate income loss from other non-agricultural sources, while men seemed better able to derive increased income from agriculture as well as outside of the sector.

1.39 On a regional level, the CDB Country Gender Assessment Synthesis report (2015) for ten Caribbean countries found indications of gender-related barriers. It should be noted that the statistics focus was mostly on formal wage labour and therefore the number of women in subsistence agriculture or working on family farms is not quantified. The report showed that the proportion of males participating in the agriculture sector is higher than females. The analysis suggests that the unequal participation of women and men in agriculture is tied to access to land, credit and other means of production. Also limited access to information and market networks and weak capacity of women's group, might limit their participation in the sector. A more detailed gender assessment is provided in Appendix II and further comprehensive gender assessment will be conducted as an initial activity of the Project [TOR in Appendix VI(i)].

Poverty Climate Change and Climate Variability

1.40 The extent of poverty, in rural areas and specifically,[17] in the agricultural communities could worsen with CC and CV, based on the projections of changing rainfall patterns and decreases in annual rainfall in the wet season. This is likely to be exacerbated by more dry spells and droughts from drier and earlier dry seasons.

1.41 Economic[18] analyses on impacts of CC also revealed that while short, variations giving rise to higher temperature could be managed with adaptation, long variations even though small, could adversely impact crops and small livestock. The country is divided into eight Agriculture Regions, with small farms scattered all across the island. This provides a good indication of the importance of resilient small farming activities at the household level, and the scope of any adverse impact on livelihoods security whether for income generation, employment creation or for household food security.

1.42 Small size of land area under agriculture will also be a factor in CC and CV, as due to rugged topography, there is no opportunity to relocate. The threat to farming systems and to livelihood security, and food production posed by CC and CV, require the most urgent action for a deliberate programme of adaptation measures to building resilience in the agriculture sector.

1.43 The[19] poor and marginalised, mostly concentrated in farming populations (ESR 2016) will be the first to experience these adverse outcomes due to inherent sensitivity to changes and are likely to be exposed to persistent and worsening livelihood circumstances, even without further global warming.

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[15] Economic and Social Review 2017.

16 Paul, Rufina (2007): Gender Dimensions of the Agricultural Sector

[17] Saint Lucia Second National Communication to the UNFCCC (2015).

[18] UNECLAC- Assessment of Economic Impact of Climate Change on the Agriculture Sector in Saint Lucia (2011).

[19] Saint Lucia Second National Communication to the UNFCCC (2015).

1.44 Some of the major CC challenges will be experienced more quickly by the poor, and increasingly deepening changes in livelihood security will emerge from social, economic, cultural and environmental issues including (a) inability for small-scale farmers, backyard farmers and subsistence food producers (two hectares and under) to continue growing food on the scale that they currently do. This will result in loss of rural livelihoods directly or indirectly related to agriculture and the potential of increasingly higher demand on the share of household expenditure to purchase food (b) social instability and serious conflicts over access to land with rivers and springs, for food production and beach area in fishing communities (c) increasing rural urban drift (d) inability to keep children in school due to shrinking incomes (e) changes in agro-ecological and marine eco-systems that could change food production systems naturally, requiring a whole new culture to cope or to positively affect welfare at the rural household level.

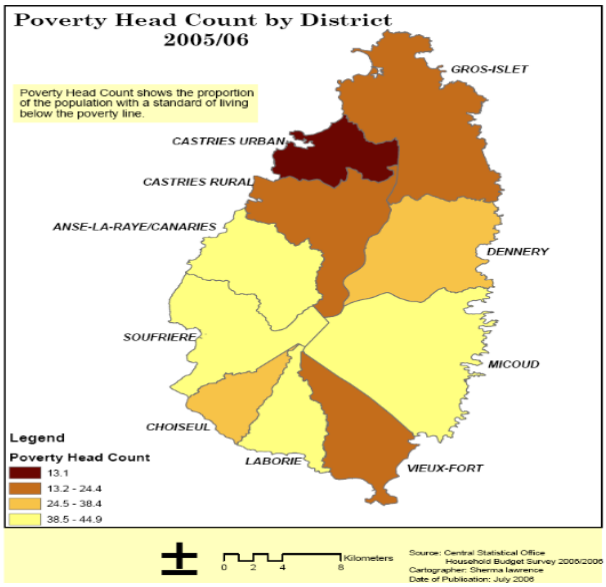


Figure F: Poverty Head Count by District

Economy

1.45 The economy of Saint Lucia is highly dependent on sectors, which are sensitive to the vagaries of CC. These sectors include tourism and agriculture, which are critically dependent on biodiversity and water. Together the tourism and agriculture sectors account for an estimated 44% of GDP, underscoring the vulnerability of the local economy to the impacts of CC and CV. In 2017, GDP at current market prices stood at US$1,810.1 mn, an increase of 7.2% over the 2016 outturn.

1.46 The uneven trend in the growth rate over the period 2007-2017 is shown in Figure G below. The tourism sector continued to dominate economic activity, providing an estimated 15% to GDP. This sector is highly dependent on agriculture for fresh food for the hotels and restaurants, as well as on sustainability of the country's unique terrestrial biodiversity which drives the vibrant agri-rural tourism island tours.

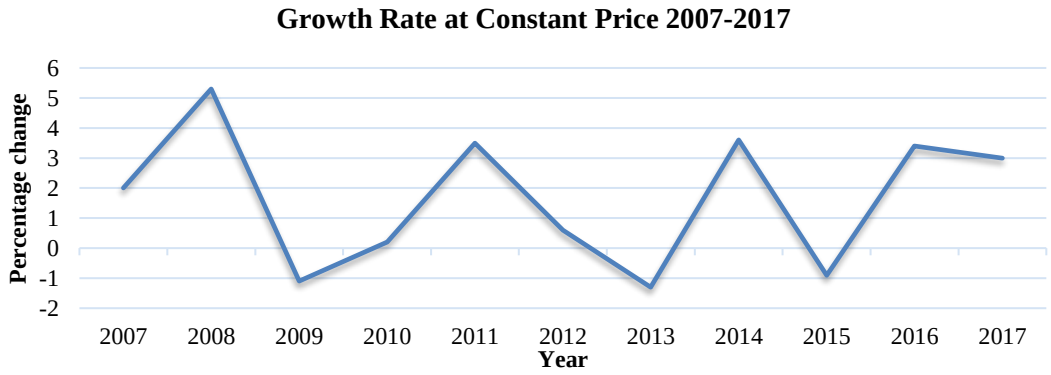


Figure G: GDP Growth Rate 2007-2017: Data Source Economic Review- 2017

Contribution of the Agriculture Sector to GDP Growth (2008-2017)

1.47 Agriculture GDP growth declined from 36.2% in 2008 to -30.8 in 2010 (Figure H) below reflecting the negative impact of unfavourable conditions for the sector including two periods of extended droughts and two hurricanes and an extreme rainfall event. The combined losses and damage to the sector from the events (see Table above) was an estimated US$358 mn. Despite the severe impacts the sector continues to be critical to the economy due to its multi-functional role in earning foreign exchange, generating an employment rate

of 22 % in 2017, a slight increase of 0.3 % on 2016, and contributing towards food and nutrition security and social stability in rural communities.

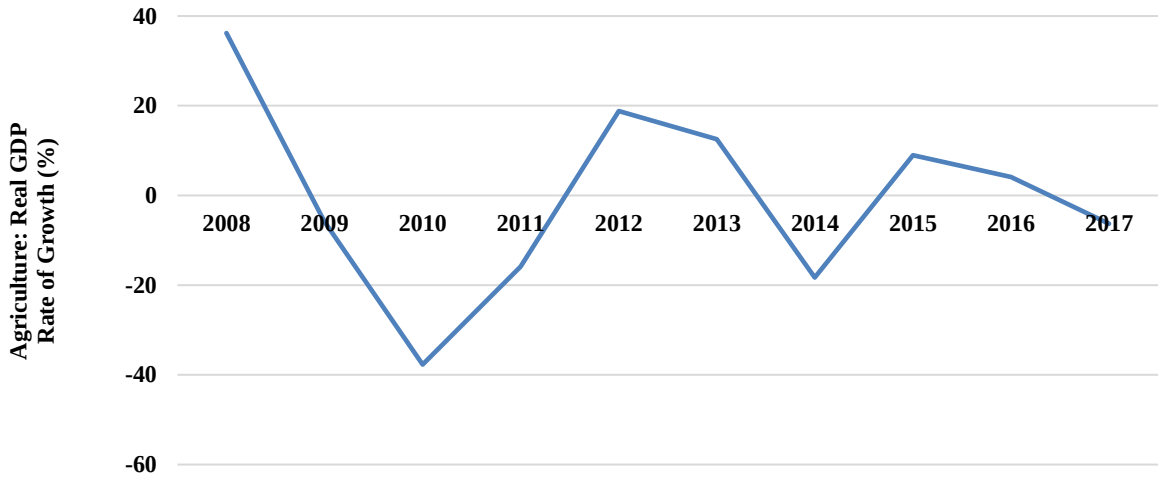


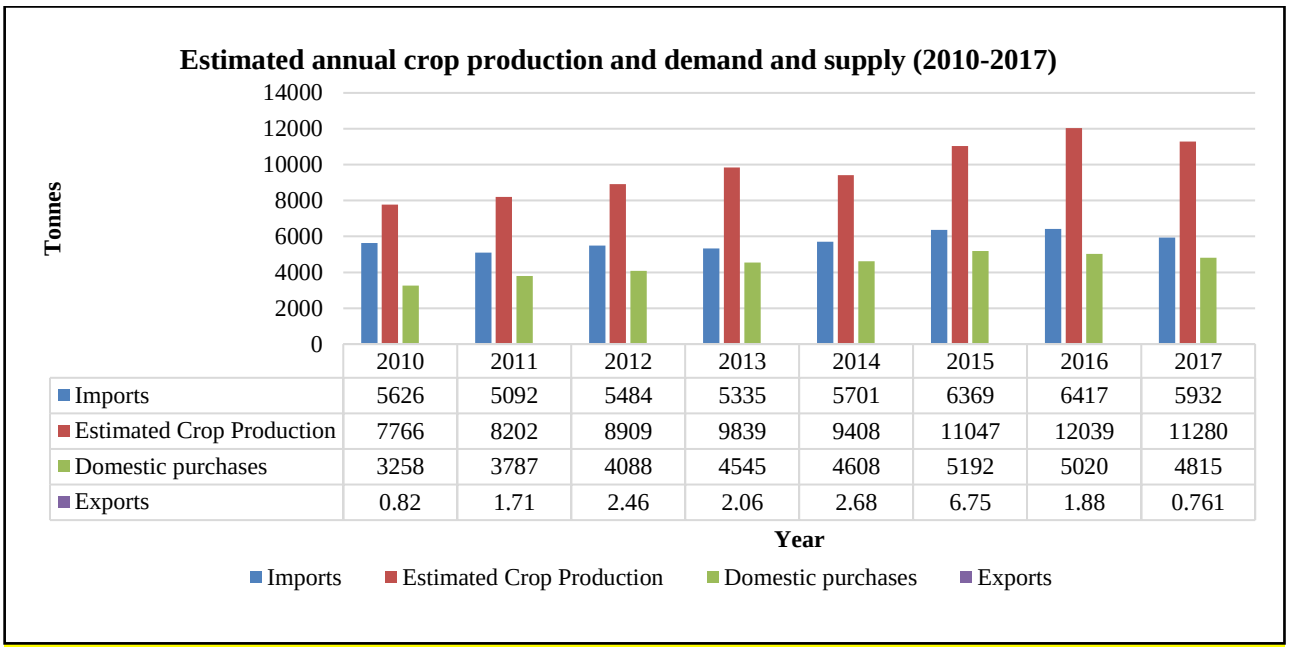
Figure H: Agriculture: Real GDP Rate of Growth (2008-2017): Data Source –ESR (2017)

1.48 The crop subsector continues to be dominant in terms of livelihoods, food security and income generation. However, by nature this subsector is highly vulnerable to CC and CV and comparatively they will pose highest risk to livelihood security with the projections of unexpected dry spells [20], earlier dry months and significant decrease in annual rainfall amounts.

1.49 Figure I below shows demand and supply relative to estimated annual crop production. The data is showing average food imports as high as 55.5% of crop production and extremely low exports. The data also confirms that domestic purchases were only an average 45.2% of crop production through the period 2010-2017. These figures reflect the following: (a) the unwillingness of the major buyers to establish contractual arrangements with farmers due to unreliability in supply resulting from shifting planting dates due to CV (b) unexpected dry periods during the wet season that impact expected yields under rain fed conditions and (c) short and intense rainfall periods sufficient to prevent cultivation, due to water logging and salt intrusion in the soil in the lower lying areas, especially on the west. The chart also supports the farmers' frequent complaints about gluts. Vulnerability and weak adaptive capacity of the crop subsector to changes in agro ecosystem services, particularly access to water, would have contributed to the low and uneven GDP growth (Figure H).

1.50 Therefore, it is important that the project's strategies to build resilience in agro-ecosystems to avoid or mitigate the adverse impacts of CC and CV seriously consider enhanced production practices that can: (a) increase productivity (b) diversify and extend agriculture value chains (c) increase competitiveness in the domestic markets and (d) effectively reduce fresh produce imports, with improved livelihood security and incomes for the well-being of vulnerable and marginalised rural populations.

[20] TNC (2017).



	2010	2011	2012	2013	2014	2015	2016	2017
Imports	5626	5092	5484	5335	5701	6369	6417	5932
Estimated Crop Production	7766	8202	8909	9839	9408	11047	12039	11280
Domestic purchases	3258	3787	4088	4545	4608	5192	5020	4815
Exports	0.82	1.71	2.46	2.06	2.68	6.75	1.88	0.761

Figure I: Estimated Annual Production of Selected Crops and Supply and Demand (2008-2017)
Department of Statistics; and Economic and Social Review (2016 and 2017)

1.51 Based on the foregoing there is an urgency on the part of the GOSL to pursue the implementation of CC adaptation strategies and actions in the agriculture sector. This will facilitate longer-term prosperity in agriculture and particularly so in the rural communities, that are highly dependent on the sector. This strategic direction is appropriate since despite the declines, and the evidence of adverse impacts of CC and CV on the sector, farming systems continue to be important to the well-being of farm family households. These households represent a population of over 32,919 or 22% of the total population, providing livelihood security, food security, and incomes generation (ESR 2017).

Developmental – Policy and Strategy Framework for Climate Resilience

1.52 The process of establishing an enabling policy and strategic framework for building resilience in agriculture was guided by deliberate measures to change likely adverse impacts of CC and CV on the country. This approach is increasingly integrated and participatory in order to ensure that the quality of livelihoods, including those populations most vulnerable to socio-economic and environmental impacts, are not compromised. GOSL has anchored the process described below beginning with the National CC Policy and Adaptation Plan (NCCPAP 2002) and in the 2012-2016 Medium-Term Development and Strategic Plan and Saint Lucia Development Strategy (MTDSP-SDS). Key national documents listed below are all responsive to the MTDSP-SDS. The latter identifies among its priorities, the expansion of contribution of the agriculture sector to the well-being of all communities, inclusive of vulnerable and marginalised households. The most recent and significant actions are briefly described below.

National CC Policy and Adaptation Plan NCCPAP (2002)

1.53 The outcomes of the NCCPAP (2002) were the basis for four subsequent policy documents: (a) National Water Policy (2004) focused on improving in efficiencies in irrigation and water management techniques by farmers as well as recommending improved access to water by farmers; (b) National Agriculture Policy (2009-2015) with a focus on environmental conservation, facilitation of agriculture communities to adapt to CC and CV and enhancing food security and sustainability of sound rural livelihoods; (c) Revised National Land Policy (NLP) 2015, focused on optimising the contribution of land to economic development and livelihoods through protection and sustainable use of agriculture lands; and (d) National CC Adaptation Plan NCCAP (2015). The NCCAP approached adaptation through three interconnected strategies; facilitation through policy, legislation and institutional arrangements; financing by putting in place measures to ensure adequate and predictable financial flows and; implementation. The aim is to ensure the undertaking of concrete adaptation actions to prepare for, or respond to the impacts of CC. Of direct relevance to the project is that

the NCCAP covers deliberate concrete actions to build the productive capacities of the country's biological diversity, land and water, for agriculture, towards national food security, rural livelihoods, employment and foreign exchange.

Second and Third National Communications

1.54 The findings of the SNC (2015) and the TNC (2017) provide critical information for the way forward in climate adaptation and resilience in the agriculture sector. Specifically, the GOSL has taken seriously the predictions of temperature changes, in particular rising temperatures on selected crop varieties and equally the significant decrease in annual rainfall as earlier described in the document. Hence among the priorities of these documents are climate adaptation practices to ensure water security for farming systems and options to improve adaptive capacities for soil conservation and soil water retention, to ensure efficient use of water. There is also consideration for options for ex-situ tracking of behaviors of local drought resistant food and feed varieties, with rising temperatures, for sustainable livelihoods, household food security and income generation.

Nationally Determined Contribution (2015)

1.55 Saint Lucia's Nationally Determined Contribution (NDC) to the United Nations Framework Convention on CC (UNFCCC) recognises both adaptation and mitigation measures. The NDC is responsive to the three broad areas of the NCCAP (2015) of (a) adaptation facilitation (b) adaptation financing and (c) adaptation implementation mentioned above. One of the adaptation areas identified in the NDC for national and community level implementation is, 'adaptation measures in vulnerable priority areas supported by existing data sets and traditional knowledge, or new data developed as necessary'. The agriculture sector is also covered by three of the adaptation implementation areas identified in the NDC, food security; community and national level interventions in water resource conservation and management and sustainable land management/slope stabilisation. Saint Lucia continues to work towards implementation of its NDCs and in 2017 became a member of the NDC Partnership. The Partnership aims to help Saint Lucia build in-country capacity and increase knowledge.

Other Studies Undertaken

1.56 Studies undertaken since 2011 of relevance include the economic assessment on the impact of CC on agriculture and its recommendations for (a) access to water with good management and drip irrigation as the best CC adaptation option with good returns on investment; (b) greenhouses for best management of variability in rainfall and variation in temperature with (c) capacity building to assist public servants, including staff of the Department of Agriculture Fisheries Natural Resources and Cooperatives (DAFNC) to identify and assess future climate scenario on economic impacts on crops and livestock. Another study resulted in the revision of the national environmental plans and strategies that support activities to minimise vulnerabilities and risk to sustainable livelihoods and enhance food and water security.

The National Adaptation Plan (2018) and Sectoral Adaptation Strategy and Action Plan for Agriculture and Fisheries Sectors (2018-2028)

1.57 The Sectoral Adaptation Strategy and Action Plan (SASAP) is comprehensive in its approach to resilient agriculture. Climate resilient agriculture best practices and businesses are given attention, as are capacity building of agriculture extension officers, development of a land use plan, data management, water supply and efficient utilisation of water, sustainable land management and slope stabilisation. Attention is also given to early warning systems, learning by demonstration, community-based approaches and linkages to the tourism sector.

1.58 Outcomes foreseen include strengthened agriculture contribution to the development of rural areas and well-being of the rural population, improved adaptive capacities the better use of natural resources for ecosystem services, improved food security and modernisation of value chains. The SASAPs is consistent with the process to pursue deliberate actions to build adaptive capacities in strategic approaches to climate

adaptation across policy, programs and projects for resilience in agriculture (including fishing) communities, through practices for sustainable use of the natural resources.

1.59 In view of the above, the GOSL continues its partnerships with Regional entities that support resilience in agriculture. These include the Caribbean Development Bank (CDB), the Caribbean Community Climate Change Centre (CCCCC), the Caribbean Community Secretariat (CARICOM), the Caribbean Agriculture Research and Development Institute (CARDI) and the Caribbean Disaster Emergency Management Agency (CDEMA), among others. The intention is to strengthen and enhance national planning systems for climate resilience in the development sectors, directly dependent on agro-ecosystem services for livelihood security, income generation and household food security.

Gaps in the Development Framework

1.60 GOSL recognises some gaps in the development framework for measures to address institutional strengthening in agriculture for climate resilience. These include stronger linkages with Sir Arthur Lewis Community College (SALCC) Farm School, for capacity building in modern agriculture production technologies; the DMS for downscaled rainfall data; and a managed database for CC and CV impacts on agriculture and rural communities.

2. PROBLEM STATEMENT

Climate Variability and Climate Change

2.01 Saint Lucia's agricultural sector provides the main source of livelihood security, household food security and incomes for 22% of the population. This constitutes an estimated household population of 32,919, on 11,000 farm holdings. The area under agricultural production is estimated at 13,771 hectares, growing mostly a variety of crops, with small livestock, inland fisheries and aquaculture. According to the country's capability map, just over 3,000 hectares of this area is suited to cultivation due to steep slopes. In addition, there is evidence of reduction in the areas under production and an increase in abandonment of farmlands by small farmers, due to weak water security, resulting in regrowth and land cover in non-agricultural biodiversity (TNC-2017).

2.02 The productivity of the livelihood base is highly vulnerable to the impacts of CC and CV, such as hurricanes, intense rainfall, floods, droughts and temperature changes. Even normal rainfall can a trigger multiple landslides with extensive soil erosion and heavy sedimentation, which results in devastating losses to the farms. Frequent disruptions from sedimentation in freshwater and coastal and marine ecosystems services often affect tourism-based livelihoods in rural coastline communities on the west and south-west of the country. Sedimentation and boulders also blocked river channels causing flooding in low lying areas. Small livestock farmers experience mortality in the herds, particularly among the young in goats and sheep, with cooler weather from prolonged rainfall, and small aquaculture farmers frequently experience losses, as the ponds go into disuse from siltation. Waterlogging and poor drainage is also problematic in low lying farms.

2.03 Official GOSL documents[21] are in agreement, that the likely impacts of CC and CV will result in significant decreases in annual rainfall and increasing demands for water by the agriculture sector. Dry months will be drier and occur earlier, and soil water deficits in the lower lying areas could expand into the wet interior where most of the moisture from rainfall accumulates (Figure D). With no projections on the potential for underground water in sustainable development, and no natural water bodies, the country is highly dependent on overflows from land into dams and reservoirs. Due to the topography and soil type of the country most of this water runs rapidly to the coastlines. In these circumstances the projected decrease in rainfall of up to 57% or ~350-400 mm is of concern to the country, as an increase in water demand will affect all areas of productivity.

2.04 In the context of CC and CV, water insecurity for agriculture could pose a major problem for livelihood security in farming populations. Drying of soils is expected to worsen in soils already low in water

[21] SNC (2015; TNC (2017); UNECLAC (2011) on Economic Impacts of CC in the Agriculture Sector in Saint Lucia.

retention capacity and cracking is also expected to worsen with increased vulnerabilities and risks to landslips, during normal or intense rainfall. This will be particularly so in the west and south-west where the most productive farm areas operate and where there are high concentrations of poor households, with more than half solely dependent on farming for livelihood and food security. Farm lands could be even more devastated from impacts of landslips and soil erosion that could have negative impacts on coastline livelihoods outside of the farming areas due to buildup of sedimentation and siltation. Due to the small size of the country there is no alternative to resettle and the narrow economic base and low investment in the farming systems have stifled production value chains. Hence on one hand, there is the problem of a water supply deficit with CC and CV and on the other hand, farming areas are most likely to become devastated and progressively lose farmland to landslips and soil erosion.

2.05 Inability to satisfy demand for water for irrigation has other worrying implications for farming systems, some of which have already emerged. Figure I, provides the context for the generally weak competitiveness in the sector to generate confidence of major buyers in local capacity for reliable domestic fresh produce supply. The low capacity to compete in domestic supply chain has been ascribed to the weak adaptive capacities in the farming systems, and absence of integration of climate smart innovative approaches for timelines in supply delivery arrangements due to shifting plantings dates with CV, even though the buyers have publicly expressed preference for local fresh produce.

2.06 Despite the preference for local fresh produce, arrangements between major buyers and crop farmers are dependent on the farmers' evidence of access to a river or other evidence of water available for irrigation, to ensure reliability in quality and timeliness of supply. The chart at Figure I shows that less than an average of 45.5% of annual fresh produce is recorded under domestic purchases, and that exports are woefully low. Essentially, the requirement for evidence of water security and ease of marketing fresh produce to the major buyers places more than 70% of the farmers at a disadvantage. The scattered nature of the farms and weak organisational approach in the farming systems adds to the problem as this creates challenges in coordination and consistency in quality in the supply chains for the demanding tourism sector and upscale supermarkets. Opportunities to respond to demands for fresh food in the growing tourism and hospitality sector are not being exploited, food imports continue to be high and with evidence of annual gluts.

2.07 Without greater reliability of production it will be even more difficult for local small farmers to compete with food imports given the reliability of deliveries at the level of the food import markets. This is further compounded by the projections for increased water demand, the disruptions from landslips and soil erosion over almost 1,000 hectares of farmlands in the project area, as well as the prediction of a decrease in rainfall and earlier dry months. The tendency to resort to food imports to satisfy food security could have serious national level implications for food security especially with rising food prices and the weak ability to store food, even in the case of early warning system alerts. This poses a serious risk to household food and nutrition insecurity in rural communities.

2.08 Relative to problems arising from changes in temperature, affluent farmers with greenhouses and poultry are already using electric cooling fans. Crop farmers both in open field and PAS are increasingly facing higher production costs through purchasing pesticides to control the increasing incidence of insect pest. Changing temperatures could also be problematic for small livestock farmers due to heat stress or cooler weather. Local farmers also complain of hotter days with intermittent rainfall showers resulting in rotting of tubers in root crops and some vegetables. There are also unsubstantiated claims of changes in the phenotypes of local crop cultivars. Higher labour costs from weed infestation partly linked to increasing levels of chemical fertilizer during the seasonal wet months was also cited as a major problem. These issues were articulated during the community consultations that supported the project formulation process.

2.09 CV and CC could be strong determinants of the well-being of vulnerable and marginalised rural populations. Other problems are foreseen in the predictions of the National Communications (2015 and 2017) that cited the potential for increasing loss in areas under food production due primarily to water scarcity, with displacement of populations, and in general challenges to sustainable development in rural areas. There would also be adverse impacts on livelihood security from the forest, marine biodiversity, tourism and health sectors; some emerging from the continued degradation of farmlands and unsustainable practices with CC and CV.

These sectors are highly linked directly or indirectly to agriculture through ecosystem sustainability, food security and food safety.

Baselines of Climate Adaptation for Building Resilience in Farming Systems

Data and Information for Climate Adaptation

2.10 There is a fundamental concern that downscaled data, maps and baselines are either not available, sparse, in urgent need of updates and inaccessible since they are stored in different Ministries of the GOSL.

2.11 Firstly, preliminary data on agro-ecological systems, geographic information systems (GIS) maps on landslips and farming areas, and direct impacts of landslip events on farmers, for example damage and loss data, are held in different agencies. Some data has not been updated since 2010. In the case of the DAFNC the data used is primarily an assessment in order to determine distribution of farm agri-inputs for recovery after a disaster. Data on landslips are mostly used for rehabilitation of roads, housing or other infrastructure and are held in the Ministries covering the respective portfolios. However, as reported in the Assessment of the Impact of Hurricane Tomas (2010), the devastation in the agriculture sector was due mainly to landslips.

2.12 A major problem for farmers is that, typically, the disaster recovery programmes and projects have not gone beyond assistance in the form of planting materials to restore the harvest. These are not usually supported by treatment works to reduce vulnerabilities on their farms. Farmers continue to farm the same inappropriate cropping pattern on another section of the farm, or with little or no attention to disaster risk management and risk reduction (DRRM) measures. At times the farmers replant on the same area or wherever the landslip settles. During drought conditions the farmers plant on river banks, resulting in degradation of these areas with sedimentation in river flows. As a result, land management to reduce vulnerabilities and risks from extreme rainfall events require urgent attention. During the consultation process it was clear that mapping of the landslips for adaptive capacity interventions must be addressed at the local level.

2.13 Rainfall data at the level of Agriculture Regions is incomplete, due to poor management of the rainfall station network across the country. Soil analysis data is outdated, and there is need for increase in the delivery time on soil analysis from the Agriculture Engineering and Soil Department. The treatment of soils on hillsides and slopes for reduced vulnerabilities to CC and CV with improved and sustainable livelihood security and food security in the farming areas are not as readily available. Finally, there is no institutional arrangement or practice to house in one place all the requisite data necessary to support efficient and effective climate adaptation practices in farming systems.

Climate Related Threats Super-imposed

2.14 CC threats are being super imposed on problems already existing in the farming system. As a result, some 90% of the 11,000 largely small hillside farmers experience water shortages on their farms which results in a halt in planting. Increased frequency in drought years since 2001, as well as dry spells during the seasonal wet months, coupled with poor land drainage and salt water intrusion, especially on the west coast are also problematic for small farmers. Further, there is a weak data management system to build climate resilient farming systems.

Key Challenges of the Farming Systems

2.15 The participatory consultations revealed that: (a) extension officers and local farmers are aware of negative effects of CV in rainfall but there is no discreet programme by DAFNC to respond; (b) the crop subsector is the most at risk to weather changes, with low resistance to adverse drought conditions and it provides the largest share of farm production. Any loss in this subsector will impact negatively on the vulnerable populations, in particular the ability of small farmers to sustain their livelihoods and household food security; (c) the majority of the small farmers have moved away from using traditional knowledge practices such as the use of compost, mulch and fertilizer teas and biological control of insects, that could build resilience for sustainable agro-ecosystems. An increase in plant pests, higher application of agri-chemicals, higher costs of production and lower yield in root-crops are being reported. Livestock farmers

complain about scarcity in forage trees for livestock forcing famers to buy commercial feed at higher prices. Farmers in low lying areas are increasingly concerned about water logging and salt water intrusion. Finally, there is no practical demonstration of the benefits of integrating climate smart innovative practices to reduce demand and increase efficiency in the use of building resilience in agro-ecosystem services to increase competitiveness in domestic supply value chains.

Non-Climate Variables

2.16 There are important social and economic problems that if not addressed, will burden or delay efficiency or effectiveness of the climate adaptation practices in the field and capacity building skills in intended project beneficiaries. These include (a) general lack of capital, appropriate technical assistance and business focus in small farming systems; (b) weak crop performance profiles which impact access credit from the financial institutions through additional evidence of collateral being required of farmers to access credit; **(**c) continued preference of youth for off-farm income generation and employment;(d) a lack of data on gender equality in agriculture or outdated data where it exists. Available evidence points to gender-related barriers to participation in the sector;[22] (e) exclusion of CC adaptation practices in farmer education programs and technological packages currently used by the DAFNC; (f) insufficient coordination among the institutions with the required resources in the agricultural sector in the country such SALCC-Farm School and the DAFNC; (g) weak capacity of small farmers for increasing participation in the vibrant agri-tourism farm tours through a mix of innovative and modern technologies; (h) the absence a national land use policy with necessary provisions to protect agro-ecological zones and the absence of a disaster management plan for agriculture, for prevention and mitigation of impacts on the farming systems and their populations.

Geographic Location of the Project

2.17 The project interventions will be in the west, south-west and northern parts of the country where there are serious problems with steep slopes, landslips and water shortages within the farmlands, poor drainage and salt intrusion in low lying areas, low production capacity and weak competitiveness in the domestic supply chains. The project activities are intended to reach directly 2,400 farmers in the project area over four years. An estimated 50% of the farmers under the DAFNC will benefit directly. The project benefits in incomes and livelihood security are expected to impact a farm family population of 7,200. It is also expected that as a result of the planned capacity building within the DEAS, the agriculture extension officers outside the project area, will be encouraged to integrate the learnt practices in their respective regions. This should impact another 2,400 farmers, through the regular FFS training sessions in production and utilisation of material for building resilience to CC in the farm soils.

2.18 The project area is also the geographic area where the larger segments of the population living below the poverty line reside. The project is therefore well placed to impact the lives of households at risk from CC, who are among the poorest and are highly concentrated in agriculture communities suffering the devastation of regular landslip hazards. (see Figure E).

3. PROJECT OBJECTIVE

Project Objective

3.01 The project goal is to build resilience in Saint Lucia's the agriculture sector for livelihoods security through enhanced adaptive capacities for CC and CV. The project objective is to increase the resilience of rural farm communities in Regions 6,7,8 and , increasing farm productivity, water and livelihood security and reducing vulnerability to natural hazards, climate vulnerability and change. It is designed primarily to respond to the projections of significant decreases in rainfall, intensive and more frequent hydro-meteorological events, including droughts, reported in the TNC by building adaptive capacities of agro-ecosystems and livelihoods to these threats. The Project will also contribute positively to the growth indicators for agriculture in the MTDSP (2012-2016), There is also good alignment with TNC recommendations for climate adaptation measures to enhance resilience in agriculture and with the proposals under the National Agriculture Policy

[22] Country Gender Assessment Synthesis Report (2015) prepared by Rawwida Baksh and Associates and financed by CDB.

(NAP) SASAP (2018) to enhance the resilience of farmers and fisherfolk to protect and improve the productive assets (soil, water, fisheries and other marine resources) while focusing on investment in the sector for poverty reduction in rural communities. The project is also responsive to Saint Lucia's NDC. Gender equality will be mainstreamed throughout the project to ensure that the project does not perpetuate gender inequality but enhances gender equality through project interventions.

4. PROJECT COMPONENTS AND FINANCING

4.01 The project will target farms on slopes in the west, south-west using downscaled maps that show increasing evidence of landslip between 1994 and 2018, and available data on the increasing cost to agriculture. It will use climate adaptation and DRR/DRM practices, to reduce vulnerabilities to landslips; create opportunities for expanding farm production areas with sustainable increase in farm incomes and; improve on-farm water security with a focus on farmers wholly dependent on rain fed agriculture, integrated with improved adaptive capacities for resilience in soil functionality with rainfall variability, using compost and other organic soil-building materials.

4.02 The added benefits of energy integration using solar power in resilient farming systems will result in higher levels of productivity, efficiency and competitiveness from the built resilience in agro-ecosystem services. This will happen through enhanced and intensive production in temperature controlled greenhouses using aquaponics with plant fed tilapia for diversified production value chains. Also, improved control on water management and water use efficiency with drip irrigation, spread over large areas among several farmers involved in all three subsectors will also be a feature. Additionally, the project will integrate intensive production on two sites totalling 30 hectares. Finally the project will include extension of the farm production chain to agro-processing using solar power with possibilities for competitive branding and labelling and enhanced cost-effectiveness.

4.03 The project will undertake deliberate organisational building strategies to facilitate the formation of CC adaptation groups at community levels and national levels, for rainwater harvesting systems (RWHS) including water users, agro-processors, producer cooperatives. It will strengthen a coordinated approach to domestic marketing by small farmers. The intention is to remove the current challenges presented by demands for operating in reliable and competitive domestic fresh food supply chains. There will be added benefits to livelihood security with the packaging of a climate adaptation and climate resilience farm tour value chain in order to benefit from the growing numbers in stayover tourists, who continue to show interest in the unique biodiversity of the country and the linkages with its rural populations.

4.04 There will be focus on the necessary actions to support planning and coordination of the sessions for building adaptive capacities for improved livelihood security and incomes in the farming households. This will include inventories and data to establish baselines in adaptive capacities and to develop content for capacity building; collection and analysis of field data on climate adaptation and climate resilience in the project area. Simulation of climate variables in climate control grow rooms to observe the impact of climate adaptation practices on resistance in selected food crops grown in Saint Lucia will also be a feature. The intention is to identify the limitations of CC adaptation practices to inform strategic decision making for research and development of resistant varieties in the country in order to preserve agricultural biodiversity for livelihood security in farming systems.

4.05 Since resilience is an on-going process, the knowledge management component will be integrated in the work of the Central Planning Unit of the DAFNC by training technicians to undertake economic analyses of CC impacts on the agriculture sector. This will enhance the mainstreaming of climate adaptation considerations in farming systems at the level of policy and strategy by the DAFNC. Knowledge transfer for awareness and responsibility for sharing among the many players in the farming system will be extended to the community levels.

4.06 Monitoring and evaluation (M&E) of the improved adaptive capacities in agro-ecosystems and the contribution to resilient farming systems and livelihood security will be on-going. Hence an important output of the component is the proposed activity to improve and establish strengthened relationships among critical institutions such as the DMS for exchange of data and the Department of Statistics to ensure quality of social

data. These data will be held with the Department of Statistics in a climate adaptation database that is linked with the DAFNC's master database. This will ensure strengthening of social data for improved quality of the farming system and livelihood security.

4.07 Without the project, the farming populations in the targeted areas will be significantly impacted by CV and CC since their livelihood activities are highly climate sensitive. These farming systems must be better prepared to operate in local domestic fresh food markets. Failures or delays in achieving the proposed level of built resilience to CC and in improved capacity to operate with competitiveness in domestic supply chains could be reflected in loss of livelihoods, increased poverty levels and reduced efficiency of agro-ecosystem functions.

4.08 The following three integrated components are proposed to capture the interventions of the project:

(a) Building resilience and sustainability of farming systems through interventions for water security, soil conservation and management.

(b) Establishing green agro-parks, including the use of solar energy, for increased efficiency in resilience farming systems.

(c) Knowledge management and transfer for capacity building to institutional and local level adaptive capacities.

4.09 The three components are complementary as they provide the building blocks for resilience as an ongoing process through: (a) building adaptive capacities for resilient farming; (b) establishing a pathway to increased growth rates for resilient well-being of the target population through productivity and competitiveness in intensive farming practices; and (c) improving understanding of the limits of climate adaptation options and timely integration of innovative adaptation measures to avoid or mitigate risks from increasing demands on agro-ecosystem services.

Component 1: Building Resilience and Sustainability of Farming Systems through Interventions for Water Security, Soil Conservation and Management

Outcome: Increased farm productivity with improved livelihood security and incomes and new farm areas brought under production in the project areas.

Output 1.1 Reduced landslips, and soil erosion on farms through creation of updated maps, vulnerability analysis, and field practices for DRR/DRM and FFS.

4.10 The approach will be comprehensive including; (a) updating existing maps and creating new maps and data on landslips, through inventory of farms, and positioning landslips relative to farms in project areas focusing on Region 6; (b) producing overlay maps showing farming areas vulnerable to landslips (c) recommending various types of climate adaptation options and codes for the different treatments and (d) community-based disaster risk management (CBDRM) participatory approaches in undertaking the adaptation practices. The methods used will seek to prevent debris from entering stream channels through afforestation of landslip areas, with different types of agro-forestry and alley cropping. This will allow natural regeneration of landslides in some areas, trapping of debris on a hillside in channels and debris basins and the redistribution or diversion of debris.

4.11 The Assessment of Hurricane Tomas (2010) indicated that many of the flow slides originated in cleared cultivated slopes with sixty of the more serious landslides identified in some of the farming areas. However, there has been no treatment applied at farm level under any discreet GOSL programme and no farm overlay maps have been created since then. This has hampered the ability of the GOSL to develop a targeted programme to address the landslide problem. The map at Figure G represents coverage of an estimated 75% of the area of 9,000 hectares of Region 6. Due to the extent of the vulnerability and risks associated with some of these cultivated areas, the project will, in its proposed bi-annual inventory, provide information to the

DAFNC on any farms or farm settlements for which consideration should be given for suitable alternative to farming that do not focus on shallow rooted crops in monocultures for livelihood security.

Output 1. 2 Access to on-farm Water from RWHS and Bare slope Catchment with Drip Irrigation Integrate with Built Soil Resilience using Compost and Other Organic Material

4.12 The predictions of future decreases in rainfall, make farms in the project area highly vulnerable to water shortages. This combined with low soil water retention of volcanic soils in the area, means that strategic measures for water security is critical as well as building adaptive capacities in the farming populations before the start of a significant decrease in rainfall amounts around the year 2040. It is expected that this project will assist in these practices becoming a culture in agricultural communities by this time. The proposed on-farm approach means that those small farmers scattered in clusters will not be denied participation in the benefits from RWHS. It is therefore the best option for water security that is inclusive of all farmers targeted in the project area, including the communities of Anse-la-Raye, Soufriere, and Canaries, on the west and south-west coast, identified among poorest (National Social Protection Policy 2015,) and in La Bourne another agricultural community in the north.

4.13 Two types of RWHS catchment surfaces are proposed: on-farm rooftop runoff, two of which will be standalone storage from runoff from public buildings, and also bare slope surface runoff, combined with runoff from household rooftop along the main line of the slope. Livestock farmers and farmers operating on challenging sites will be provided with water from standalone RWHS in centralised areas using mobile tanks. The RWHS sites were preselected through intensive consultation at technical and community levels in the project area. Participants included farmers, interested community folks, specialists in agronomic practices, water and knowledge management, and GOSL agricultural technicians. Farmers assisted by describing experiences in water shortages and identifying areas where most vulnerable farmers are located.

4.14 Technicians were used to: (a) conduct risk assessments associated with rapid surface flows, (b) provide options for the best layout, to include as many farmers as possible, especially in locations; and (c) reduce the cost of conveyance lines across the hills due to the scattered nature of many of the farm clusters. The exercise resulted in recommendations for an estimated 90-100 on-farm RWHS structures over 25 settlements in the west, south-west of the project area. This will provide an estimated 270-300 farmers mostly on holdings of one hectare and under. The individual holders and clusters were selected on the basis of water needs, specially targeting farms that are wholly rain fed, inclusive of youth and women farmers. Based on the findings of the gender assessment (Appendix II), which will be an initial activity of the Project, a gender-sensitive targeting approach for the RWHS distribution will be adopted. Any related training activities of farmers will also include women, to sensitise them to the healthy and hygienic usage of rainwater acknowledging that women have the primary responsibility for washing and cooking in households. Two main seedling nurseries in the project area, managed by the DAFNC will also be provided with water, to ensure the availability of tree crop and forest tree seedlings for replanting.

4.15 Due to the extent of the landslip susceptibility of the project area, the preliminary risk assessment undertaken by the Informal Technical Team (ITT) comprising WRMA, AESD, Department of Forestry (DOF) and the DEAS, was thoroughly reassessed through an environmental impact assessment (EIA) and an environmental management plan (EMP) prepared for the project. The Environmental and Social Management Plan will be amended after the gender assessment as a condition for further disbursement. Modification of the EMP will be done during the inception phase. The conclusions of the expert is that the impacts can be easily mitigated with appropriate site selection as outlined in the EIA and the EMP. It is also important to note that none of the sites proposed are in those considered as risks.

Output 1.3 Farmers and DAFNC Staff Trained in Improved Land Management for Climate Resilience

4.16 All farmers in the project area will benefit from capacity building in production and utilisation of soil building material (compost, vermicomposting, mulch fertilizer teas and vermi-culture), to address the easily erodible volcanic soils. Farmers will also be able to access these inputs from six outdoor facilities constructed under the project. An updated inventory of farmers and the state of the farm will be developed, supported by

an overlay map prepared as proposed above in order to create a baseline for adaptive capacities within the project area. Holders of farms selected for the different interventions have given their commitment to actively participate in the respective farm activity. This will promote learning by doing.

4.17 The project activities under Component 1 will be aligned with the Annual Work Plans of the DAFNC to accommodate the implementation arrangements of the project (See Part III) for Project Team Leaders and other technical support from the DAFNC to the Project Management Unit (PMU). The DOF in particular has wide experience in participatory approaches through its field staff in recovery after devastation from landslips from weather events. The current capacity in the DAFNC to manage landslips and assess risks in RWHS systems will be bolstered with technical support from an expert in vulnerability analysis and DRRM contracted under the project. This will be sufficient expertise to build the required level of capacity by the DAFNC to strengthen, monitor and sustain the outputs from this Component.

Component 2: Establishing Green Agro-parks, including the Use of Solar Energy, for Increased Efficiency in Resilient Farming Systems

Outcome: Increased Productivity and Competitiveness in Resilient Small Farming Systems with Improved Livelihood Security, Increased Incomes, Employment Generation and Household Food Security.

4.18 The interventions under this Component are expected to increase general competitiveness in diversified production value chains, to allow better participation in the domestic supply chains, as well as enhance livelihood security from resilient farming. The transition to renewable energy through integration of solar applications offers the opportunity to reduce high energy costs thereby increasing the competitiveness of the sector. Effectively the transition from fossil fuel to solar energy in farming from, production through to processing, will provide the level of reliability in local food supply chains as observed in the preferred food import chain (Figure I). The National Energy Transition Strategy (NETS) and Integrated Resource Plan 2016 sets a renewable energy penetration target of 35% and an energy efficiency target of 20% reduction in consumption to be achieved by 2020. This is intended to reduce Saint Lucia's heavy reliance of diesel generated electricity in a small market resulting in an exorbitant price of an average of US$0.33 per kilowatt hour for electricity. The interventions under this component, are expected to increase general competitiveness in diversified production value chains, while simultaneously building resilience in the sector. At 25 kilowatt (kW) of solar photovoltaic energy system, will be installed at each agro-park. The cost of energy is expected to be reduced to an estimated US$0.16 per kilowatt hour through displacement of imported fossil fuels. The payback period for this system is calculated at four years.

4.19 Solar applications will promote increased efficiency in water use and reduce water insecurity. This will be achieved through reduced pumping costs for water and for operating controls to properly manage water and drip irrigation among several contiguous small farms, cooling of greenhouses and energising aquaponics. Other benefits include, improved soil water functionality; cleaner plant nutrition including green fresh fish supply value chain and; extended farm production value chains into agro-processing. Transitioning to solar energy as well as introduction of solar energy in new areas of the farm production process, has the potential to improve the current levels of contractual arrangements in the domestic market based on reliability in fresh food supply, as well as to reduce selected fresh food imports.

4.20 For coordination and consistency in quality and greenness, Component 2 will be established and managed using a park concept based on two intensive production sites with built resilience for water security and soil conservation. The green practices to be utilised will allow them to be promoted as green agro-parks and will demonstrate the competitiveness and intensive production of these farming sites. The focus will be on greening, enhanced practices of efficient and competitive diversified production value chains. This will offer improved livelihood security for small farmers in vulnerable households. Based on the findings of the gender assessment (Appendix II), which will be an initial activity of the Project, a gender-sensitive targeting approach for selecting female and male farmers will be applied. In addition to solar energy, the project will include innovative climate sensitive practices that contribute to the greening concept, such as aquaponics to supply plant nutrient needs in greenhouses, using selected plants for feeding of tilapia, climate smart housing, on-farm protein banks for livestock feed and for plant material for building climate resilience in soils.

Output 2.1: One Green Agro-park Established in Region 7 in the West of the Project Area and One in Region 2 in the North-East on a Total of 34.4 hectares.

4.21 One of the intensive production areas will be located in the west and one in the north-east of the island. The focus will be on greening different types of technological practices for higher levels of productivity and competitiveness, for CC adaptation in farming systems, inclusive of all three subsectors. In addition to building resilience for water security and soil conservation, the activities will include improved drainage to reduce water logging, sedimentation and flooding of river tributaries. Solar energy will also be used for cooling in greenhouses and climate smart housing for small livestock; the management of RWHS in open and protected agriculture systems; and in aquaponics. Solar energy will be used to pump water for aquaponics, green houses and open field production. These practices will be integrated with agronomic practices for improved biological insect control using companion cropping patterns, and mixed and intercropping systems for built resilience in soil. The climate smart practice for small livestock will also be integrated with on-farm protein banks that will also provide opportunities to build organic soils from legume waste. Restoration of aquaculture ponds and tilapia feeding with selected plants as in the case of aquaponics will provide an opportunity for integrating clean practices for water recycling in the crop subsector.

4.22 The intensive production activities will generate two complementary chains an agri-food production chain extending beyond the farm gate into agro-processing, and an agri-tourism chain developed around CC adaptation and climate resilient farm tours. The first chain is foreseen to occur, as farmers seek to benefit from year-round production from built resilience in agro-ecosystem services and enhanced production practices, as well as climate smart practices for productivity, diversification and competitiveness for livelihood security and incomes. A major gain will be the ability of the small farmers on both production sites to coordinate and consolidate their supply arrangements to local hotels and restaurants for competitiveness in economies of scale.

4.23 The second chain (agri-tourism), is foreseen to broaden the content of the highly popular agri-tourism farm tours through the display of innovative, productive and climate sensitive approaches of the farming activities in the agro-parks. The expectation is also to build adaptive capacities among the small farmers in the project area as those farmers operating on lands close to the routes of the farm-tours will adopt some of the more attractive agri-tourism practices. This will allow them to join the group of agri-tourism farms on the west and south-west coast. The prospects for positive projections of the tourism sector and the associated services have increased by more than 24% since 2007. Based on the findings of the gender assessment (Appendix II), which will be an initial activity of the Project, a gender-sensitive targeting approach for the selection of potential farmers to join the agri-tourism activities will be adopted.

4.24 Adherence to participation in a green approach in all the farming practices will be required of all the beneficiaries in these two production areas. Direct benefits of the project to the beneficiaries will include (a) on-going farmer education in adaptive capacities for resilient farming with practical demonstrations through the entire production value-chain; (b) water security with drip irrigation, agronomic practices for resilience in soil fertility and structure. This includes the promotion of cropping systems for efficient water use and biological control of pests and disease; (c) strengthened organisational capacity for a producer cooperative approach to production and marketing of fresh produce; (d) integration of aquaponics and renewable energy for cooling in the management of greenhouses; and (e) promotion of small scale aquaculture for youth employment and practical demonstration of land management for drainage. If the gender assessment indicates that training should also include not only the household head, which primarily is male, but also female dependents to cross-fertilise gained knowledge on the farm this will be considered during implementation.

Output 2.2: Two HAACP Certified Agro processing Production, Training and Certification Facilities using Renewable Energy Established on Two Sites for Post-harvest Handling of Fresh and Processed Foods

4.25 The two agro-processing facilities will utilise renewable energy and other energy efficient practices for processing and packaging. The activities to be undertaken will include (a) fresh produce quality control in leafy vegetables including packaging; (b) processing and packaging of a wide range of products from local fresh produce; and (c) capacity building as required by the Saint Lucia Bureau of Standards (SLBS) and the

Ministry of Health, including technical training to the level of certification required by the SLBS. Farmers at the production sites and the project area in general will be encouraged to enter into supplier arrangements with small scale processers operating on the production site. This will minimise loss of farm production, as well as to expand and diversify incomes within the farming systems.

4.26 Youth and rural women will be trained to improve packaging, attract higher prices, prepare small agri-business plans to set up small scale green micro enterprises, as well as to brand their green products with the potential to enhance penetration for regional export markets. Small-business persons and other entities such as schools and restaurants will be facilitated under special arrangements.

4.27 Investment in agro-processing facilities using efficient and renewable energy, fits with the expected increase in productivity through improvements in agro-ecosystem services and modernised technologies. Increased agro-processing activities will help to reduce gluts and maximise income from improved access to water. To overcome gender-related barriers in the agricultural sector such as organisational capacity, access to resources and assets, technology, networks and information, the SLNRWP with membership of an estimated 70 women will be supported through this Component.

4.28 The proposed siting of the production areas and the agro-processing facility on the west and north-east gives accessibility to vulnerable and marginalised households in the country. The type of activities proposed, will optimise the rate of growth and reasonable timelines necessary to reverse the uneven but persistent declines in agriculture since 2007 and the significant imbalance in the trade of fresh produce. The aim is to positively impact production (Figure I). The outputs of this activity will satisfy the objectives of the MTDS-(2010-2016) and the NAP-SASPs (2018) for concrete contributions from the agriculture sector through increased production and expansion of areas under intensive farm production that can positively impact livelihoods, income generation, and food security, in vulnerable and agriculture communities.

Component 3 Knowledge Management and Transfer for Capacity Building to Institutional and Local Level Adaptive Capacities

Outcome: Established Information and Communication Systems to Support Adaptive Capacities for Resilience of Small Farming Systems, Improved Livelihood Security, Income Generation and Climate Change/DRR Awareness

4.29 The activities are designed to support data capture and management for shaping adaptive capacities, building resilience and improving awareness of climate sensitive impacts at several levels of the agriculture sector. For this reason, Component 3 is cross cutting in nature.

Output 3.1 Baselines and Capacity Building for Adaptation and Resilience

4.30 This output will underpin organised community and national levels awareness (knowledge, attitudes and practices) for supporting the preparation of policy and strategic plans and programmes for improved resilience, capacity building in CCA adaptive capacities and strengthening of farming and systems local level organisations. The relevance of disaggregating information for example by, sex, age and conducting gender-based analysis, in this component will facilitate capacity development of participating institutions on gender and agriculture.

Output 3.2 Rehabilitated Infrastructure to Facilitate Activities for Greater Awareness on Climate Change and Climate Resilience in Farming Systems

4.31 This output will seek to rehabilitate an existing structure formerly housing Research and Development in Agriculture. The proposed design for this facility is such that it will house the activities at Output 3.1 and 3.2 including the use of solar energy for improve efficiency; conservation in land-use by the combination of activities; research on CC and CV resistance in crops; capacity building in climate resilience in soils; management of climate data, and capacity building for improved agro-processing value chains in the farming systems.

Output 3.3 Two Climate Change Interpretation and Learning Centres

4.32 The CC Interpretation Learning and Laboratory Centre (CCILLC) will track and highlight experiences gained from project implementation, and conduct ex-situ plant behavior observations in climate control grow rooms, powered with solar energy, for greater awareness and for strategic direction that can help to mitigate the projected negative impacts of CV and CC on local food and feed varieties.

4.33 This output will facilitate the capturing of data generated in the laboratory, in order to identify drought resistant food, as well as feed plant varieties and species, by tracking plant responses at different levels of soil water availability and water stress. Also data on variations in temperature and the duration of the variation in temperature will be captured. The laboratory will describe and include in the project database those resistant varieties so that the DAFNC can put in place a timely programme for protection and multiplication of these selected food and feed plants to enhance resilience in farming systems, and to minimise the predicted impact of future climate on agro-ecosystem services. The work in this activity will be undertaken with the technical support of the University of the West Indies-Mona Climate Studies Group.

4.34 Indicators of the output will include: (a) two climate control grow rooms managed to gather data on water stress on agriculture bio-diversity and other variables focusing on the most important food crops grown by small farmers in Saint Lucia, starting with leafy vegetables, tomatoes and sweet potato using multiple climate variables with soil water changes. These findings will be used to assist in awareness building of climate resilience and to conduct further field-tests of climate adaptation in small farming systems in Saint Lucia; (b) release of promising varieties to the DEAS and the Research and Development Unit of the DAFNC including the DOF; (c) greater awareness about CC in agriculture through information sharing on social and environmental resilience in agriculture through bi-annual surveys of selected farms in the project area; (d) organised discussions and biennial conferences and competitions with enhanced capacity of public officers in the DAFNC and the Department of Sustainable Development; and (e) adaptation and interpretation in farming systems included in the design structure of the second agro-park in the north east of the country.

Gender as A Cross-cutting Theme

4.35 Gender is a cross-cutting theme across all project components. To facilitate the integration of gender into the project and to optimise its design in terms of participation and training content, the project will include:

(a) data collection in the form of baseline and Knowledge, Attitudes, and Practices studies complemented by a gender assessment to update the 2007 Gender Dimension in Agriculture Report, including the integration of gender responsiveness to CC and CV impacts;

(b) gender capacity development to sensitise participating institutions on the inter-linkages between gender and agriculture and to enhance monitoring and evaluation of the project in terms of measuring and reporting on gender results; and

(c) gender-responsive community engagement giving both men and women a voice.

TABLE 3: PROJECT COMPONENTS AND FINANCING

Component	Concrete Outputs[23]	Expected Outcomes	US$	
Component 1 Building resilience and sustainability of farming systems through interventions for water security, soil conservation and management.	Output **1.1** Targeted farmlands in the west and south-west of the project area with built resilience to CC and CV with reduced land slips.	Increased farm productivity with improved livelihood security and incomes, and new farm areas brought under production in the project area.		
	1.2. Improved water security from the bare slope water harvesting system and from on-farm rooftops, with drip irrigation, and integrated with soil building climate adaptation practices over 200 hectares and reaching an estimated 2,400 farmers (disaggregated by sex and age).			
	1.3 1,500 farmers trained in improved land management and soil conservation CC adaptation practices with reduced soil erosion on 500 hillside farms, supported by on-farm soil building facilities on six sites and demonstrated adaptive capacities (disaggregated by sex and age).			
Sub Total 1			**3,053,781**	
Component 2. Establishing green agro-parks, including the use of solar energy, for increased efficiency in resilient farming systems.	**2.1** Two green agro-parks totalling 30 hectares established through enhanced CCA including solar energy, with improved and integrated food and agri-tourism chains value chains in the three subsectors and supported by eight built outdoor facilities for improved adaptive capacity building for climate resilience and targeting small farmers, fully integrated.	Increased productivity and, competetiveness in resilient small farming systems with improved livelihood security, increased incomes, employment generation and household food security.		
	2.2 Two HACCP certified solarised agro-processing facilities providing space for training and production activities for small-scale agro-processers, with 300 beneficiaries reached through 1,000 hours of production.			
Sub Total 2			**2,824,545**	
Component 3: Knowledge management and transfer to improve adaptive capacities.	**3.1** Gender sensitive baselines for improved adaptive capacities to build resilience in farming systems, established and incorporated into capacity building for information and communication instruments on climate adaptation practices for learning and policy formulation in the DAFNC.	Established information and communication systems for improved adaptive capacities to build resilience in small farming systems for livelihood security and income generation, with CC awareness.		
	3.2 CCLLIC services established and providing information for greater CC awareness, and data for limits on resistance in food crops.			
	1.3 Rehabilitated infrastructure to facilitate awareness on climate resilience with respect to crops; capacity building for data management on climate resilience at national and local levels; space for solarised agro-processing, and training in adaptive capacities for small farming, building adaptive capacities for resilience in soils**.** 1.4 Completion of a baseline data and gender assessment to address critical gender and sector specific data gaps.			
Sub Total 3			**2,024,470**	
GRAND TOTAL			**7,902,796**	

Total			8,297,936
Project Execution			855,310
NIE			705,325
GRAND TOTAL			**9,858,570**

Projected Calendar

Milestones	Expected Dates
Start of Project/Programme Implementation	October 2019
Mid-Term Review (planned)	March 2021
Terminal Evaluation	September 2022
Project Programme (Closing)	May 2023

[23] All people data will be disaggregated by sex and age.

PART II: PROJECT JUSTIFICATION

5. PROJECT JUSTIFICATION

Part II-A. Describe the Project Programme Components Particularly Focusing on the Concrete Adaptation Activities of the Project, and How These Activities of the Project Contribute to Climate Resilience.

5.01 Saint Lucia's agriculture sector has begun to experience the effects of CV and CC. More frequent and intense rainfall events have increased the incidence of landslips and accelerated soil erosion in farm areas which are mostly located on steep slopes. The low water retention capacity in soil due to its volcanic nature, and subsequent rapid rainfall runoff, leading to high levels of sedimentation, further adds to the problem. In addition, changing micro-climatic conditions on the farms have increased pest infestation, water logging, the incidence of unexpected droughts, and cost of production.

5.02 TNC (2017) projections for future scenarios resulting from CC and CV, are for a decrease in annual rainfall up to amounts of 57%. Earlier seasonal droughts, and more dry spells are also expected. These environmental changes have the potential to decrease agro-ecosystem functionality in the traditional food production systems, including disruption of key agri-supply chains. These impacts could be increasingly severe during the period 2040-2100 due to the predicted[24] significant decrease in rainfall amounts and earlier droughts. The predictions are that these adverse changes will be slower in the west, south-west of the island but becoming increasingly more severe beyond 2040.

5.03 The threat to the poorest populations, especially rural populations concentrated in agricultural communities in the west, south-west and parts of the north of the island from the likely impacts of CC and CV on the sector is of major concern to the GOSL. These communities rely heavily on farming and related rural activities for livelihoods, household food security and incomes. While the poor in general will be impacted, these already sensitive rural households could be further impacted due to weak coping strategies and a preoccupation with their daily needs. For these households, support from community-based organisations for resilience and persistence in CC adaptation practices is required.

5.04 The negative impacts of CC could also be felt in rural population highly dependent on tourism due to foreseen damage to infrastructure from sea level rise. The direct impact would be reduced attractiveness of the island to visitors. The large majority of visitors to the country are attracted to the rural tours and provide an added source of income through purchases at restaurants along the route and the village stops. Disruptions in the tourism sector resulting in reduced visitor arrivals will also have negative impacts on livelihood security in agricultural communities. These different populations are integrally connected in their dependency on ecosystem services that provide livelihood security for communities, but the dependency of the farming sector is far more critical as it is tied directly and indirectly to the vagaries of CC and CV. Both populations are primarily on the west and south-west and parts of the north of the country where poverty settlements and poverty head counts are highest.

5.05 Without adequate adaptation to CV and change, Saint Lucia's attempts to achieve the Sustainable Development Goals for poverty reduction and food security will be severely hampered. The impacts of CV and CC have the potential to disrupt climate sensitive farming systems and livelihoods thereby threatening the country's food security and poverty reduction objectives.

5.06 Some off-farm challenges emerging from the foregoing would be the increasing levels of sedimentation in river channels that could further affect river flows, with extended impacts at the farm level. Sedimentation in coastal areas also affect marine ecosystems and coastal fisheries and weaken livelihood security for rural fisherfolk. For instance, many rain fed farmers who cannot show evidence of access to a

[24] TNC (2017).

source of water for irrigation, are not able to register with the main buyers in the domestic markets. Unregistered farmers also experience gluts, when they try to benefit from favourable weather, by planting short-term crops– mostly leafy vegetables.

5.07 Interventions to be facilitated under the project are intended to change the potential for adverse impacts. These include decrease in rainfall and increased frequency of droughts, on the functionality of the natural resources, for livelihoods security and incomes, primarily in the geographic area of the project. The project will achieve this through, activities that build adaptive capacities in the populations and in selected agro-ecosystem services. The project will implement a set of concrete CC adaptation activities for resilience in agriculture for sustainable livelihoods, provide increased income generation and food security with special considerations for vulnerable groups. The built resilience in the farming systems with CC and climate resilience will provide the environmental conditions to improve competitiveness of small farming systems in domestic markets with improved livelihood security.

5.08 The components are distinctive and measurable in outputs but highly interlinked in delivery to provide outcomes of (a) increased farm productivity with livelihood security and incomes and new farm areas brought under production in the project area; (b) increased productivity and efficiency in resilient small farming systems with improved livelihood security and income generation through enhanced production practices and value chains; and (c) established information and communication systems for improved adaptive capacities. The project will use a participatory approach for inclusiveness to ensure that all beneficiaries are treated fairly and with transparency. The expected longer- term outcome of the project is for sustainable agro-ecological system services to support farming (crops, livestock and aquaculture), through improved adaptive capacities. Accordingly, the extent to which the three proposed project components are strategically linked can be observed as shown below.

Component 1: Building Resilience and Sustainability of Farming Systems through Interventions for Water Security, Soil Conservation and Management

This component will seek to Build Climate Resilience in two Specific Areas which Combined, will Contribute to Increased Resilience in Farming Systems.

Outcome: Increased farm productivity with improved livelihood security and incomes and new farm areas brought under production in the project area.

Output 1.1 Reduced Landslips and Soil Erosion on Farms through Creation of Updated Maps, Vulnerability Analysis, and Field Practices for DRR/DRM and FFS.

5.09 The project activities selected to reduce vulnerability to landslips and soil erosion control were based on an extensive review of studies on landslips susceptibility in Saint Lucia. This was reported[25] in assessments of impacts of rainfall events and of work undertaken on landslips for roads, houses and other infrastructure. Institutional knowledge of farmers, Caribbean Agriculture Research and Development Institute (CARDI) and from agriculture extension officers, gathered during the consultations also provided information on frequency of landslips and soil erosion in the farming areas.

5.10 The review and consultations revealed that an estimated 60 sites have been identified in the farming communities, but that no discreet action has ever been taken to address the risks to the farms and that the total number of farms at risk in the project area are far in excess of 60. Therefore, the project will conduct vulnerability analyses to identify the most serious landslips presenting risks to farms/clusters, with a view to applying DRR measures to 75-100 sites during project implementation. The process will involve an integrated approach using two DAFNC teams, each comprising technicians from DEAS, DOF, AESD, and WRMA. *(See Project Implementation Arrangements- PART III*). This will allow each team to have the expertise to conduct farm inventory, needs assessments, identification and vulnerability analyses of landslips, and agree on the type

[25] National Scale Landslide Susceptibility Assessment for Saint Lucia – World Bank 2016: Flood Event of December (2013)- A Report of the GOSL and World Bank (2014); MACRO-Socio-ECONOMIC and Environmental Assessment of the Damage and losses caused by of Hurricane Tomas- A Geo- Environmental Disaster. Towards Resilience – (2010) UNECLAC-OECS-UNDP-IICA)

of DRR measures to be undertaken as a team. All of this information will be used to update any existing landslip map and to create new maps in other parts of the project area.

5.11 The overlay farm maps created from the inventory will enhance the decisions on the most urgent landslips and farms to benefit from the project activities. As this is also a participatory approach with farmers, it will provide good learning and practical demonstrations on vulnerability analysis and DRM for improved land stability in small farms, in the areas most vulnerable to CC impacts. The WRMA input will be primarily to use this same process to identify clusters and individual farms that should also benefit from improved water security at 1.2 below. The focus on landslips will be heavily on Region 6, as well as the extent of hillside farming observed during the field visits. No DRM action has taken on these landslips and no new maps have been created since the Trough of 2013, although further landslips have been observed. This work will be undertaken under the leadership of an expert on vulnerability analysis and DRR, engaged by the project and with full consideration for the Report of the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) at Appendix III.

5.12 Urgent action is required to improve adaptive capacities, in as much of the 3,449.6 hectares of farm land assessed as possible based on suitability[26] for cultivation. The project aims to retain a team of technical officers in the DAFNC, with the capacity to continue the process of building resilience in farming areas susceptible to landslips, including from normal rainfall events. There is another 10,000 hectares of agricultural land, described as unsuitable for cultivation, due to the steep slopes and soil limitations. These areas are under cultivation by necessity, in order to secure livelihood and food security within the households of the 32,919 small farm families. These lands are also at risk from landslips. Hence the project will ensure that the capacity to conduct vulnerability analysis at the farm level in agricultural communities, is significantly strengthened in the DAFNC, through the expert vulnerability analysis and CBDRM.

5.13 In summary, the project will use the CBDRM approach to build farmer and agriculture extension capacity to conduct inventory and vulnerability analysis, to prepare an overlay farm map from existing[27] data and maps (landslips and agro-ecological systems) in the project area. This action will update the positions and rank of the farms most susceptible to landslips. Project beneficiaries will be selected on the basis of ranking of susceptibility of the farm or the cluster, and guided by the EIA/EMP. At the same time, the project will seek to ensure that there is no discrimination in the participation of male and female farmers. Due to the susceptibility to landslips and the steepness of the slopes the project proposes mostly non-structural methods to reduce vulnerability to land slips as well as to protect incomes and food security of the farming populations. In this manner, the project will reverse the current practice of monoculture systems in vegetables and root crops even on steep slopes, towards tree cropping and inter-cropping.

5.14 Against this background the list of proposed treatments emerging from the consultations include (a) tree crops for intercropping and agro-forestry as a priority using tree crops such as coconuts, lemons, limes, nutmegs, coffee, citrus, mangoes and cocoa, and tree legumes for forage and for building soil fertility and structure (b) hillside ditches and other drainage infrastructure including regular drainage maintenance, (c) cover crops and other limited land preparation practices across the slopes with minimum tillage on very steep slopes (d) alley cropping (e) establishment of fast growing crops on sloping terrain to achieve quick ground cover (f) establishment of contours and cross drains (g) application of compost, vermi-composting, mulch and fertilizer teas to improve soil structure and reduce erosion and (h) grass and plant barriers.

Output 1.2: Access to On-farm Water from RWHS and Bare Slope Catchment with Drip Irrigation Integrate with Built Soil Resilience using Compost and Other Organic Material

5.15 There is an obvious need for infrastructure to harvest and store rainwater during the wet season for irrigation during extreme dry spells and the seasonal dry months. This contributes to reduced water security on the farms for both crops and livestock (small ruminants). The project will address this problem by building adaptive capacities in the farming systems in the project area to harvest rainfall surface runoff using bare slope

[26] Land capability map of Saint Lucia.

[27] National Scale Landslide Susceptibility Assessment for Saint Lucia – The WORLD BANK- Caribbean Handbook on Risk Information Management –CHARIM (2016).

and from different sources of rooftops as catchment surfaces. Roof-top catchment surfaces will be on-farm from modest structures, except for where the catchment surface is from bare slope. The project will also provide (a) drip irrigation infrastructure for on-farm access (b) training for farmers in water management and soil water use efficiency in farming systems and (c) the organisational capacity for management and responsibility sharing of the RWHS infrastructure, through the formation of a National Water Users' Association. The outputs of these activities will inform a country wide strategy for rainwater runoff harvesting for agriculture.

5.16 The selection of Region 6 in Output 1.1 was guided by several reports on the extent of landslips and the impact on the farming, as economic activity in the project area. The vulnerabilities at the household level is significant with poverty head count ranging 38.5% to 44.9%. Unemployment rates are as high as 29.7 % across communities due to the impact of weather events. The final selection of the beneficiaries and sites will include more detailed assessment to identify and address areas that will reduce the level of vulnerability on the farms of an estimated 500 small farmers. Further justification for the selection of this area is that a cursory[28] assessment of the scars of Tropical Storm Debbie and scars (unclassified) of Hurricane Tomas. The agriculture land-use map shows that landslides areas were previously farmed.

5.17 Relative to the selection of beneficiaries under Output 1.2, this process started with selection of sites during the consultative process focusing on where farms were wholly rain fed or experience water shortages during dry periods. The intention was to ensure water and food security for the farm for household, income generation and employment through a transparent process and in the most cost-effective manner. In this respect, the sites, clusters and beneficiaries were determined by the following inputs from the consultative process:

(a) Five focus group meetings in the project area to present the purpose and activities to farmers, technical staff from the WRMA, DEAS, DOF, AESD, and an ITT (comprising expertise in water and agri business, agronomy and post-harvest handling, land and soil engineering, knowledge management and communication) sub-contracted to strengthen the project formulation process.

(b) Field visits with farmers through the communities in the project area to listen to experiences on water needs and to view some of the sites and clusters in the farm settlements, identified in the focus group meetings. Experiences included impacts of droughts, drying of rivers and wholly rain fed situations of the clusters.

(c) A first mapping of the settlements was undertaken by WRMA and AESD, followed by an assessment that included DOF and the ITT, on the safety of the hillside sites for establishing infrastructure for RWHS. Research was conducted on the cost effectiveness of on-farm rooftop RWHS compared to larger storage systems with water lines across the scattered farm settlements. These were mostly in small clusters, across the hill sides.

(d) Three technical meetings to review the mapped sites and listen to further comments from farmers on the sites selected and to agree on changes based on best approach to reach optimum number of farmers, ensure safety of sites, meet water needs, ensure productivity of the farmer and to women from the SLRNWP and youth farmers were engaged and included.

(e) Two field visits with the wider community including some of the leaders to present the plans for the sites selected and to encourage support for community-ownership of the systems.

(f) Undertaking of the AESD, WRMA and DOF with selected cooperative farmers to finally agree on the clusters in the settlements and to position some of the clusters using GPS, based on safety first and the agreements reached with the community and farmers.

[28] Agriculture Tourism Plan- Elizabeth Soomer (2018).

Output 1.3. Capacity Building Workshops for the Water Users' Groups

5.18 The social aspects of vulnerability and shared responsibility of RWHS in small farming systems will be covered in workshops and enhanced through the participatory approach already started in the consultations. Particular consideration will be given to the participation of females in the training given their critical role in water management in the household. The workshops will include considerations for maintenance of infrastructure and other sustainability elements of ownership, governance, efficiency and effectiveness. This will enhance effective participation during project implementation and social responsibility post-project. The workshops will also include considerations on the economic use of water through best crop selections and agronomic practices. Farmers will be required to sign a Memorandum of Understanding (MOU) agreeing that the RWHS and the irrigation system will be managed for food production on the site for at least ten years. Failure to adhere to these conditions could result in the removal of the system to another farm. This will apply to all farms regardless of the tenure arrangements.

5.19 The type of catchment surface was based on the potential for capturing surface flows and the number of farms that would receive water relative to the cost of establishing the system. On this basis, agreement was reached on the selection of the Monchy-La Bourne slope. For on-farm rooftop catchments, selections were made from 25 clusters in the project area (Appendix IV). Selections were also made to provide standalone water storage tanks for livestock farmers and for the, two main seedling nurseries. Where pumping of water is necessary, the system will be solar driven.

5.20 Project beneficiaries at the La Bourne site are located on steep slopes and are vulnerable to drought conditions due to soil type. According to the major buyer participating in the national consultation, this is one of the areas where some of the most productive farmers growing crops in open field and greenhouses and keeping livestock, operate. In addition to bare slope as catchment, the conveyance system will incorporate rainwater harvested from rooftops of a public building, dwelling houses, as well as on farm constructed roof catchment surfaces. This area is already fitted with soil probes, water level recorders and rain gauges. The area has two ponds which will be desilted, lined and fitted with silt traps for storage, with cost saving installation. These ponds will be maintained by the WRMA under its regular work programme. All of this water will be gravity fed. Farmers will be introduced to dryland farming techniques for increased soil-water savings during the seasonal wet months. A mix of farmers totaling 40-60 including youth, and women, working on 30 hectares of mostly contiguous land, managing crops and livestock will benefit.

5.21 Project beneficiaries for RWHS from rooftop runoff were identified from 25 clusters in the west and south-west: using a participatory approach with the farmers, the technical support team of WRMA, DAFNC, AESD and the DOF mapped and GPS positioned prospective sites for water. Clusters were described by the farmers as highly vulnerable to drought conditions and highly dependent on farming a mix of vegetables, vine fruits, melons, cucurbits, sweet potato, peanuts, peas, tree crops, small ruminants, and pigs and aquaculture. There is also a good gender balance in the area- typically females are about half the number of males. The establishment of on-farm access to water and the proposed training in the efficient use of harvested water and in responsibility sharing, will serve to enhance livelihoods security and incomes from an estimated 200 hectares. All farms benefitting under Component 1 will be assisted to improve soil structure and fertility. A community-based participatory approach will be used for building adaptive capacities production and utilisation of the soil building material from six outdoor facilities built under the project.

5.22 The capacity building will be on-farm and at the production sites with a view to reach all 2,400 beneficiary farm families in the project area directly[29] and another 1,800 through the capacity building undertaken in the entire DEAS. Livelihoods security with land stabilisation, improved production, and improved incomes are the expected outcomes. Specific to landslips and RWHS systems, the selected activities under this Component will be guided by the EIA and EMP, under the leadership of a vulnerability analysis expert engaged by the project Terms of Reference (TOR) provided in Appendix VI.

[29] This will be guided/determined by the needs assessment of baseline data collected during the first six months of the project implementation.

Component 2: Establishing Green Agro-parks, including the use of Solar Energy, for Increased Efficiency in Resilient Farming Systems

5.23 The Economic and Social Review (2017) provides evidence of persistent trends toward declines in the contribution of the agriculture sector to National GDP (PART 1-Figure H). Figure I also shows growth trends in domestic purchases with indicators of high levels of annual fresh food imports alongside gluts in fresh produce in domestic production. Understandably, the NAP-SASAPs (2018) and the TNC (2017) agree that it is unlikely that integrating climate resilience in agriculture only, will not remove the constraints to local demand and supply in the sector. GOSL is therefore concerned that the combination of climate and non-climate variables affecting the sector in the last decade or so could create adverse situations on livelihood security of rural communities, especially the farming communities where poverty is highly concentrated.

5.24 In view of the above, Component 2 will provide support to the recommendation[30] for urgent action for a range of modernised and enhanced production field practices, with the necessary capacity building in the DEAS. These are expected to result in higher yields from agriculture, to positively impact livelihood security and incomes and reduce poverty in rural communities. In addition, the Component will use CC and CV adaptation measures to reduce or minimise the incidence of annual gluts by targeting and removing the bottlenecks in the domestic demand and supply of fresh produce. The Component will also create additional chains to manage gluts through value added in agro-processing. The project will do this from production through to processing by integrating CC adaptation practices, including the integration of renewable energy, for higher levels of efficiency in the building climate resilience in agro ecosystem services.

5.25 The project will adopt an agro-park[31] concept as it provides a management approach for large numbers of continuous small farms working together to achieve high levels of productivity and efficiency. The process will involve improved productivity, competitiveness and reliability in farm production value chains. This will enable a greater share in domestic fresh produce supply chains, facilitating value-added, through agro-processing and promoting CC adaptation.

Outcome: Increased productivity and competitiveness in resilient small farming systems with improved livelihood security, increased income, employment generation and household food security through enhanced production practices and value chains.

Output 2.1. Two green-Agro-parks established: one in Region 7 in the west of the project area and another in Region 2 in the north-east on a total of 34.4 hectares of Crown Lands.

5.26 Two main activities are proposed for building adaptive capacities for CC adaptation in highly intensive small farming systems.

(a) Integration of modernised agriculture production technologies with climate adaptation practices including drainage for improved land use, water security and built soils with drip irrigation, small livestock on protein banks and aquaculture with water recycling for crops and lined ponds for sedimentation control.

(b) Post-harvest handling for fresh produce quality control through to processing and packaging, in HACCP facilities that offer capacity building and production space for small-scale operators.

5.27 Both activities will be integrated with solar energy in different ways for enhanced efficiency, productivity and competitiveness in diversified small farm production chains with improved livelihood security and incomes for small farmers and small scale-agri-processers. There will be a strong focus on CC adaptation practices for improvements at the farm level to enable a greater share in supply chains to satisfy domestic demand for fresh produce.

[30] MTDSP-SDS (2012) the NAP-SASAP (2018-2028) and the TNC.

[31] Involves all facets of the agricultural chain from pre-production (land management, irrigation, drainage, access roads) driven by production practices for enhanced productivity, and post -harvest marketing arrangements to promote investment in the sector. The project will use primarily green practices to maintain the focus on resilient farming systems.

Output 2.1.1 Intensive Farm Production

5.28 The production areas will cover an estimated 30 hectares of farmland operated by 70-100 small farmers engaged in activities with the following outputs: (a) an estimated 26 hectares of selected crops (leafy vegetables, root crops, sweet potatoes and or dasheen), tree crops (mangoes or cocoa) and vine fruits (water melons or pineapples) from 16 greenhouses and open field, in highly intensive production systems and with built climate resilience in agro-ecosystem services; (b) highly productive intensive cropping patterns with built resilience for agro-ecosystem services in water security, built soil from organic inputs and legumes in different mixed systems and adaptive capacity for biological control of insect pests with variation in temperature; (c) climate smart small livestock practices through protein banks, in-house feeding and cooling; and (d) restored aquaculture ponds with diversified production chains through water recycling integrated with cropping systems and farm tours.

5.29 Production and utilisation of organic material to build resilience in soil will be on site through small outdoor facilities constructed by the project. The integration of climate resilient and enhanced farm technology approaches is expected to increase productivity and improve competitiveness by removing bottlenecks in the local supply chain. Positive impacts on livelihood security of the 54-70 contiguous farmers on the two production sites are expected. An additional 900 farmers external to the production sites will benefit from the capacity building exercises under the Component. The selection of farmers will include female farmers and dependents of households if the gender assessment indicates.

Output 2.2. Two HAACP Certified Green agro-processing and Training Facility

5.30 Each facility will accommodate 15 beneficiaries in each session. Training in post-harvest handling will include fresh produce quality control in leafy vegetables, with packaging and processing activities for the range of leafy vegetables, fruits and herbs. The project will make special provisions for equipment and training for the 70 members of the SLNRWP. This group processes and packages chocolates from cocoa beans grown by the women. These women will also have access to the regular services of the agro-processing facility should they choose to engage in other types of agro-processing offered.

5.31 The facilities will observe all the standards as required by the SLBS and the Ministry of Health and will also provide technical training to the level of certification required by the SLBS. The intention is to encourage supply chains between small farmers on the sites and small-scale agri-processers as a means of diversifying and expanding value chains that benefit the small farming populations and communities with greater livelihood security.

5.32 Under the project, youth and rural women specifically, will benefit from training to determine economically viable packages and to improve packaging in order to attract a higher price for the product. Rural women and youth will also be assisted to prepare small agri-business plans to set up small scale green micro–enterprises in popular marketing spaces, in the tourist areas as well as to brand their green products to enhance penetration of the regional export markets. Small-business such as schools and restaurants, involved in agro-processing and wishing to transform their own operations, will be facilitated under special arrangements, to use the services on scheduled days.

Component 3: Knowledge Management and Transfer for Capacity Building to Improve Institutional and Local Level Adaptive Capacities

Outcome: Established Information and Communication Systems for Improved Adaptive Capacities to Build Resilience in Small Farming Systems for Livelihood Security, Income Generation and CC Awareness.

Output 3.1 Baselines and capacity building for adaptive capacities

5.33 A convenient schedule will be agreed on with the leaders in Components 1 and 2 to ensure timely deliveries in the proposed training and capacity building of staff of the DEAS and at the farm level. This will

be done in close collaboration with all the agriculture Regional Heads, the DOF, AESD and the WRMA and will include the following considerations:

(a) A participatory needs assessment to establish or improve baselines for adaptive capacities and to provide information for the final determination on location of concrete field activities, (particularly in Component 1), and the scheduling of the field training programme.

(b) Documentation of lessons learnt with easy access for use by project beneficiaries.

(c) Support for timely delivery of capacity building training at the level of the DAFNC and at the farm level. This Component will also pay critical attention to the capacity building reports coming from the local level to ensure that there is no evidence of Regions or clusters of farmers in the project area being left behind. This approach is necessary as the project is multifaceted requiring the proper phasing of all components.

(d) Facilitation of the formation of CC organisations, and supporting the organisation and the hosting of Biennial Competitions on climate adaptation in agriculture. Baseline, Knowledge, Attitudes and Practices Studies as well as a gender assessment will facilitate these activities.

5.34 This Component will also establish a CC resilience database for the purpose of M&E of the social and economic benefits of the project activities. The data collection instrument will be developed with the support of the Department of Statistics to ensure inclusiveness of women, youth and the three vulnerable and marginalised communities in the project area. The project will also strengthen and re-design, as necessary, the master database in the DAFNC to accommodate the CC adaptation data and to establish a more friendly method of data capture by the DEAS. Despite a modern data management infrastructure in the DAFNC and a core group of trained personnel, local and national production data is inadequate or sparse. The DEAS is challenged to formulate a strategy that is sufficiently convenient to farmers for collecting and reporting on farm production data. The web based Agriculture Resource System (ARS) will be upgraded to improve functionality and longer term management of agricultural data, including the integration of CCA data. The data bank housed in Corporate Planning is appropriate as this Department also includes the Information and Communications Systems Unit, Agricultural Statistics Unit, Documentation Centre and Marketing Unit and is therefore well placed to support knowledge management for learning and policy. A portal to the DAFNC website focused on providing information for greater awareness and responsibility sharing, and knowledge management in CC adaptation in agriculture will also be established.

Output 3.2. Climate Change Interpretation Learning and Laboratory Centre

5.35 The CCILLC will provide graphic interpretations of the experiences and learning tracked in agriculture with a keen eye on evidence of increased resilience in the sector, or of limits on adaptation options. The CCILLC will do this through two climate control grow rooms and the planned bi-annual data collected in the field. The findings will be shared with schools, the scientific community, policy makers and development partners through the sessions of the Conference Centre and the cultural sessions mentioned below. The complex nature of the impact of temperature on the agro-ecosystem, in particular the crop subsector, even with slight variations will be carefully observed through climate-controlled grow rooms. Tree crops and, tomatoes in particular, show this level of complexity (mango, avocado, soursop, breadfruit) in the models used in Saint Lucia (GOSL/UNECLAC -2011).

5.36 Therefore, the CCILLC activities will improve the quality of local and national awareness of CC in agriculture, particularly focused on the farming systems and agro-ecosystem services and livelihoods of the farming population through (a) practical demonstrations of farmer participation and adaptive capacities demonstrated in agriculture and the farming systems through different communication instruments; (b) graphic analysis of impacts of the projects on livelihoods, income generation and general social well-being of the agriculture communities; (c) a forum for rethinking and improving CC adaptation in agriculture including limits on climate adaptation practices, and (d) climate controlled grow rooms for observations and strategic responses on different climate scenarios managed with solar energy.

5.37 The expectation is that through the climate-controlled rooms the CCILLC would be able to demonstrate from the work undertaken, multiple variations simulating agro-ecosystems, temperature, soil-water, light, resistant varieties, insect behavior, flowering and yields. It will also include information on evidence of built resilience in land and soil in collaboration with AESD and the Research and Development Division, through soils data collected from the field, evaluation of impact on incomes and employment, and changes in areas of traditional livelihood security.

5.38 The CCILLC will bring some of this learning and interpretation once a year to a larger venue where more of the agriculture communities can participate in a practical way, thereby generating more community-based knowledge and knowledge transfer. For example, on these occasions the CCILLC will borrow the practice of engaging folks from the Monsignor Patrick Anthony Folk Research Centre to work with community-based groups to communicate their experiences in climate adaptation through competitions. The capacity support group of the DAFNC has responsibility for ensuring dissemination of information through the national data management system.

5.39 The outputs will be presented in different forms of graphic data, learning and interpretation for reflection on climate resilience and adaptation strategies in agriculture. It will be presented in a form that is useful to the farming communities, through the schools, public officials and the scientific community in Saint Lucia. The quality of data collection and management will be of a category that will satisfy sharing in the OECS sub-region and other regional bodies with interest in CC impacts on agriculture and rural communities highly dependent on ecosystem services for food production and livelihoods security. Various press releases and communication products generated will be disseminated through regional agencies including the Organisation of Eastern Caribbean States Commission, CCCCC and CDB.

Output 3.3 Rehabilitation of Building to Host Knowledge Management Activities of the Project

5.40 The building to house the Knowledge Management and Transfer component of the project is located at the Agro-park sited in Region 7 on 14.4 hectares of farm land owned by the Crown. This is the same area proposed for the green production sites using climate adaptation and renewable energy activities, integrated into farm production and agro-processing as well as other good practices for higher levels of productivity. This building will be rehabilitated under this project and will house all the off-farm knowledge generated, managed and transferred by the project. These include all of Component 3 comprising the data capture and management, the CCILLC (climate control grow rooms and Conference Centre); one of the solarised agro-processing facilities and training room; farmer meeting/training room, with provisions for the meetings of farmers in Region 7, and training for adaptive capacities in built soil resilience with CC and CV. Currently the building houses the Agriculture Region Office and the Fairtrade Group.

5.41 At this site, the Agro-park with its innovative and modernised production and agro-processing practices, as well as the CCILLC will satisfy the requirements of a tourism attraction, generating a CC adaptation farm tour value chain. Another added benefit of the selection of this building is that it is located along the main farm tour route around the island, whether from the city of Castries or through the well-known scenic back roads. There is also the rich history and work in agronomy and Good Agriculture Practices (GAPs). The project will assist in restoring the culture of intense interaction among agriculturists and farmers in research and innovation, with the enhanced intrigues and curiosity of CC adaptation and climate resilience in agriculture. Agro parks by nature are income generation enterprises. Of the two value chains mentioned, the farm-tourism value chain will be an income generation source for the GOSL. The farm/food production chain, should be able to maintain their farm enterprises with the normal technical support from DEAS and the Marketing Unit.

5.42 The building was confirmed structurally sound after an assessment by the Ministry of Infrastructure, Ports, Energy and Labour (MIPEL). The MIPEL and the DAFNC will undertake the necessary agreements with the Crown Lands Department for the Block and Parcel to be registered for this use. The DAFNC will also undertake the regularisation of leases where there may be farmers who are already farming on the land without the necessary leases from the Crown Lands Department. This is a normal procedure facilitated by the DEAS.

5.43 The second learning center (CCILC) is a modest reception area, to receive the tour groups to the farming areas covering 20 hectares of small farms which utilise intensive production integrated with renewable energy just as the Agro-park in Region 7. This area will be accommodated in the design of the building for the agro-processing facility under Component 2.

5.44 Appropriateness of the Project Activities: The project activities are appropriate as they respond well to the recommendations of the TNC (2017) and other national documents. These include (a) the MTDSP (2012-2016), that supports commercialisation of non-traditional crops grown almost entirely by small and micro-farmers, sustainable land use practices, modernising the agriculture extension system and strengthened linkages of agriculture to tourism; (b) the Revised (NEP-NEMS 2014) intended to minimise environmental vulnerabilities and risk, support sustainable livelihoods, with considerations to develop a green economy; and (c) the NAP-SASAPs (2018) focusing on higher levels of productivity with climate resilience to positively impact rural communities. The considerations for a more economically viable and environmentally secure approach, will create improvements in the lives of rural people. These include among others

5.45 In addition to the above, the project activities also include major considerations for changing the lives of a significant portion of the estimated 70% of the small farms, who are entirely rain fed and another 20% that are supplemented with water from the rivers. Of significance, is that the CC adaptation options proposed are highly suited to the disposable income levels of small farmers and their households, particularly those under the poverty line. There is good reason to expect that the environmental and socio-economic benefits realised will be effectively manifested in (a) reduced vulnerabilities of farmland in the project area to climate related hazards; (b) farmers involved in more productive and sustainable livelihoods; (c) youth and women with strengthened capacity and improved levels of livelihood security; and (d) and a greater awareness of adaptive capacities and resilient farming, with CC and CV.

Part II-B. Describe How the Project Provides Economic, Social and Environmental Benefits with Particular Reference to the Most Vulnerable Communities, and Vulnerable Groups within the Communities, including Gender Considerations. Describe How the Project/Programme will Avoid or Mitigate Negative Impacts, in Compliance with the Environmental and Social Policy and Gender Policy of the Adaptation Fund.

5.46 The Project will benefit small farming populations, primarily farmers in the west and south-west and north of the island where the larger majority of vulnerable populations, live including three of the four poorest communities in the country, Canaries, Anse-la Raye and Soufriere. Attention will be given to both sexes and to youth through participatory approaches to interact with these groups in order to ensure equity and transparency. Males working in agriculture have been deemed the poorest amongst the males in the labour force. There are about twice as many male farmers as female farmers, acknowledging that women often are not counted in official statistics as their work might be unpaid on family farms or they might engage in subsistence agriculture. There is an undetermined number of youth farmers. Among them are 150 young persons targeted under YAEP for capacity building in livestock, crops and aquaculture in two production areas, both of which fall into the project area.

Economic Benefits:

5.47 The guaranteed economic benefits include improved incomes and employment generation from water security integrated with practices for improved soil fertility and structure, and with improved capacity to participate in the domestic market supply chain as harvests are more reliable. The potential will also exist for an increase in the number of harvests, with water access during low rainfall and with improved productivity from heathier soils. Benefits will include savings accrued by greenhouse farmers who currently supplement their water needs with household water at very high cost, as daily, large volumes are required, relative to the demand of a household. Open-field farmers will also improve their incomes as they would now be able to add at least two harvests annually with water security and drip irrigation during the seasonal dry months, as well as to satisfy water supply during unexpected dry spells. Diversified production value chains in crops and aquaculture will also add to the economic benefits of the project while small livestock farmers will benefit primarily from the reduced cost for feed as they shift from commercial feed to on-farm protein banks. Progressively the farming households, covering three of the four poorest communities in the country will be able to raise the profitability of the farm as they gradually shift from practices such as high inputs of agri-chemicals to organically built soils using compost, mulch and other soil building production and utilisation practices learnt on the project.

5.48 The economic benefit of water security for greenhouses alone is evidence of some of the early economic benefits expected. Calculations on annual cumulative storage from RWHS from a greenhouse with rooftop catchment of 100 square metres (m) can provide water for irrigation for up to six months and more. Greenhouses used in Saint Lucia are normally 9.3m wide x 18m providing 50% more surface runoff for each greenhouse, than is required over the dry months. The calculations on the 100-square catchment surface shows potential savings of US$1,455.29 annually per greenhouse from not using water from the public distribution system during the seasonal dry months. There is also the greater security of domestic market for the local produce with reliable water security, and for the GOSL, the expected foreign exchange savings from the expected reduction in the importation of leafy vegetables and root crops. Credible demonstration of increased yields in open field and greenhouses and the ability to prepare farm production profiles showing stability in yields and participation in domestic fresh produce supply chains will greatly assist farmers with easier access to loans from credit and other financial institutions for targeted production systems.

5.49 Other economic benefits in the farming system will derive from some farmers re-starting farming activities in areas which had been abandoned due to water shortages and will also give access to those who expand their operation on hillsides where improved land management practices have resulted in new lands for cultivation with additional sources of farm income.

5.50 Small-scale agro-processers including the women involved in the Project will be able to demand higher prices for their products with improved labelling and packaging that can appeal to the tourist market and upscale shopping areas. There is also potential for employment generation for rural youth involved in rural-urban selling of small sized packages of initially processed foods (peanuts, cashew nuts, juices, and farine). The proposed CC adaptation and climate resilience farm tours will be an added source of income for these households.

5.51 The project activities are not expected to create any harm or interruption to other farmer income generation and employment generation activities outside of the project area. With the high levels of poverty in some of these households, it is expected that the project will be well received and will be of benefit to the 2400 direct beneficiary farm households, plus generating employment for marginalised households with no access to land. Also of importance to the marginalised households in the project area, is that the project formulation process was intentionally inclusive and through extensive community consultation utilising the proposed needs based and participatory approach to capacity building, ensures that no household will be left behind. This will be monitored through the bi-annual data collection. Also, due to the current high level of fresh food imports relative to estimated annual crop production (Figure I), it is not expected that significant growth in numbers of the beneficiaries in the share of the domestic fresh food supply chains will disadvantage or displace farmers outside or inside the project area.

Social Benefits

5.52 Higher levels of profitability with increased income generation, employment and improved livelihood security and welfare at the household level will be realised. In addition, farmers, including women, will no longer have to carry water, often from public stand pipes or the river which significantly reduces time devoted to those activities and reduces the burden to reconcile productive and reproductive tasks in particular for women. This will also release the pressure on Water and Sewerage Company Inc. (WASCO) to find new intakes for the public water distribution and to reduce interruption to household water in some of these households due to water shortages. Through the capacity building under Outputs 2.2 and 3.1, women and other small–scale agro-processers will be better organised to manage their agro-processing operations both organisationally as well as within the international requirements for agro-processers. These and other social benefits described so far in the project could be briefly described as:

(a) Empowerment in rural communities through capacity building for organisational, ownership and responsibility-sharing in agriculture community activities and infrastructure, leading to decision making and actions to make positive changes in the use of the natural resources.

(b) Increased access to disposable incomes through the reduced cost of agricultural inputs and the potential for increased yields with access to water, with the potential to improve well-

being at the household level in vulnerable rural communities.

(c) Enhanced Education and awareness about climate resilience at the national level generating sustainable and appropriate responses at individual, household and country levels.

(d) Improved household food and nutrition security for health and economic productivity.

(e) Opportunities for a broadened organisational base for women in agriculture through linking production with small and micro enterprises processing.

(f) Reduced disruption in school attendance by children from marginalised households, due to the challenges of coping with poverty.

5.53 The intensive and participatory consultative process was undertaken to ensure fairness and transparency in the selection of beneficiaries. Additionally, the processes sought to ensure that community members not directly benefitting, felt assured that no social harms would result to any community group from the actions taken by the project. For example, community meetings were not exclusive to the farming populations, but were attended by a wide range of persons, including many who turned up to the field visits on their own initiative. Considerations offered from the mix of persons provided good information such as positioning standalone community RWHS for water security for poor small livestock farmers with low numbers of animals, thereby facilitating the inclusiveness of the social benefits of the selection process. In addition, there is no risk of resettlement in any of the project areas.

5.54 In general, the community members were satisfied that there was balance in terms of gender and youth, particularly among the proposed beneficiaries for water security. These measures were a necessary undertaking to also satisfy the National Social Protection Policy (NSPP 2015) which seeks to ensure that sustainable development in Saint Lucia is inclusive and equitable. Relative to the selection of beneficiaries on the intensive production sites in Component 2, first consideration will be given to farmers already on the site, to ensure there is no risk of loss of income to farm households in the area. In fact, none of the activities carry any threat of social loss or disadvantages. Instead, farmers will enjoy better welfare not only in terms of incomes and livelihood security but through the inputs of the proposed community and gender development specialist there will be good understanding of rights and justice in project implementation, trust building and avoidance of situations resulting in grievances which could delay results of project activities. Further activities such as gender data collection and gender capacity building of stakeholders of the Project will increase awareness around gender issues in the sector and help refine the Project in terms of gender results and targeting.

5.55 According to CDB's Gender Marker the Project is gender mainstreamed having the potential to significantly contribute to gender equality (shown below).

TABLE 4: CARIBBEAN DEVELOPMENT BANK's GENDER MARKER FOR PROJECT (ABOVE USD1,000,000)

Project Cycle Stage	Criteria	Score
Analysis: **Introduction/ Background/ Preparation**	Consultations with relevant categories of males and females and relevant gender-related public/ private sector organisations and Non-Governmental/Community-Based Organisations will take / have taken place. Socioeconomic, Sector and/or Institutional analysis considers gender risks and / or gender disparities that impact the achievement of project outcomes.	0 0.5
Design: **Project Proposal/ Definition/ Objective/ Description**	Project interventions / policies address existing gender disparities. Project objective / outcome includes the enhancement of gender equality or the design of gender-responsive policies or guidelines.	0.5 0

Project Cycle Stage	Criteria	Score
Implementation: Execution	Implementation arrangements include either: Capacity building initiatives to enhance gender mainstreaming of the executing and/or implementing agency. Or Active participation of representatives of gender-relevant stakeholders in project execution. Terms of Reference of consultancy / project coordinating unit / project management unit includes responsibilities and resources, including budgets for gender mainstreaming.	0.5 0.5
Monitoring and Evaluation: Results-Monitoring-Framework (RMF)	Collection of sex-disaggregated data is part of the project. At least one gender-specific indicator at the outcome and/or output level in the RMF or included in tranche releases of Policy Based Loans.	0.5 0.5
Maximum Score:		**3**
Scoring Code		
Gender Mainstreamed (GM): if 3 to 4 points The project has the potential to contribute significantly to gender equality.		

Environmental Benefits

5.56 The environmental benefits that will result from the proposed activities include positive impacts on terrestrial and marine ecosystems from reduced landslips, soil erosion and pollution of rivers, as a result of the shift to practices with strong emphasis on climate adaptation measures to build resilience in land-use. Benefits would also include: (a) improved land management in areas susceptible to landslips; (b) increased resilience in agricultural soils for soil water retention, structure and soil fertility; (c) reduced carbon footprints by the adoption of renewable energy in agriculture value chains and by the anticipated reduction in the need for fresh food imports; (d) improved land drainage; and (e) improved conservation of water in ecosystems from condensation in canopies of cover crops and tiered systems.

5.57 Environmental risks associated with the project would fall within those relevant to category B of the Environmental and Social Policy of the Adaptation Fund (ESPAF). These risks are associated with limitations on the establishment of on-farm RWHS in hilly areas and the appropriateness of treatments for the slopes in and around farming areas. The assessment of the ESIA/ESMP and ESMP of this intervention is attached at Appendix III.

5.58 The Project takes into consideration the conclusion of the initial assessment that the outlined mitigation interventions and environmental management process, and the said impacts can be mitigated even when site specific vulnerability is described as ‘very high, high and moderate’ and will therefore follow closely the ESIA/ESMP with technical guidance of an expert in vulnerability analysis and DRRM engaged in the project implementation. The Project also takes into consideration that none of the areas proposed fall into the areas identified as moderate to very high. The Project does take into consideration the limitations on flat areas to establish RWHS on hillside farms and will be guided by the general recommendation of the EIA/EMP. The Project noted that the baseline adaptive capacities within the WRMA, DOF, AESD and DEAS technicians is adequate for an effective participatory approach. As a result of the project activities, the Government agencies which provided support will have sufficient capacity to conduct M&E and vulnerability analysis after project completion. This is important as the assessment expresses confidence that the project will greatly improve water security for farm purposes leading to a general positive impact for the economic and social development for rural areas, against a broader backdrop of declining agriculture (production, employment and farmer participation), declining agricultural exports and losses suffered due to extreme weather events.

Part II-C. Describe or Provide an Analysis of the Cost-effectiveness of the Proposed Project.

5.59 Saint Lucia's agriculture sector has begun to experience the effects of CV and CC with evidence of degradation of farm lands from intense rainfall events, droughts due to low soil water retention and related unreliability in yields and timing of the harvests with uncertainties in livelihood security in farming systems. In addition, sedimentation flows have resulted in freshwater and coastal and marine ecosystems with potential for negative impacts on the tourism industry and important commercial fisheries. Projections towards 2040 are for 57% decrease in annual rainfall, earlier seasonal droughts, and dry spells in seasonal wet months, further threatening agro-ecosystem services for farming. Moreover, these projections could become increasingly severe towards 2081. The GOSL is deeply concerned with the extent to which these projected changes could adversely impact livelihood security, incomes and food security in rural communities, and more so for vulnerable households highly dependent on farming activities, mostly concentrated in the project area (Figure F). The cost effectiveness of the project can be best judged on the expected results over the short, medium and long term as well as on the co-benefits of the climate adaptation practices which the project will use.

(a) Component I will provide water security and improved land management and soil quality with evidence-based results from the crop subsector by the end of year two and with longer term benefits from built resilience in ecosystem services and improved adaptive capacities within the farming population to respond to CC and CV.

(b) Component 2 will build on resilient systems to increase productivity and reliability through modernised technologies for higher levels of efficiency and more intense integration of energy in the agriculture chain by using solar energy instead of fossil fuel. This is expected to increase productivity with reliability and competitiveness in the local fresh food supply chain, and to generate production value chains in agro-processing, diversification in aquaculture activities, and climate adaptation farm tours through climate smart practices including in the management of small livestock and integrated farming in crops, livestock and aquaculture.

(c) Component 3 is strongly focused on building adaptive capacities for CC and CV based on established baselines in the project area. The Component will capture, document and disseminate for capacity building, lessons learnt from data and information collected at the local and institutional levels including through climate controlled grow rooms, to target and improve adaptive capacities for resilience in the farming systems in the project area. Monitoring and evaluation will also be undertaken under Component 3 with benefits to improvement on policies and strategies for climate adaptation practices for on-going resilience in the farming systems for improved livelihood security, income generation and employment for the farming households including those most vulnerable and with the necessary considerations for gender balance and youth.

5.60 The expected cost effectiveness of the climate adaptation practices is fully supported by the extent to which the targeted CC adaptations options agree with the recommendations for effectiveness and efficiencies in climate adaptation by the Food and Agriculture Organisation (FAO)[32] of the United Nations, the Intergovernmental Panel on CC (IPCC) Technical Paper 1V (2008) on water security for agriculture with CC and results of UNECLAC studies on Economic Assessment of the Impact of CC in the Agriculture Sector in Saint Lucia (2011). In the case of the FAO, best land management practices for efficiency and effectiveness to reduce impact of future climate is DRRM for slopes and hillsides using agro-forestry and RWHS using bare slopes. These are the options selected by the project. FAO also recommends drip irrigation, built organic soils with compost and mulch and protected agriculture systems as in Components 1 and 2 for building resilience.

5.61 Component 2 also recommends climate adaptation options that take cognisance of water supply and demand as proposed by the IPCC. The project targets controls for water use efficiency with pumps and soil tension meters among soil water measuring devices, enabled by the integration of renewable energy for efficiency and cost effectiveness. The project adopts a new modernised approach by using solar energy to

[32] CC food security risks and responses (2016).

manage climate control grow rooms to track the limits of CC adaptation practices through simulations simulation and manipulation of CC variables of relevance to identification of resistance in (Component 3). This is an example of cost effectiveness and efficiency in the project as using an agro-park concept, this solar energy is to be shared from a 25kWp system which also provides energy for managing water security in farm production systems, aquaponics and agro-processing on one site (Component 2).

5.62 Work undertaken by UNECLAC[33] focused on CC adaptation options for improved soil water such as contours and cross drains as in Component 1 to reduce soil erosions, and best options for water management using greenhouses and drip irrigation (Component 2) to conduct cost and benefits analysis. Table 5 provides the outcome of the study conducted using 24 commodities and the targeted climate adaptation options. The best climate adaptation options emerging for Saint Lucia were water security with drip irrigation, mainstreaming CC and CV issues in agriculture management and establishing systems of food storage. While the project does not include the establishment of systems of food storage, the outputs of the green agro-processing facilities potentially can establish the basis for food storage systems at rural community levels.

5.63 Taken all together the climate adaptation practices are from the most highly recommended sources of climate resilience in farming systems and are highly relevant to the adaptive capacities for building resilience in the farming system in the project area with improved livelihoods security, income generation and employment over the longer term.

5.64 The cost to the project for Component 1 intervention is US$3,053,781. This might have to be revised within the Component when the full extent of the vulnerability analysis of the landslips are confirmed. Component 2 of the project is budgeted at US$2,824,545. This budget is not expected to change in any way that would require more than an internal revision. The Knowledge Management Component 3 and the agro-processing facility in Region 7, among other services, is budgeted at USD2,024,470.

5.65 It is expected that with improved adaptive capacities in the farming systems, in particularly water security and built resilience in land and soil, the current production levels of average 40-50 % of expected yields in vegetables, tomatoes, vine fruits and sweet potato could be significantly improved due to the year-round water security and other built resilience. Using Component 1 alone as an example of cost-effectiveness, a breakdown of expected yields from built resilience in agro-ecosystem resources, would show the following at current farm gate price for the respective crops:

(a) Vegetables as a base and assuming five harvests annually would generate an estimated US$4,699,000 from 200 hectares.

(b) Tomatoes annually as a base at 22,000 kilograms per hectare at current farm gate would, over the same area generate an estimated US$7,920,000.

(c) Vine fruits would be lower due to 6,803 kilograms per hectare, generating an income of US$1,904,840 over the same area of 200 hectares assuming three harvests. While net profit is not available for vegetables, vine fruit and tomatoes, complete data on sweet potato alone (with yields per hectare similar to lettuce and with farm gate price 40% lower than lettuce) reveal net profit of US$1,396,800 from 200 hectares annually. These potential annual gains in income generation, are good indicators that the project activities can significantly change the well-being of the farming community.

5.66 The project has strong indicators of important co-benefits of the climate adaptation practices, beyond the boundaries of the project area, which are shown in Table 6. Table 6 shows how targeted CC adaptation practices used in the project will promote resilience in farming systems, protect productivity and livelihoods in the important tourist sector, release pressure on the water sector and the degradation of river banks; and potentially accrue savings on foreign exchange.

[33] Economic Assessment of Climate Change Impacts on the Agriculture Sector in Saint Lucia (2011).

TABLE 5: SUMMARY OF PRESENT VALUE COSTS AND BENEFITS OF THE HIGHEST RANKED PROPOSED ADAPTATION ACTIONS FOR SAINT LUCIA

Details	Cumulative Present Value of Benefits	Cumulative Present Value of Costs	Benefit Cost Ratio	Net Benefits	Payback Period (years)	Scores based on selected criteria of 34 adaptation options (max. 45)
Promote water conservation – install on- farm rain water harvesting from roof tops.	**$144,387,790**	**$7,492,284**	**19.3**	**$136,895,506**	**0.03**	**39**
Installation of Greenhouses	$37,336,194	$7,350,424	5.1	$29,985,770	0.13	30
Mainstream climate change issues into agricultural management.	**$188,225,079**	**$27,119,882**	**6.9**	**$161,105,197**	**0.13**	**34**
Adopt improved technologies for soil conservation	$236,137,937	$94,286,452	2.5	$141,851,485	0.42	35
Establish early warning systems and disaster management plans for farmers.	**$97,531,499**	**$7,233,794**	**13.5**	**$90,297,705**	**0.60**	**39**
Use water saving irrigation systems and water management systems e.g. drip irrigation.	$360,969,473	$53,688,895	6.7	$307,280,579	1.42	39

TABLE 6: CO-BENEFITS OF THE CLIMATE ADAPTATION PRACTICES OF THE PROJECT

Climate change adaptation practices	Improved adaptive capacity contribution to resilient –farming	Co-benefits of the climate change adaptation practices
Mulch and compost.	Reduced vulnerabilities to landslips and soil erosion with improved soil conservation, and land management.	Improved livelihood security on rural coastline communities from healthier coastlines on the west south-west. Protection of a variety of commercially important nearshore marine fish species with sustained foreign exchange earnings for the fishing industry and sports tourism.
DRM and DRR using Agro-forestry and tree crops for slope management.	Reduced vulnerability to landslips, loss of farm assets and lives.	New farm areas brought under production, tree crops and new livelihood chains from tree crops and forestry products.
Drainage interventions in low lying areas.	Reduced water logging and siltation in farming areas.	Reduced siltation in river beds and flooding from back-up at river mouths with reduced cost to WASCO Ltd for desilting of intakes and dams.
RWHS from on-farm roof tops and from bare slope as catchment with drip irrigation.	Water security on farms.	Conservation of saved water with reduced demand on household water from WASCO for agriculture. Released pressure on WASCO Ltd to find new sources of potable water intakes in project area as demand on household water for farming activities will be lessened. Reduced degradation of river banks and less cost to WASCO for river bank training for sustaining flow depth as rain fed farmers no longer need to cultivate on river banks during dry periods.

Evaluation criteria (low cost; effectiveness, acceptance to stakeholders, short-term farming; potential size of beneficiary group; institutional capacity; ease of implementation; potential for social and environmental impact; potential to sustain over time).

Climate change adaptation practices	Improved adaptive capacity contribution to resilient –farming	Co-benefits of the climate change adaptation practices
		Reduced CC footprints from reduced clearing of forested areas for agriculture due to water shortages.
Integration of renewable energy into built resilient farming systems.	Increased productivity reliability, and expanded production chains.	Potential for foreign exchange savings from reduced fresh produce imports. Diversified value chains with reduced carbon footprints. Associated reduction in carbon footprints from reduced daily movement of fossil-fueled large food trailers of imported food moving across the country. Savings for food importers on cost of vat charges on ports of entry with improved reliability in local supply chains. Access to energy efficient agro-processing facilities for a strategy to establish community-based food storage systems for disaster response. A database of resistant varieties of food and feed plants for food security as decreases in rainfall becomes increasingly severe.

Part II-D. Describe how the Project is Consistent with National or Sub-national Sustainable Development Strategies including Where Appropriate, National Adaptation Plan (NAP), National or Sub-national Development Plans, Poverty Reduction Strategies, National Communications or National Adaptation Programmes of Action, or Other Relevant Instruments, where They Exist.

5.67 Key GOSL documents which guided formulation of the project process were, the Interim Poverty Reduction Strategy and Action Plan (IPRSAP) (2003), the MTDSP-SDS (2012-2016), the NCCAP (2015), the Revised NAP (2009-2015), the SNC (2012) and TNC (2017) and the NDC (2015) to the UNFCCC as well as the NAP-SASAPs (2018 -2028). The expected outcome of the enabling policy and strategic framework for the agriculture sector may be summarised as foreseen in the context of the NAP-SASAPs (2018-2028), that seeks to increase the contribution of agriculture to national sustainable development by enhancing the resilience of the farmers, and fisherfolk to protect and improve their productive assets to provide ecosystem services, thereby helping to reduce poverty, improve livelihoods, and income generation. The project activities as designed, will improve the contribution of the agriculture sector to the expected outcome of the enabling policy framework by building resilience in livelihood security in agriculture through enhanced adaptive capacities for CC and CV in the farming systems in the following way.

5.68 Component 1 with an outcome to increase farm productivity with improved livelihood security and incomes and bringing new farm areas under production in the project area, is essentially a direct response to the IPRSAP. The IPRSAP strategy and action plan aims to reduce the impact of poverty at the household and community levels, by enhancing economic and social opportunities for poor people, especially those populations considered the poorest. As shown earlier (Figure F located in Part I) the poorest are in agriculture communities in the west and south-west and parts of the north of the country where the project activities are highly concentrated. The project activities will integrate well-established climate adaptation practices that can effectively reduce vulnerabilities in farming systems to CC and CV, and improved livelihood security, food security and income. This will be manifested on the farms through improved land management including soil conservation and improved access to on-farm water security, integrated with built organic soil. The immediate output will remove much of the root causes of poverty arising from inappropriate cultivation and agronomic practices that have resulted in poor yields, high cost of production inputs, degradation of farming areas and loss of income. This Component will also contribute to NCCAP (2015) which focuses on a country wide strategy for water for agriculture through RWHS.

5.69 Component 2 with an outcome of increased productivity and efficiency in resilient small farming systems with improved livelihood security and income generation through enhanced production practices and

value chains is consistent with the strategic goals of the MTDSP-SDS (2012-2016) and the NAP-SASAP (2018-2028). It will also contribute to the target set out in Saint Lucia's NDC (2015). Together these documents provide an outlook for a modernised and expanded agriculture sector with improved productivity and a level of efficiency that can attract new investment to drive production and value chains for welfare in rural communities. The project proposes to integrate energy efficiency into farm production chains using solar energy instead of fossil fuel, and organic soil building instead of inorganic material, as well as solar energy for agro-processing. This strategy is as foreseen in the NEP-NEMS (2014) which promoted the use of renewable energy in the agriculture sector. Integration of energy also lends competitiveness in farm production value chains by enabling the management of enhanced production practices

5.70 This component focuses on all three subsectors, with an emphasis on the crop subsector and a preference for leafy vegetables, vine fruits and sweet potato as they make up the bulk of the fresh produce imports. The activities maintain a focus on livelihood security and income generation for households in vulnerable rural communities in the project area. Accordingly, all the climate adaptation options selected are suited to small farming systems including subsistence farmers, youth and women, or for upscaling to larger areas of production. The set of activities are defined in two complementary chains: an agri-food production chain extending beyond the farm gate into agro-processing, and an agri-tourism chain developed around CC adaptation and climate resilient farm tours. Both production chains include discreet activities for full integration of youth and rural women in the benefits of the project.

5.71 Component 3 with an outcome of an established information and communication system for improved adaptive capacities to build resilience in small farming systems for livelihood security and income generation is highly consistent with NAP-SASAPs (2018-2028). The focus is on building adaptive capacities in farming populations and within the public sector to move the agriculture sector forward. The document promotes the pursuit of a way forward that operates within a framework that strengthens agriculture extension officers, protects farming systems by way of an approved land-use plan, and designs a learning by participation program for improved adaptive capacities for climate resilience in agriculture from established baselines. As in Component 3, the NAP-SASAPs (2018-2028) also promotes learning by doing, community-based approaches and strengthened organisations for awareness and responsibility sharing. Component 3 will also support other policy objectives through the preparation of the Draft Disaster Management Plan for Agriculture in support of the Agriculture Policy Framework and Strategy (2016-2021) that supports implementation of sustainable and environmentally friendly DRR. In addition, Component 3 seeks to respond to Outcome 7 of the AFs Results Framework by seeking to prepare and promote draft land use policy measures and plans supported by an agriculture disaster management plan to define and protect agro-ecological zones. It provides training for technical staff of the DAFNC to undertake economic analysis of climate actions for the sector. Other activities which improve technical capacities will build on and sustain good farm level practices developed under the project, inform investment plans and work programmes which are also applicable to areas outside the project.

5.72 Other policy and strategic directions of the GOSL consistent with the project activities include (a) the conduct of research and development, particularly in the area of drought resistant varieties which will be addressed ex-situ in the CCILLCC and (b) recommendations [35] for capacity building for public servants to identify and assess economic impacts that may result from the projected impacts of CC and the costs and benefits of climate adaptation measures on selected agriculture subsectors.

5.73 There are some areas of the project design which cuts across different policy and strategy documents including (a) the promotion of gender equality and ensuring sustainable livelihoods by encouraging youth involvement in fisheries and specific activities that support rural women (NCCAP (2015); (b) the urgency placed on water security from RWHS for farming systems as in the TNC (2017); and (c) the strong focus on improved adaptive capacities for better use of the natural resources and strengthened agriculture contribution to the development of rural areas and well-being of rural populations (NAP-SASAPs 2018-2028). The NEP-NEMS is particularly holistic and the project finds consistency with the strategy in several areas, including promotion of water use efficiency on the farm, sustainable land management and slope stabilisation and as mentioned above energy security to minimise environmental vulnerabilities and risks with sustainable

[35] UNECLAC/GOSL (2011); EU Global Climate Change Alliance (EU-GCCA)/GOSL.

livelihoods enhanced food security through promotion of green practices.

Part II-E. Describe how the Project Meets Relevant National Technical Standards Where Applicable, Such as Standards for Environmental Impact Assessment, Building Codes and Complies with the Environmental and Social Policy of the Adaptation Fund.

5.74 Overview: Sections A and B describe the project activities which indicate that the project falls into category B of the ESPAF due to the unique nature of landslips within farming areas. In the case of water, care must be taken that none of the flows to WASCO intakes are negatively affected. In this regard, the project has prepared an EIA and EMP which is included in Appendix III. This plan will be monitored and assessed during the implementation process at the project mid-term evaluation and any other time deemed necessary.

5.75 The GOSL has for several decades, been party to international agreements and commitments, that speak to needs and rights relating to poverty and vulnerability, and the link to natural resources. Saint Lucia continues to satisfy its obligations relative to sustainable development and the protection of plant genetic resources, biodiversity conservation in general, and practices that could reduce carbon footprints. For example, the GOSL continues to satisfy its obligations to the UNFCCC through diligence in its reporting, with its latest submission being TNC in 2017. The country also reports to FAO on the use and misuse of pesticides. Through these agreements, the GOSL is aware of the sensitive link between natural resources, in particular the multi-functionality of agro-ecological services, and poverty as reflected in its leading national documents linked to the agri sector (Section D).

5.76 Against this background, the project activities were developed within GOSL's national policy framework that (a) seeks to assist agricultural communities to adapt to CC and CV while promoting environmental conservation (NAP 2015); (b) focuses on optimising contribution of land to economic development and livelihoods, with policy imperatives for protection and sustainable use of agricultural lands (Revised NLP-2015); (c) promotes actions on the ground to build productive capacities of the country's biological diversity, land and water resources towards national food security, rural livelihoods and employment and foreign exchange (NCCAP 2015); and (d) protects the environment through activities to minimise environmental vulnerabilities and risk, support sustainable livelihoods, and enhance food and water security, among others (NEP-NEMS 2014). The country has also established a long-standing partnership with CDEMA, in a continuing process to integrate disaster risk reduction measures, into the national planning systems with benefits for resilience in the agriculture sector and with due care/diligence.

5.77 Therefore, as concluded in its Diagnostic Study and Proposed Interventions for Building Resilience in CC in the Agriculture Sector (2015), the country has in place the requisite policy, legislative and institutional framework for compliance with the ESPAF. This framework is sufficiently enabling to support a programme to build adaptive capacities for resilience in farming systems that could reduce vulnerabilities in the agro-ecosystem services and enhance the well-being of the populations with the necessary measures to avoid or minimise harm to the environment or to populations at any level. Hence the project activities will build and improve on agro-ecosystems services for livelihood security of the target populations in their respective communities and with evidence-based co-benefits of the climate adaptation practices to ecosystem services in general with improved livelihood security and income generation to other dependent populations, outside of the geographic area of the project. Therefore, in compliance with the ESPAF, the GOSL will ensure oversight of the respective public sector bodies in the four areas of relevance to the project:

(a) Environmental Impact Assessment for natural resources, falls within the Ministry of Agriculture, Physical Planning, Fisheries, Natural Resources and Cooperatives (MOA) making the project well placed for compliance with these standards. Also, the Development Control Authority governed by the Physical Planning Act No. 29 of 2001 and its subsequent amendments of the Land Development (Interim Control) Act 1971 and its subsequent amendments – Revised January 2016, with guidelines for development and submission requirements provide guiding parameters. Under this Act there are 18 different types of activities which require that an EIA is undertaken, none of which apply to any of the activities undertaken under the project.

(b) In compliance with the AF, the project will undertake the ESMP as it applies to measures to manage landslips and soil erosion. While at this time none of the proposed RWHS systems assessed and recommended by the DAFNC fall into areas considered moderate, high or very high risk, the project will ensure due diligence to the ESMP and observe the conditions governing the establishment of RWHS. These two activities will be implemented under the leadership of an expert in vulnerability analysis and DRM and will be regularly monitored during project implementation. The MOA through the DAFNC Project Team (PART III) will be integrally involved in the M&E.

(c) Building Codes are managed within the Ministry of Infrastructure, Port Services and Transport (MIPST): the functions include attention to ensuring adequate building standards that emphasize measures to avoid the damage caused by extreme natural events, normally from hurricanes or intense rainfall. The MIPST has conducted the required structural assessment and has confirmed that the building proposed for rehabilitation in one of the agro-parks is structurally sound. The normal procedure for the MIPST oversight in building construction permit and licensing will be continued during project implementation.

(d) The Ministry of Health and the SLBS operates under very strict standards in line with international standards and is the appropriate authority to approve technical standards for the agro processing facility. Of relevance is the Food/Agro-processers Certification and the HACCP Recognition Programme-Codex Recommended International Code of Practice and the General Principles of Food Hygiene Programmes. The Project will ensure that both of the agro-processing facilities satisfy the requirements to receive the seal of approval for these two services. This will provide access to services such as labelling and grades.

In addition, the project will seek to benefit from on-going relations between the DAFNC and the SLBS to develop a series of agricultural standards to promote good husbandry and agricultural practices to make agriculture value chain goods more competitive, in particular in the food chain. These standards will focus on advancements in the requirements for labelling and grades in order to strengthen certification of select agricultural produce.

(e) National Utilities Regulatory Commission (NURC- 2016). The project proposes to integrate solar energy for efficiency with climate adaptation practices in water security and cooling of greenhouses for productivity and biological control of insects. The project will use solar energy instead of fossil fuel as this is best practice for building resilience through climate adaptation practices. This is also in line with the GOSL NETS-2016. As described earlier, GOSL has set a renewable energy penetration target of 35% and an energy efficiency target of 20% reduction in consumption in the public sector, to be achieved by 2020. The use of solar energy in the project will be most evident in Component 2 and 3 specifically in information technology systems for data management, in production chains from the field to agro-processing and in the climate-controlled grow rooms. Based on the assessment conducted by the Energy Division in the Department of Sustainable Development, requirements for renewable energy connectivity to the LUCELEC Grid will not exceed the limit of 25kWp set by the NURC. The NURC regulations provide standard application forms which are easily accessible on the website.

5.78 Compliance with environmental and social policy of the AF: None of the 18 activities identified under the Saint Lucia Revised Land Development Act (2016) fall under the actions that would require an EIA in Saint Lucia or any special permissions such as change in use of land. In the case of (b**)** and (d) above, the MIPST has conducted the necessary structural assessments on the building to be rehabilitated and confirms that the structure is sound and will not present any likelihood of social or environmental harm. This is supported by the ground survey conducted around the building. Instead there are positive and significant benefits to sustainability of the environment which will emerge from the project activities. For example, the integration of renewable energy in the production systems and the greening of the practices under Component 2, is in harmony with the country's obligations to the Kyoto Protocol. There will be environmental benefits from reduced carbon emissions thereby contributing to Saint Lucia's Intended Nationally Determined

Contribution (INDC) under the UNFCCC which sets a goal of reaching 16% reduction in carbon emissions by 2025.

5.79 The use of mulch, compost and other organic agri-chemicals, will reduce the use of fertilizers and other Persistent Organic Pollutants (POPs) which extensively used in agriculture. In addition, there are expected benefits from the relationship between the MOA and SLBS to develop a series of agricultural standards that could present the opportunity for agro-processing facilities to benchmark better selection, packaging and presentation of produce with potential for increased income from being able to meet standards of export markets. Combined, all of the above will generate more sustainable environmental and social benefits to vulnerable groups in the project area, through capacity building in areas that will reduce their operating costs either in on-farm production activities or in the secondary production value chains with income generation. The ESMP will be updated after the gender assessment is completed.

5.80 Relative to the AF Social Policy, there are no significant negative impacts from project implementation. The project shows alignment with the country's poverty reduction objectives, targeting the most vulnerable communities. The implementation process promotes equitable participation to improve livelihoods and well-being. The National Social Protection Policy (2015) and Strategic Plan of Action of the Policy (2015-2019), provides a clear framework for enhancing equity, efficiency and transparency to the most vulnerable in the country in the delivery of benefits, for the well-being of vulnerable communities. Specifically, the Plan promotes, the participation, development and organisation of the different vulnerable and marginalised populations to utilise resources and services, to effect self-directed change towards socio-economic, political, and cultural advancement of themselves and their communities. The Plan identifies outcomes and outputs including greening of the economy in areas such as: agriculture, manufacturing, research and development that contribute to restoring the environmental quality, protection of ecosystems and biodiversity, more efficient use of water and energy and to minimise or avoid generation of waste and pollution.

5.81 The expectations above are well aligned with building resilience in agriculture/farming systems. The project will also maintain a database to monitor vulnerable households, ensuring that services and resources from interventions are making a difference to the livelihoods and welfare. The NSPP Monitoring and Evaluation Framework has established a mechanism to track beneficiary households, monitor the effectiveness of programme processes, and evaluate programme performance. This will be of benefit to the project, as the related services of the MSJEEY will be integrated into the project processes such as the establishment of baselines and need assessments, six monthly monitoring and evaluation, and building and strengthening of community-based organisations. This approach shows the Government's commitment to its obligations to guarantee social protection and enable citizens to claim their social protection rights through on-going improvements in accountability mechanisms and building institutional capacity to guarantee the appropriate design and delivery of social protection.

Part II-F. Describe If There Is A Duplication of Projects with Other Funding Sources, If Any.

5.82 The Global Environment Facility United Nations Development Programme Small Grants Program (GEF-UNDP-SGP)-Saint Lucia is the only programme in Saint Lucia with activities on the ground that are similar to those of the project. None of the current projects overlap with the target populations. However, some project beneficiaries may have benefitted from two concluded GEF-UNDP-SGP described below, which have since been concluded.

(a) Introduction and Optimisation of Organic Farming in Canaries using solar powered hydroponics and other biodiversity agro-processing methodologies: This project targets young people in the poorest part of the west south-west. The objectives are to: (i) transform 2.5 hectares of land into farmland using organic principles and methods; (ii) train and build the capacity of unemployed youth in ecologically sound farm production and the delivery of an environmentally friendly public education programme; (iii) identify baseline data on current information and knowledge of the public on the use of chemicals and POPs[36] in Saint

Lucia and use at least four local and/or primary schools as a major avenue for education; and (iv) design, build and promote a major farm marketing system and sales process as a means of sustaining the enterprise.

(b) Creating Sustainable Communities – Building Local Capacity for Adaptation to CC*:* This project includes measures related to issues such as water shortages, flooding, landslides, and coastal erosion. The project has already terminated but provides valuable lessons that could be considered by the Project including (i) community engagement is critical to addressing CC and CV (ii) disposable income is important and relevant to impacts and (iii) large numbers of beneficiaries may not be ready for project implementation and for building adaptive capacities and there is a need to address this in the project planning stage and (iv)greater awareness of CC and its impacts is important to buy-in and full participation in project implementation.

5.83 In view of the geographic location of the GCF projects, members of the farming community would be natural beneficiaries of the AF project even though not specifically identified as past GEF-Saint Lucia beneficiaries. In this manner they would be involved in the Needs Assessment baselines under Component 3 of the project, undertaken as the first activity in project field implementation, to provide the necessary information to influence the participatory approach method proposed. The proposed gender assessment detailed in Appendix II and the Gender Specialist proposed in TORs at Appendix VI(i) will inform the approach. Every effort will be made to collaborate with similar initiatives in the project area aimed at strengthening and improving livelihoods since Canaries is one of the three poorest communities in the geographic area.

Part II-G. If Applicable Describe the Learning and Knowledge Management Component to Capture and Disseminate Lessons Learned

5.84 The project formulation process included input from an expert in knowledge management who prepared an annotated Action Plan for Knowledge Management to guide a Communication Strategy for institutional building and knowledge transfer on climate adaptation practices for building resilience in agriculture. The work was undertaken through field visits and meetings in communities throughout the project area, inclusive of populations most dependent on resilient farming for livelihoods. The consultative process to capture and generate lessons learnt will be continued through the project implementation process. The intention will be to record changes in the baselines and to identify the contributing factors, resulting from project implementation for planning purposes.

5.85 In order to maintain focus on the country context for climate adaptation, priority was given to data and behavioral changes towards risk reduction in land management, selection of type and siting of RWHS, and sustainability of management of plant genetic material to protect longer-term livelihoods and food security from agriculture. Due to small land space for agriculture attention will be given to documentation that can provide good learning on how to integrate climate resilience into intensive farm production value chains and with strengthened linkages to economic opportunities in agri-tourism chains, as a means of upscaling livelihood security in selected rural communities.

5.86 The consultation revealed that knowledge in climate adaptation practices in agriculture was undocumented and based mainly on perception of weather-related changes in the field, with no downscaled data support for the project area. Hence the proposed project communication strategy includes extensive participatory data collection at institutional, technical and local levels and different forms of documentation (reports, videos, technical leaflets, web site, photographs). The participatory approach to capture data will continue throughout project implementation, especially so at the agricultural community level. In this regard, the project has in place different types of engagements at community levels through workshops, focus groups and field visits, including technical staff in the project area and visits of the PMU with members of the Project Steering Committee (PSC).

5.87 The participatory approach to knowledge transfer is not new to farmers in Saint Lucia as for close to a decade they have been involved in FFS approach and both extension staff and farmers are well versed in the practice. The DAFNC staff and farmers are expected to show a high level of competence in the transfer of knowledge where the practice is used. Full Baseline and KAP surveys will be undertaken and repeated near completion. This will form the basis for systematic measurement of changes in knowledge and practices from participating institutions and beneficiaries as well as wider community. Disaggregating data by sex and other categories such as age will give information on gender-relevant differences and this will be complemented by a comprehensive gender assessment of the Project Area. The capacity support group of the DAFNC has responsibility for ensuring linkages with the national data management system and regional data management system of the Organisation of Eastern Caribbean States Commission. These information sources will be used to document lessons of experience which will be shared through the national, sub-regional and regional agencies including the CDB. The project provides for a Communication Strategy which will provide further details on information dissemination approaches.

5.88 Reports of projects undertaken by GEF-UNDP-SGP Saint Lucia, in the project area were also taken into consideration. The findings were that successful dissemination and participation in project implementation could be delayed or denied where community engagement, disposable income and awareness of CC are low. In view of this the knowledge management component of the project is strong on building CC agriculture organisations at the community level (water users' groups; small scale agro-processers). Awareness building will be at the forefront of the gains expected from organisational building.

5.89 In summary, the learning and knowledge management component of the project will capture and disseminate lessons learnt in project implementation through:

(a) Establishing an improved needs assessment baseline of the beneficiaries including staff within the DAFNC for CC awareness and for transfer of CC and climate adaptation for resilience.

(b) Establishment of a database to support the technical quality of the inputs to the project activities for adaptive capacities throughout the farming system.

(c) Institutional strengthening or creation of community-based organisations to encourage participation, facilitating community exchanges, evaluation and inclusiveness of their own concerns and findings and perspectives on CC adaptation practices.

(d) Capacity building within the technical units and DAFNC Central Planning Unit for knowledge transfer methodologies.

(e) **A c**ommunication strategy that captures, guides and monitors the work of the Knowledge Management and transfer Unit in collaboration with SALCC-Farm School, DEAS, selected farmer organisations and the Media Unit of the DAFNC.

(f) Ensure integrity of the information and a participatory process for a people centered approach to learning and interpretation on CC and climate resilience. The conduct of baseline, Knowledge, Attitudes and Practices studies and a gender assessment will facilitate the activities above.

Part II-H. Describe the Consultative Process Including the List of Stakeholders Consulted. Numbers undertaken During Project Preparation, with Particular Reference to Vulnerable Groups, including Gender Considerations in Compliance with the Environmental and Social Policy of the Adaptation Fund.

5.90 A review of the relevant official national documents on CC and CV in the country and on the factors, that would impact a project designed to build resilience in agriculture, for livelihoods security, income generation and employment, provided good information on the best approach to the consultation process. In brief the documents revealed that the enabling policy and strategy framework is adequate to support a project

to build climate resilience in the agriculture sector. However adaptive capacity in the DAFNC to undertake the project needs to be improved at the technical as well as the policy level in areas such as economic analyses of CC adaptation options and impacts with future scenarios particularly for rainfall variability: both from droughts and unexpected dry spells and from intense rainfall events.

5.91 Furthermore, to reduce vulnerabilities in the farming systems, improvements in a wide range of climate adaptation practices would be required in order to build resilience in livelihood security, income generation and food security. These would include actions to improve soil conservation and land management, increase productivity through enhanced production practices, and significant capacity building in the farmers, starting with baselines for adaptive capacities for climate resilience in the farming systems at the level of institutions and at the farm level. Therefore, consultations were conducted at both levels but more highly concentrated at the farm level as the poorest and most vulnerable communities in the country were in fact in the geographic area of the project (Figure F).

5.92 Consultations in the Field: The consultative process included meetings with the DAFNC, specifically the DEAS and mixed sessions with the DEAS and farmers in community centers in the project area as well as several meetings in farmers' fields to observe some of the experiences described by farmers and interested community members. An ITT brought together by the Team leader in consultation with Regional Heads also participated in the meetings. The ITT included technicians/engineers from the DAFNC (WRMA, AESD, DOF, DEAS) and subcontractors (Agronomy/post-harvest, knowledge management, water/agribusiness and a youth volunteer video recorder). The field process included: (a) seven PRAs with extension officers and members of the farming community to explain the project and to assess awareness, experiences and changes in practices in response to weather-related changes; (b) five focus group meetings lead by WRMA, farmers and other technical staff of the DAFNC to assess sites for RWHS mostly in clusters of 25 settlements with follow-up meetings held with DOF, DEAS and the sub-contractors in agriculture engineering, water management, agri-business, agronomy and post-harvest handling, and knowledge management and the youth video volunteer, to agree on best options and safe sites for climate adaptations practices, with water security and soil building integrated for resilience; (c) one-on-one stakeholder's meetings including Massey, SLHTA, CARPHA, YAEP, IICA, OECS-Agriculture, DMS, SALCC-Farm School, WASCO, and PROPEL[37] in Saint Lucia, among others to apprise them of the project, avoid duplication, listen to lessons learnt in the undertaking of their activities and to encourage participation in the planned National Consultation; (d) National Consultation held at the Department of Fisheries Conference Room to present the Project to over 70 participants and receive feedback and; (e) three Technical Sessions and several field visits with the ITT and farmers from the different communities, to confirm clusters for establishing on-farm RWHS, visits to the prospective agro-park sites to assess suitability of areas (types of farmers and activities in the vicinity), land drainage and siltation problems and other infrastructure requirements such as soil stability at the site of the building to be rehabilitated. The participants list for the National Consultation in included at Appendix VII.

5.93 Major Findings from the Consultations: Beneficiaries: the total number of male farmers participating were more than the number of females, but the mix varied from community to community, such that in some meetings there were more females than male farmers. Male farmers were involved in crops and livestock and youth farmers mainly from the YAEP were involved in crops, livestock and aquaculture. Based on the information received, a number of females were involved in PAS including shade houses with nets and raised sides but mainly greenhouses. Females were also involved in small-scale processing, and backyard gardening. According to the 2007 Agriculture Census 30 % of individual holders were female up from 25% in 1996.

5.94 While there is no organised process by the DAFNC to build capacity in women in agriculture, these women were participating in all the training activities and particularly active in FFS exercises which is the core training tool for the DEAS. A gender assessment to be conducted at the beginning of the Project will give further details on targeting women in the Project.

5.95 Practices in the Field with CC**:** The evidence of climate adaptation practices on the farms was limited to a very small percentage of farmers in Region 6 using contours on hillsides and to farms in Region 8 pumping water from the rivers which they indicated were drying. The best level of organisation and focused approach

[37] Promotion of Regional Opportunities for Produce through Enterprises and Linkages.

to farming was among the Belle Vue Cooperative, Black Bay Farmers' Cooperative and reportedly Grace Farmers' Cooperative, and this was also where women appeared to be most successful. Farmers' main concerns were with water shortages, the high labour cost for weed control due to rainfall peaks and increasingly high use of chemical fertilizers to sustain soil fertility, the extent of abandoned farms or the number of farmers who had reduced the area under production, and challenges with feed for small livestock due to impact of droughts on trees for forage.

5.96 Impact on Project Components: The project components were finally designed with a view to ensuring the identification and inclusion of the best climate adaptation options to satisfy the farmers concerns which were: (a) persistent expression of problems that were causing increasing water shortages for the farm, (b) challenges with planting dates and associated impact on timing of the harvest vis-a-vis the need to satisfy market arrangements (c) having to move to the interior of the country to satisfy soil water needs (d) water logging and salt water intrusion in low lying farms (e) higher pest infestation and diseases, with flower drops, rotting in root crops and root vegetables, and low crop yield (f) shortage of forage for small livestock and (g) higher cost of production from increasing use of agri-chemicals especially herbicides and the need to buy shop feed. Farmers also felt that the extension system was not focused on CC adaptation and there was a lack of awareness of these practices.

5.97 Actions by the Farmers: An important outcome of the field consultations was that some of these farmers took off to work alongside DAFNC and the sub-contractors involved in project formulation, to identify some of the clusters and individual holders mostly affected by water shortages and who are mostly rain fed with some wholly rain fed. These areas were later mapped and positioned using GPS by the DAFNC, WRMA, DOF and AESD. The participation of the farmers who were the most familiar with clusters within the group helped to ensure that farmers in small scattered clusters were not missed during implementation and also that women in backyard farming, individual youth, and very small livestock farmers were included, some through recommendations for standalone RWHS storage at the community level. Tree crop nurseries that will provide planting material for DRRM in land management were also identified for RWHS. Seedling nurseries are also a good source of employment for rural women and fitted well into the project. This practice of GPS and GIS mapping for all RWHS will continue through project implementation for M&E in compliance with the EMP/EIA, for data collection on sustainable production and to encourage maintenance of the infrastructure, post project.

5.98 The National Consultation provided the opportunity for more than 70 stakeholders and farmers to discuss and agree on the project interventions, during the focus group sessions. This part of the consultation process provided much information on practical sites for the green agro-parks with discussions around opportunities to extend value chains, improve coordination in production planning and market fresh produce to the hospitality sector, and considerations for increased use of technologies and implementation of GAPs. Stakeholders and farmers were particularly interested in the foreseen increase in numbers of annual harvest with improved water security and the use of renewable energy both for cooling and water pumping in greenhouses. High productivity and the possibilities for stronger contractual arrangements in local supply chains was foreseen especially for leafy vegetables. The sites proposed were also considered convenient for the project activities to directly affect the poorest communities in the country, including some of the women involved in small-scale processing, and the two sites on which the YAEP were operating, as well as to participate in the popular island farm tours.

5.99 Farmers felt that although there was a cost to capacity building for extension, the gap in adaptive capacities in agriculture to transfer technology and practices for climate adaptation would only get wider with serious delays to project implementation. As a result, the project makes adequate provision in the knowledge management component and in the establishment of institutional arrangements with technical cooperation partners such as SALCC to assist with capacity building. Other areas of need emerging from the consultative process and captured in the project activities were mostly institutional including (a) strengthening areas for management information systems and (b) effectively mainstreaming climate adaptation in the DAFNC research and development program. The considerations were wide ranging and included the need to establish CC databases. Participants at this session also recognized important spin offs of the project activities due to the fact that populations out of the project area who are highly dependent on the marine ecosystem for

livelihoods and incomes, would benefit from the reduced sedimentation affecting the coastlines and nearshores resulting from improved land management on the west and south-west.

Part II-I Provide Justification for Funding Requested, Focusing on the Full Cost of Adaptation.

5.100 The project is requesting total funds in the amount of US$9,858,570 to support the implementation of the proposed activities intended to reduce vulnerability and increase adaptive capacity to respond to the impacts of CC and CV in the project area. This amount will be complemented by in kind contribution from GOSL in the amount of US$975,823 equivalent to the cost of 20 public officers from the DAFNC assigned to the PMU over four years to support the activities under Components 1, the field production activities in Component 2 and knowledge management and transfer activities under Component 3.

5.101 The proposed activities are well-established practices that can avoid or minimise the extent to which CC and CV continue to threaten livelihood security highly dependent on agro-ecosystem resources for sustainable farming systems. These practices will also increase farm productivity, bring new areas of land in the project area under production, with improved efficiency and extended production value chains from the farm gate through to agro-processing facilities with improvement in livelihood security and income generation. This is in addition to significant capacity building in adaptive capacities in farmers, and in the technical staff of the MOA-DAFNC, supported by improved information infrastructure for knowledge management and transfer for resilience in farming systems. The range of beneficiaries include men, women and youth engaged in small farming.

5.102 The extent of the likely negative impact of CC and CV on the farming systems into the year 2081, described in PART 1 of the document is a clear indicator that sustainable agriculture for livelihood security in Saint Lucia will not be achieved without targeted and integrated action to build resilience in agro-ecosystem resources in small farming systems. This is particularly so for some 70 % of the farmers experiencing water shortages on wholly rain fed farms and thousands who continue to be exposed to risks of devastation due to vulnerability to landslips, soil erosion and flooding.

5.103 While the data on economic impacts of CC on the country is limited, there is sufficient information from the cost and benefit analysis conducted on selected crops and showing the highest ranked climate adaptation practices to justify the use of the funds. The climate adaptation practices targeted in the study provided clear indicators of the ranking and benefits from the application of these selected practices. Considered against the recorded losses from the passage of hurricanes and other adverse weather related conditions during the period 1960 -2016 in the amount of US$568[38] Million dollars and the intensity in losses over the three years 2010-2013, that accounted for 63 % of the value of loss and damage, the GOSL is anxious to implement climate adaptation measures with strong indicators of adaptive capacities to build resilience in agro-ecosystems services for agriculture. This is of extreme importance to the strategic approach described in the NAP-SASAPs (2010-2018) for agriculture to improve levels of productivity for improved livelihood security in rural communities as there are growing concerns that the outcome of the strategy could be severely minimised without measures to build climate resilient farming systems.

5.104 Further justification for adaptation measures for improved livelihood security by drawing comparisons between the baselines for adaptive capacities in the farming systems determined during consultation and net benefits foreseen at project termination (is provided below). The level of built resilience observed would be a major contribution to livelihood security with social improvements in the circumstances of vulnerable rural households in the project area (1.2 PART 1). Delays in building resilience in land management and soil water functionality could significantly alter the foreseen change towards favourable circumstances of the population of 7,200 in the farm families, due to the uncertainties of sudden and devastating changes in the extent of the threats to the farming systems.

5.105 The risks posed are immense, mostly from devastating landslips and water insecurity on the farms but can be avoided or minimised with evidence-based results in the short to medium term with the proposed

[38] Amount rounded.

climate adaptation practices and enhanced production practices proposed. The project will use the best climate adaptations options for water security, soil erosion control and land management as reflected in Section C above. The holistic approach to building resilience in the farming system will ensure timeliness in project outputs and the benefits to be derived. On the other hand, the observed uncertainties of rainfall pattern and amounts combined with the extent of susceptibility to landslips if continued, could increase vulnerabilities and create risks and a worsening situation in livelihood security and incomes in farming systems. This means that the funding support should be considered as urgent as the risks from the devastation from combination of cracked dry cultivated soils, intense rainfall and landslip susceptibility could extend beyond the geographic area of the project into rural coastline communities, weakening livelihood security and incomes even beyond the project areas.

TABLE 7: VALUE OF THE PROJECT INTERVENTIONS IN COMPARISON TO THE BASELINE FOR ADAPTIVE CAPACITY AND NET BENEFITS TO RESILIENCE IN LIVELIHOOD SECURITY

Components	Baselines for Adaptive Capacities in Agro-ecosystems (farming systems)	Residual or Net Benefits from proposed project activities	Funding required from the AF US$
Component 1: Building resilience and sustainability of farming systems through interventions for water security, soil conservation and management	Weak adaptive capacities to reduce vulnerabilities and risks from landslips and soil erosion resulting in loss of farm assets and lives amounting to US$567.9 mn from 21 events 1960-2017 and US$358.2.4 mn from three events during the period 2010-2016 and uncertainties in livelihood security.	Improve livelihood security in the farming systems for a total of 4900 farmers directly using DRRM practices that reduce vulnerabilities to landslips, create additional safe areas for production on hillsides and diversify farm production chains from tree crops and agro-forestry products over on an estimated 1,000 hectares.	**3,053,781**
	70% of farmers wholly rainfed operating on hillsides, low soil-water retention with projections for decrease in rainfall between 22-57% by 2040-2069. Reduced areas or abandonment of farm due to frequent droughts, and high cost of public water for open field and greenhouse production.	Resilient farming systems from water security and drip irrigation integrated with built organic soil with potential for increased number of annual harvest and access to forage for small livestock.	
Component 2 Establishing green agro-parks, including the use of solar energy for increased efficiency in resilient farming systems.	Weak evidence of technical support for modernised agriculture technologies and CC and CV readiness capacities in the DAFNC to drive competitiveness and promote investment in small or medium sized farming systems at the desired level of the NAP-SASAPs -2018 -2028).	Demonstrated intensive production area of 30 hectares of contiguous small farms for crops, livestock and aquaculture on two sites, using CC adaptation practices for climate resilience integrated with modern technologies and renewable energy, with increased productivity, reliability and competitiveness in diversified domestic supply chains.	**2,824,545**
	Persistent declines in value of agriculture GDP, evidence of low share in the domestic fresh produce supply chain due to uncertainty in planting dates and water availability in wet season.	Potential for expanded share in domestic supply chain for selected crops with reduced imports of selected fresh food and with foreign exchange savings on imports.	
	.	Shift from food imports to local purchase, will benefit local buyers with reduced cost of shipping from external production areas due to economies of scale and value added tax and other costs associated with imports.	

	Gluts in small farming systems and national data with indicators of low domestic purchases from local production of crops.	Small farmers with access to generate crop production value-added chains through efficient agro-processing facilities using green energy for branding and observing international standards for certification in processing and packaging.	

Components	**Baselines in Adaptive Capacities in Agro-ecosystems (farming systems)**	**Residual or Net Benefits from proposed project activities**	**Funding required from AF US$**
Component 3 Knowledge management and transfer to improve adaptive capacities.	Youth and employed males in agriculture among the poorest and in the lowest wage scale, and women with low capacity to improve agro processing businesses Knowledge management on climate adaptation is tacit- resulting in weak adaptive capacities for climate adaptation among farmers, and needs to be documented, shared and transferred using an established institutionalised approach Weak capacity in DAFNC for economic analyses in climate adaptation in agriculture Weak or no organisational approach at the local level relative to CC, CV and livelihood security.	Strengthened and diversified value chains for farmers including youth and women including established linkages to the vibrant agri-tourism farm tours. Established database to capture baselines and subsequent improved adaptive capacities in farming systems providing information on new and improved strategies to continue to build resilience in livelihood security in agriculture Capacity in DAFNC to conduct economic analyses of impact of CC and CV for strategic planning for on-going built resilience in farming systems; a draft land-use policy brief and draft Agriculture Disaster Management Plan Built social capital through Water Users Association, Agro-processers Organisation for Women, four Community- based CC Adaptation organisations for longer term prosperity with CC in farming systems established in 2,400 farming households. Institutionalisation of knowledge management and knowledge transfer to building resilience in agriculture, including dedicated space, climate control grow rooms, and training and meeting spaces for farmers and CCILLC for awareness building and responsibility sharing. Outdoor facilities for production and capacity building in utilisation of organic soil building material for longer term access to land and built resilience in soil productivity with CC and CV.	**2,024,470**

5.106 In addition to the devastation in the farming systems, there would be negative impacts on foreign exchange earnings from the commercial fishing industry and from heritage and water sports tourism that are major attractions for cruise ship and stay visitors. This loss of livelihoods and foreign exchange earnings could continue with different levels of frequency and intensity for undetermined periods of time due to ongoing sedimentation and other forms of pollution from poorly managed hillside farms, with negative impacts on households on the coastlines.

5.107 The financing from the AF is therefore critical to help the country in general and the farming households in particular to adapt to proposed practices. Due to the integrated nature of the activities, ready and timely access to the full cost is imperative as any delays in one part of project financing could result in

loss of gains in built resilience from another adaptation measure or Component. Hence the significance of this funding source. For example, water security must be integrated with land management and resilient soils, and the expected impacts of modernised and new technologies such as aquaponics and integrated solar power will be highly dependent on the built resilience in the agro-ecosystem services.

5.108 The planned improvements on the rehabilitated building and the important role it will play in facilitating knowledge management and transfer of climate adaptation practices and gains also points to the need for the early readiness of this facility. The human resource capacity to ensure that the project is based on sound targeting, indicators and adaptation measures and limits of adaptation will be highly dependent on the capacity building and the learning and interpretation instruments which will emerge from the work to be undertaken in this building.

5.109 Eighty five percent of the funds requested for project implementation (US$9,858,570) will go directly to concrete activities in built resilience including, reduced vulnerability to landslips with risks to the farming areas and improved farming practices on hillsides with natural susceptibility to landslips, resilience in soil structure and fertility, water security, established climate adaptation in greenhouses, and refurbished aquaculture ponds for integrated farming for youth. The funding will also go towards infrastructure for two green HACCP certified agro-processing facilities with special consideration for rural women; the CCILLC with two climate control rooms; requirements for tracking and assessing resilience in agriculture; and for training and capacity building at all levels of project beneficiaries. The remaining 15% will go towards the soft infrastructure to manage databases and conduct analyses, and to build capacities in CC organisations for ownership, and responsibility-sharing in the sustainability of the built environment for agriculture and for strengthening and expansion of the organisation for example the SLNRWP. Eighteen percent of the grand total is for project execution and NIE costs.

5.110 Properly executed this is a no-regrets project considering the nature of the concrete activities for short to medium term outputs and with longer term benefits. The level of financing requested is reasonable as is the level of technical human and physical resources that the country is prepared to commit to the work of the PMU. Without this source of funding that allows for timely disbursements, the economic, environmental, and social benefits of the outcomes could be severely delayed or minimised, or not happen despite the strong indications of the changes that could be realised over the short to medium–term.

5.111 Most importantly, if not approved, an opportunity for improved livelihood security provided for an estimated 2,400 households an estimated population of estimated 7,200 persons directly impacted), would be missed. Implementation of this project will result in improved household food security; improved diets with reduced incidence of Non-Communicable Diseases (NCDs) from pollutants in food grown with chemicals; improved household disposable incomes to keep children in school daily and; the adaptive capacity to contribute to livelihood security and incomes. There are also the important co-benefits of the climate adaptation practices with positive impacts on livelihood security and incomes in the poor coastline communities, and protection of foreign exchange earnings for fisherfolk.

5.112 Based on the foregoing, the alternative to no action, could be that already felt impacts of CC and CV on the sector will continue to result in serious adverse effects., Some impacts cannot be easily reversed, particularly those linked to landslips, with loss of land and lives at times and the continuing persistence in poor farming practices on the slopes in the project area.

Part II- J: Describe How the Sustainability of the Project Outcomes Has Been Taken into Consideration When Designing the Project

5.113 Consideration for the sustainability of the project outcomes was a main focus during the review of the official GOSL documents. The participatory process in the field and also in two sessions with the DAFNC. Six critical results were identified as priority areas for enhanced sustainability and upgrade of the project gains. Effectively these results are integrations of outputs and outcomes which in the case of this project cut across in one or more ways to provide resilience with CC and CV in agriculture. They include tangible results that will cause the following responses within the farming systems and in the DEAS:

(a) Ensure ownership, responsibility, and perceived equity in the benefits of the concrete outputs: the best guarantee for post-project sustainability and upgrade, is for farmers to be satisfied that the project had made a difference to their farming activities, with improved productivity, markets and profitability as a result of the concrete activities. Also, that they have a good understanding of the climate adaptation practices. How and why they worked and can be made to continue to work to change their lives with CC and CV. This will happen through the information sharing on positive changes in adaptive capacities baselines and discussions on lessons learnt that will provide the basis for evidence- based changes within the farming systems.

The activities in the CCILLC will help to demonstrate environmental benefits of the project and are expected to generate greater awareness for sustainability, ownership and responsibility to minimise the possibility of these benefits being lost or diminished by neglect. The project therefore promotes CC adaptation community-based organisations, RWHS water users', rural women in agro-processing, and producer cooperative.

As timeliness and quality of the deliverables will be essential for commitment to ownership and responsibility the project will ensure that outputs that are visible and stable are promoted so that the farmers and their communities would be able to make their own judgements in terms of change in livelihood security and well-being from improved incomes, employment generation and food security in their households and in the rural communities. Most importantly the interaction among farmers promoted in this approach would allow them to learn from each other thereby increasing trust, a critical ingredient for ownership and perceived equity.

(b) Achieve the sustained interest of the farmers so they want to remain on the farms, and to continue to use CC adaptation practices: It was reasonable to assume that the farmers would want to remain on the farms if there is good evidence of improved productivity; improved income generation with good farm gate prices; opportunities to diversify and extend value chains and; uninterrupted capacity to meet the requirements for reliable supply arrangements, in all of the outputs from the three subsectors. The project activities will deliver on these areas, for example, in the crop subsector by (**a**) minimising fluctuations in farm gate prices by avoiding gluts through better production planning and control over planting dates with water security for irrigation and better quality leafy vegetables from organic soils; (**b**) readiness to satisfy the requirements for registration as a supplier of fresh produce, now that there is access to water and; (**c**) higher profitability from reduced use or elimination of agri-chemical inputs.

Components 1and 2 include activities that will generate these benefits. Also under Component 2, the establishment of protein banks, small livestock farmers would be less stressed to find forage. Some of this newly found free time could be devoted to crop production activities. Youth will be benefitting from diversified production chains in aquaculture and small scale agro-processers would also be able to diversify production value chains in certified facilities. These are all outputs and changes in livelihood security and income that could serve to guarantee sustainability of project outcomes. Component 3 will contribute to agriculture drought alerts, for better control of planting dates and improved coordination among farmers, in production planning for selective crops and to support the Producer Cooperative approach for best organisation strategies. Other important and new benefits on which the farmers would be expected to place high value is the ability to present sound investment profiles based on production performance, to allow them to access farm credit including for new opportunities to extend production into the new farming areas released from improved land improvement or brought back into production with water security. These positive changes in farming systems will serve to encourage and intensify the interest of the farms and strengthen commitment to continue and replicate the learnt practices resulting from the project activities.

(c) Establish the type of institutional collaboration from policy level to the farming communities to maintain a database that satisfy M&E of gains and provide indicators for on-going resilience building with a focus on marginalised communities. The consultations started in the project formulation process with farming communities and with the wider stakeholders will continue at least once annually as indicated in the M&E. The Gender Specialist and the baseline data collection and gender assessment study, will enrich the M&E elements of the Project. Also under Component 3 the project activities include the conduct of six monthly need assessments and inventory of farms and households in order to monitor benefits of the project to the targeted beneficiaries. As proposed in the document the social impacts at household level will be undertaken with the support of the Department of Statistics which has the responsibility for household poverty assessment in Saint Lucia.

(d) Integration of CC adaptation practices into the Work Programs of the DAFNC and specifically in the DEAS. The DEAS is expected to lead the process of climate resilience at the farm level post project implementation. Accordingly, the proposal is for project activities to be aligned with the Annual Work Plans of the four Agriculture Regions in the project area. This is to ensure that the DEAS is not left behind in the practices and achievements of the project. Furthermore, while during the project implementation, the focus will be on the 2400 farmers directly affected, the project activity in Component 3 to build capacity in the DEAS would have improved adaptive capacities in the entire DEAS staff to contribute to replication and upscaling of climate adaptation practices post project and in other communities across the island.

(e) Establish greater awareness of climate resilience in the farming systems. The project is designed to create greater awareness of CC and CV in agriculture. The establishment of the CCILLC is intended to raise the level of awareness and the benefits of climate resilient adaptation. It will provide graphic presentations and discussions on the likely adverse impacts of CC and CV on the natural resource base for farming, with and without resilience building in the farming systems. This will extend to annual competitions for keeping awareness building in the forefront to ensure climate adaptation practices are fully integrated in farming systems, with the decrease in rainfall and the predictions of earlier and more extreme drought conditions. The project assumes that eventually the outcomes of the project activities will gain most attention through livelihood security, especially for household food security due to the expected decrease in rainfall amounts and to earlier and more extreme droughts.

(f) Financial sustainability for on-going climate resilient databases for policy and strategy, and for sustainable livelihoods, food and nutrition security. The participatory process provided the opportunity for consultations that resulted in a project design that generated considerations for financial sustainability of critical tangible outputs which would fall directly under the GOSL/DAFNC annual budget. The consultations resulted in alternatives to in-situ research and development to identify resistant crop varieties and limitations on resistance through the CCLLIC, renewable energy/solarised agro-processing facilities to extend the agri-food value added chain and cost related agri-tourism linkages for greater awareness and learning. The result was project activities targeted to include income generation for GOSL, including services provided by the in-situ research and development agro-parks through farm tourism tours, climate resilience related services from the CCLLIC and related CCA, CC and CV conferences and meetings, training opportunities in solarized HACCP certified agro-processing facilities.

Section K Provide an Overview of the Environmental and Social Impacts and Risks Identified as Being Relevant to the Project

5.114 The project geographic target area, is in the part of the country most vulnerable to the impacts of CC and CV. This is also the area of the country most vulnerable to poverty with three of the four poorest communities. Small farming systems in these areas are exposed to environmental impacts and risks from intense rainfall and extended drought conditions over farmlands which are susceptible to landslips, poor soil

water retention and located on hillsides and slopes. These are also households with weak disposable incomes, are more sensitive to shocks and with low capacity to cope from the increasingly intense nature of recent hydro-meteorological events over the country.

5.115 The project is designed to build resilience and sustainability of farming systems through interventions for water security, soil conservation and management, integration of solar and other energy efficient practices in intensive agriculture value chains and for knowledge management and transfer for capacity building to improve institutional and local level adaptive capacities. The assessment undertaken places the project in Category B due to the steep slopes and general topography of the country. In line with the ESPAF the project has been screened for environmental and social impacts against the environmental and social principles. As a result, the project document is consistent in its approach to implement a participatory process and includes a set of targeted activities for built adaptive capacities for CCA among beneficiaries that reach the most marginalised. These include strengthening social and gender data for better targeting of adaptive capacities and needs, using the improved CCA baseline established at project initiation, monitoring through the planned six monthly reporting and community-based meetings to identify indicators of social, environmental impacts and timely action to make sure no one is left behind. These actions would be within the agreed project resources and could include access to farming opportunities for landless farmers, within the production activities in the agro-parks.

5.116 The NSPP (2015) ensures inclusiveness and equity in Saint Lucia. In line with the Policy and Strategic Action Plan (Section 5:80), the project proposal supports a strategic approach for access and equitable utilisation of the services and resources provided to all project beneficiaries by the integration of inputs from the Department of Equity in the implementation process at the very start. The description of the project components, activities, beneficiaries, and the method of delivery are clearly described in the project including the implementation template. The baseline and needs assessment established as the first project activity will be conducted with the input of the Department of Statistics with responsibility for household surveys, the [39] MSJEEY, the Department of Gender Relations, and the Department of Agriculture with skills in empowerment of vulnerable populations. All of the project beneficiaries will benefit from activities to improve livelihood security based on needs assessments for improved adaptive capacities on the farm. Reduced landslips are targeted in the geographic area of the project where the most serious events have occurred and increasingly between 1994 - 2013.

5.117 All farmers will benefit from soil building practices and 90 RWHS systems are planned based on needs. It is possible that some farms could fall into all three categories, hence the project will use data from the proposed inventory and needs based assessments along with the updated and newly prepared overlay farm maps for the final decision on the selection of beneficiaries. In collaboration with partnerships in undertaking the baseline and needs assessment at the inception, the project will benefit from the participation of MSJEEY and from the Department of Gender Relations. The project will also benefit from those special and unique considerations that might emerge in the process of building of adaptive capacities for CC and CV and climate awareness. Unusual or unforeseen barriers or potential barriers emerging from the monitoring system, or in the interim brought to the attention of the PMC or the PSC if necessary. The focus will be on mitigating identified gaps at the community and household levels, and improving eligibility and access within the terms of the project. This will enhance capacities, and help to maintain the mechanisms that ensure accountability and integrity in the delivery of project benefits towards livelihood security, food security, employment generation and incomes in the farming systems.

TABLE 8: CHECKLIST OF ENVIRONMENTAL AND SOCIAL PRINCIPLES

Checklist of environmental and social principles	No further assessment required for compliance	Checklist of environmental and social principles	No assessment required for compliance
Compliance with the Law	✓	Protection of Natural Habitats	✓
Access and Equity	✓	Conservation of Biological Diversity	✓

[39] Ministry of Social Justice Equity, Empowerment and Youth.

Marginalized and vulnerable groups	✓	Climate Change	✓
Gender Equity and Women's Empowerment	✓	Pollution Prevention	✓
Core Labour Rights	✓	Public Health	✓
Indigenous Peoples	✓	Physical and Cultural Heritage	✓
Involuntary Resettlement	✓	Lands and Soil Conservation	✓

(a) Compliance with the Law: Through several international agreements of which the GOSL is a party, there is good awareness of the sensitive link between natural resources, in particular the multi-functionality of agro-ecological services and poverty. Hence while the country recognises that there is potential for natural ecosystems services to contribute to [40]sustainable development, with climate adaptation, its strategies and actions will be compliant the principles of the ESPAF that seek to ensure that the project will not result in any social or environmental harms.

(b) Access and Equity: The project does not reduce or prevents persons in the farming community from accessing the benefits of the project's planned activities; in fact, the NSPP (2015) and Strategic Plan of Action of the Policy (2015-2019) ensures inclusiveness and equity in Saint Lucia. Project beneficiaries, will have access to activities to improve livelihood security based on needs assessments for improved adaptive capacities on the farm. Reduced landslips are targeted in the geographic area of the project where the most serious events have occurred over the years and increasingly so between 1994-2013. All farmers will benefit from soil building practices and 90 RWHS systems are planned based on needs. It is possible that some farms could fall into all three categories, hence the project will use data from the proposed inventory and needs based assessments along with the updated and newly prepared overlay farm maps for final decision on the selection of beneficiaries. The project will ensure fair access, transparency, and equity throughout implementation. A comprehensive gender assessment which will be conducted as initial activity of the Project will give further insights in targeting beneficiaries on a gender-equitable basis. Direct beneficiaries of project contracts and activities are subject to CDB's procurement rules and oversight by the Project Management Unit.

(c) Marginalised and Vulnerable Groups: The project activities will benefit vulnerable and marginalised groups as these populations are concentrated in the targeted farming communities. None of the activities planned are expected to negatively affect the other members of the communities engaged in other types of livelihoods. None of the activities are expected to create negative changes in food security or in traditional cultural practices. Since this is a community-based approach (which is participatory and inclusive), members of the community, apart from the direct beneficiaries were included in the consultative process in the development of the project.

(d) Human Rights: Saint Lucia is a party to the agreements emerging from the World Conference on Human Rights and continues to observe and promote all the rights enshrined in the obligations emerging from the Conference. There is no aspect of the project which will minimise any of these rights. Furthermore, provisions are made in the Constitution of Saint Lucia for upholding of these rights.

(e) Gender Equality and Women's Empowerment: The Project encompasses several measures to ensure that gender is integrated into the Project. These are gender data collection and enhancement of M&E of gender results, gender capacity development and gender-responsive participation. There are special considerations for training of women and for providing production space in the two agro-processing facilities, as well as for water security to restore and expand growing areas for cocoa for processing. According to CDB's Gender Marker the

[40] Saint Lucia National Social Protection Policy (NSPP) (2015).

Project is Gender Mainstreamed.

(f) Core Labour Rights: The project was developed with full consideration for the national laws guided by International Labour Organisation core labour standards of which Saint Lucia is a party.

(g) Indigenous People: The project does not involve any indigenous groups, as such this concern is not relevant in respect of further assessment for ESP compliance.

(h) Involuntary Resettlement: Based on the nature of the activities descried throughout this project, no resettlement is foreseen in the undertaking of any of the project activities.

(i) Protection of Natural Habitats and Conservation of Biological Diversity: The project will not result in damage to any natural habitats. In fact, there are many co-benefits of the climate adaptation practices in the project as identified of relevance to this principle.

(j) CC: The objective of the project is to build resilience in agro-ecosystem services with CC and CV. The practices will include the integration of renewable energy in production value chains thereby contributing to reduced carbon foot prints, regrowth in degraded lands from new farm areas brought under production and in general a focus on greening of practices for adaptation with a greater focus on these elements in Component 2.

(k) Pollution and prevention: The project will contribute to reduce pollution in soil and water, through practices that reduce sedimentation and soil erosion, and the expected shift from agri-chemicals to biological inputs.

(l) Public Health: As describe in the components, the project will not use any practices that impact negatively on health. In fact, the project will contribute to a healthier environment and safer food through organic practices for soil building and the reduced use of commercial feeds, likely from GMO sources for small livestock and fish.

(m) Physical and Cultural Heritage: The project activities are mainly improvements on traditional knowledge practices and are not expected to alter, damage or remove any physical and cultural practices.

(n) Lands and Soil Conservation: The project is designed conserve land and soil and avoid degradation and conversion of productive lands or land that provides valuable ecosystem services into any other use.

PART III: PROJECT IMPLEMENTATION

6.0 PROJECT IMPLEMENTATION ARRANGEMENTS

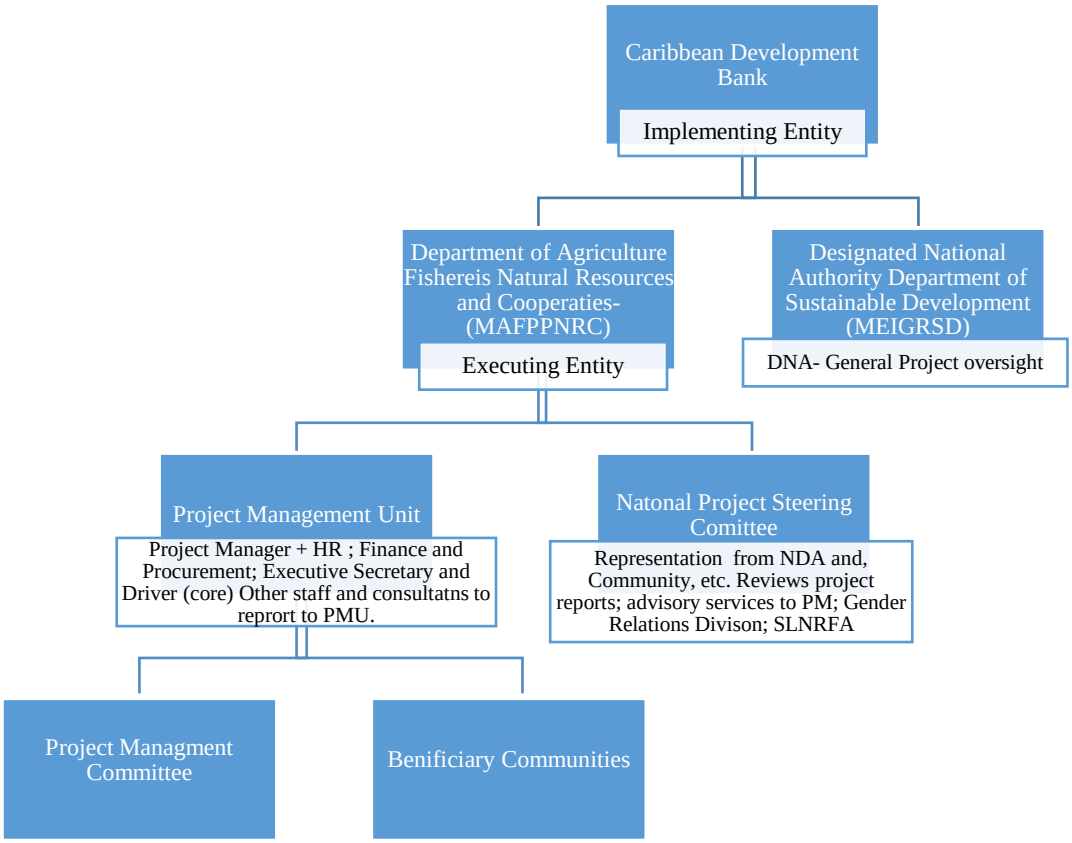


Figure J: Project Implementation Chart

Part III-A-Describe the Arrangements for Project/Programme Implementation

Project Implementation Framework

6.01 The contracting authority of the Project is the GOSL represented by the Ministry of Education, Innovation, Gender Relations and Sustainable Development. The Department of Sustainable Development as the Adaptation Fund Focal Point represents the Ministry of Education, Innovation, Gender Relations and Sustainable Development in the implementation of the project.

6.02 The proposed Project Executing Agency is the Ministry of Agriculture, Fisheries, Physical Planning, Natural Resources and Cooperatives that will delegate implementation responsibilities to the DAFNC.

6.03 The Department of Sustainable Development will provide oversight to ensure that AF policies and criteria are followed, and that the project fully meets its objective and achieves outputs and outcomes in an effective and efficient manner. The Department of Sustainable Development (SDED) will report to the Ministry of Ministry of Education, Innovation, Gender Relations and Sustainable Development on matters related to approval of annual financial reports and financial audits, approval annual reports and monitoring and evaluation of social and environmental risks through field visits in the project area.

National Project Steering Committee

6.04 *Role and Responsibility:* The PSC will undertake responsibility for providing strategic direction acting as the key body in the Project governance structure, ensuring that project deliverables are time bound, satisfy outputs and achieve the outcomes and that funds are efficiently utilised. An important role will be the review of scheduled six monthly reports prepared by the Project Manager, in a manner that facilitates monitoring and assessment, justification of expenditures and amendment of budgets and work plans if necessary (See project implementation arrangements above and Appendix VI).

6.05 The mix of selection to membership of the PSC will permit coordination and enhance synergies between the project and other climate adaptation projects in the country particularly those in agriculture, fisheries, biodiversity, water and renewable energy. The PSC will be chaired by the Permanent Secretary of the DAFNC and the Project Manager will undertake the role of Secretary/Rapporteur. Membership will agree on a Deputy Chair of the PSC. The membership will include the AF Focal point in Saint Lucia, representatives from the following Ministries of Government (MISE, Ministry of Social Justice, Equity, Empowerment and Youth [MSJEEY], Ministry of Education, Innovation, Gender Relations and Sustainable Development, including the Department of Gender Relations; SLBS), UNDP-SGP-GEF-Saint Lucia Country Coordinator; representatives of - Farmer organisations, the SLRNWP, SLAFY. This list is not exhaustive and will be reviewed and expanded to include other key stakeholders during the Project Inception Workshop. The PSC will provide advisory support to the Project Manager from time to time, and if necessary to the Project Manager and Team, in addition to regularly scheduled six monthly meetings.

Internal Management of the Project

6.06 The DAFNC will create a PMU which will be responsible for the day-to-day management of project implementation. Personnel will include the Project Manager and four administrative staff covering human resources and finance, procurement, executive secretary and a driver/messenger. Other members of the Unit will include Project Team Leaders and Project Support Team, Agro-Park Development Manager, Agro-processing Facility Managers and a Knowledge Management Resource Person. The short-term consultants will also be assigned to the PMU. These include a Vulnerability Analysis and CBDRM specialist, Climatologist, Economist in agriculture and CC adaptation, a Gender specialist, Consultancy Services for Baseline, Knowledge, Attitudes and Practices Studies and Gender Assessment, and a part time Community Development Officer with skills in gender-responsive community development by lateral transfer from (MSJEEY).

6.07 The PMU will be housed in the DAFNC and will be managed by a Project Manager. This individual will have overall day-to-day responsibility for the successful implementation of project activities and the achievements of planned project activities. The TORs of the Project Manager covers provision of overall direction for contractual, technical and administrative aspects of the Project in accordance with annual work plans and budgets and will require a number of actions including preparation of the annual budgets and work plans, oversight on M&E in coordination with main implementing entities, oversight on procurement and ensuring coordination and timeliness of deliverables. Due to the level of accountability and the size of the project the Project Manager will maintain a consultative relationship with the Permanent Secretary in the Departments of DAFNC, Department of Sustainable Development and the AF Focal Point to ensure outputs and efficiency and transparency in project implementation (See Appendix VI for details).

6.08 The Project Management Committee will ensure that the project is implemented in line with the agreed work plan, review the monthly, quarterly and annual reports and ensure that funds are used efficiently, make observations on coordination of project activities and timeliness of deliverables, assess quality of the DAFNC commitment to provide technicians for the Support Team and any other role the Project Manager and the PSC may agree as necessary. The Project Management Committee will ensure that the project is implemented in-keeping with the agreed work plan, review the monthly, quarterly and annual reports and ensure that funds are used efficiently, make observations on coordination of project activities and timeliness of deliverables, assess quality of the DAFNC commitment to provide technicians for the Support Team and any other role the Project Manager and the PSC may agree as necessary. The membership of the PMC will include 20 members comprising representatives from:

(a) Permanent Secretary (Agriculture) Chair.
(b) Deputy Chair (designated by agreement between the Department of Sustainable Development and the Development of Agriculture.
(c) Department of Gender Relations.
(d) Department of Agriculture as designated by the Permanent Secretary including DOF, DEAS, Department of Engineering and the WRMA.
(e) Department of Cooperatives.
(f) Department of Equity.
(g) Saint Lucia Hotel and Tourism Association (SLHTA).
(h) Two of the farmer organisations.
(i) SLRNWP.
(j) National Farmers Credit Union.
(k) SLDB.
(l) MIPST.
(m) Department of Sustainable Development and Energy (two representatives – one for renewable energy and one for AF Focal Point.
(n) SLBS.
(o) YAEP.
(p) SMB.

Technical and Administrative Support for the PMU

6.09 In addition to the Project Manager technical and administrative support from the AF funds to the PMU will provide the following resources:

(a) A Green Agro-park Manager for 45 man months with responsibility for the two sites and who will prepare an exit strategy for the project and guidance on the selection of two appropriate senior technical staff from within DEAS (Year 3) to continue the management of agro-parks. – (Component 2), one of whom will be selected to assume the position of Manager of both production areas post project while the second will continue to provide assigned specific services in the production areas.

(b) Agro-processing Facility Manager for 36 months and a second Manager for 18 months.

(c) Knowledge management resource person for 40 man months – Component 3.

(d) Finance/Human Resource Officer for 46 months.

6.10 In addition, the project will provide the funding support under the respective Component for the following consultants who will also be assigned to the PMU.

(a) Vulnerability analysis and CBDRM for land slips for 300 days over 36 months (see Terms of Reference below) - Component 1**.**

(b) Climatologist/Plant Scientist from UWI Climate Studies Centre, Mona for two months in two visits to provide expertise in the setting up and management of the CCILLC in particularly the climatology aspects for ex-situ tracking of climate adaptation and resilience in crops.

(c) Economist identified to conduct capacity building in economic analyses of the impact of climate adaptation in agriculture in staff within the Central Planning Unit in the DAFNC for ten days in two visits. The Project Manager through the DAFNC will also seek to access this expertise under existing Technical Cooperation Programme between GOSL and UNECLAC - Component 3.

(d) Gender Specialist.

(e) Consultancy Services for Baseline, Knowledge, Attitudes and Practices Studies and Gender Assessment.

Technical and Administrative Support from DAFNC for the PMU:

6.11 The DAFNC has in place some 80 technical Officers providing services in crops, livestock, fisheries, forestry, soil engineering and water resources management. Of direct relevance to the project are the soil engineers (AESD), water engineers (WRMA), forestry officers (expertise in cartography, slope and land management), agronomist and post -harvest handling, inland fisheries/aquaculture and indirectly marketing. There is also a Division of Research and Development and an active and well -resourced Media Unit. All of these officers have been trained in FFS approach and FFS is the core training tool of the DAFNC in field activities for the last decade. Among the forestry officers are three experts with good experience in creating maps and all water and soil engineers and several forestry officers are trained in GIS and GPS, and all forestry officers in land conservation practices.

6.12 *The DAFNC will assign from this pool eight technical officers* for the (*Project Team Leaders*) organised in two teams and an estimated eight additional technical officers (Project Support Team) to support the activities in Component 1 and as necessary the farm production activities in Component 2. Forestry officers also work with ground staff for normal work undertaken in areas such as improved land management. As necessary, such as in disasters the DOF is also well experienced in using contract labour to undertake additional land management and restoration work. The support required from the Department of Fisheries will be limited to one part-time fisheries extension officers for the five aquaculture ponds in Component 2.

6.13 There is therefore sufficient capacity and experience within the DAFNC to organise and to coordinate the undertaking of the project field activities in Component 1 and to provide the necessary support in Component 2 (Output 2.1). The DAFNC will designate these 16 technical officers who will be assigned to the PMU at the Project Inception. The two teams will spend the first three to six months in the field in inventories and needs assessment, vulnerability analysis and creation of the updated landslip map the creation overlay maps of the farms. This undertaking will also permit the confirmation of the target farms and settlements/clusters for on-farm water and drip irrigation. This integrated team approach will increase the efficiency and transparency of the project benefits and of the selection of beneficiaries. The Water Users Association, the SLRNWP and the Agro-processers Association will be formally required to oversee the Cooperatives Unit of the DAFNC. Through the Cooperatives Unit, these three bodies will continue to be supported and will be able to access the necessary technical services from WRMA, AESD and the DEAS.

6.14 *Project Team Leaders will prepare quarterly sub-plans* aligned to the agreed Annual Work plan and budget and the Implementation Chart of the PMU and make recommendations to the Project Manager for corrections based on lessons learnt, the need to adjust work plans due to unforeseen events such as poor weather or any other adverse natural events. The Project Manager and his/her team will not make revisions intended to change outcome deliverables but may make recommendations to the PSC for such revisions.

6.15 In addition to the above the DAFNC will also assign one technical officer from the Statistics Unit in the Department of Corporate Planning to provide support in Component 3 as of Year 1 and a research scientist from the Research and Development Unit to the Laboratory in the CCILLC as of Year 2. These two public officers will provide support to the Knowledge Management Resource person in the PMU. The DAFNC will also assign two senior agriculture extension officers to support the Agro-park Development Officer. These two extension will continue to provide agriculture extension services to the production sites post project. The DAFNC will also assign a Procurement Officer for 42 months and an Executive Secretary for 48 months to the PMU and will request the GOSL to assign a Community Development Officer with skills in conflict resolution by lateral transfer from the Ministry of Social Justice, Equity, Empowerment and Youth[41] for 12 months over 40 months. Detailed notes on human resources assigned to the project implementation by the GOSL are provided in Appendix VI. For all infrastructural works addressed under each component, an

[41] Ministry of Social Transformation and Community Development.

independent engineering supervision will have to be carried out as required by CDB. Draft TORs for independent construction services is provided in the Appendix VI(ix).

Part III-B. Describe the Measures for Financial and Project/Programme Risk Management

6.16 The GOSL has established procedures for reporting on funds, hence the PMU will align with budgetary and fiduciary management arrangements which govern the operations of the DAFNC and all other public-sector bodies. Procurement of consultancy services shall be in accordance with CDB's procurement policies for engagement of consultants. Procurement of goods and non-consultancy services will be in accordance with CDB's Guidelines for Procurement. The PMU will also adhere to the Government's procurement policy. The PMU will also familiarise itself with procurement requirements of the CDB, the AF Board financial management requirements, GOSL Financial Administration Act and Financial Regulations, the Audit Act, and the Procurement and Stores Regulations. This requires among other things the approval for the use of funds and sign off on the hiring of consultants by either a Departmental Tenders Board or the Central Tenders Board.

6.17 Circulars on accounting procedures from the Office of the Accountant General Department in Saint Lucia as well as circulars issued on financial policies by the Director of Finance will also guide adherence to good practices of the GOSL. Generally Accepted Accounting Procedures Principles will also guide the financial operations of the Project. In addition, all financial and project measures will be assessed as ongoing process through internal audits of the Project and financial reports and audits by the NIE (CDB). Potential specific financial, environmental, and project risks associated with the Project are shown in the Table below.

TABLE 9: MAJOR FINANCIAL ENVIRONMENTAL AND INSTITUTIONAL RISKS

Risk Class/Category	Level	Strategies and Notes to ensure project deliverables
Financial: Inflation leading to increased costs of goods and services.	Low	A finance officer and a procurement officer will be employed in the PMU in order to ensure appropriate management of funds and to make timely alerts to the Project Manager should there be need to make adjustments and or seek the necessary approvals in broader situations over which the Project has no control.
Environmental: Natural hazards (hurricanes with high winds and floods, droughts, and storm surges affecting the west, south-west and north-east coastlines) in the early stage of the project implementation. Project risk: Weak acceptance or lack of willingness of the population to understand climate resilience and participate in the implementation of the project resulting in weak-buy-in.	Moderate to high	The Project is expected to build climate resilience in farming systems to natural hazards during the life of the project. However the expected outcomes in farming systems, could be frustrated or denied by intense rainfall from hurricanes or from extended droughts with potential for more devastation in the farms from landslides, poor drainage in low lying farms with loss of production and incomes. As indicated in the document priority is given to Component 1(reduction of landslips and water security). In the case of Component 2 the drainage works for the area will be given priority. Due to the possibility of weather related delays the consultant will be engaged for 300 days over 36 months. The project was designed on the basis of a community based- participatory consultative process. Experiences and adaptive capacities and needs were identified, in the agricultural communities and their populations in the project area.
Project risk: Weak acceptance or lack of willingness of the population to understand climate resilience and participate in the implementation of the project resulting in weak-buy-in.	Low	Other stakeholders brought into the process through the National Consultations included public and private sector agencies, NGOs, marketers on whom these agricultural communities are highly dependent as buyers of their produce, and international partners in agriculture in Saint Lucia. The common agreement reached by this process was that the best-selling points of the project at this time would be the following areas which have been incorporated in the Components. 1. Capacity building for a understanding and awareness of climate change and the potential benefits of climate resilience for income generation and food security 2. Measures that improve participation in domestic market supply chains. 3. Knowledge transfer in project demonstrations that assess and include considerations for the value of traditional knowledge transfer and cultures. 4. Practices with short-term returns such improved water security and reduced the increasingly high cost of agri-inputs. 5. Activities that encourage youth and women participation with improved income generation.

Risk Class/Category	Level	Strategies and Notes to ensure project deliverables
Inadequate baseline data for planning.	Medium	The knowledge management and transfer Component has as its first activity that of establishing the necessary baselines for the project activities. To mitigate this risk the individual with responsibility for Component will be employed in time to participate in the Project Inception Workshop.
Collaboration amongst the relevant technical institutions.	Low	The successful delivery of project outputs will be determined by the extent of the ease of collaboration and cooperation of the many technical institutions involved. The project targets those agencies which the GOSL and the DAFNC have already long established relationship. These include the CDB, and UNECLAC at the international and regional levels and at the local level DAFNC working with SALCC-FARM School, Ministry with responsibility for Infrastructure and Energy, SLBS, MOH, DMS, and MSJEEY.

Part III-C. Describe the Measures for Environmental and Social Risk Management in Line with the Environmental and Social Policy of the Adaptation Fund

6.18 The Project fits into category B based on the EIA undertaken mainly reflecting the possible risks associated managing landslips on slopes and in the establishment of on-farm RWHS. However, the main focus is the improved land management in these areas, improved water security and enhanced production practices for improved livelihood, and incomes. By way of its geographic location the project activities will naturally improve the socioeconomic well- being of vulnerable populations including those in three of the four settlements where poverty is most highly concentrated in the country. Table 10 shows that the extent to which the project formulation process aligns with the risk management concerns of the AF.

TABLE 10: ENVIRONMENTAL AND SOCIAL POLICY CONCERNS OF THE AF

Environmental and Social Policy Risk Concerns of the AF	Project formulation process and proposed actions well aligned with the ESAF
Project should reflect the integration of policy, and legislative framework that aligns with environmental and social policy of the Adaptation Fund.	The Project is an outcome of the integration of the main policies and strategies governing Saint Lucia's actions to protect the environment. These include NCCAP 2015: makes provisions for sustainable water resources for agriculture biodiversity. (Component **1.1. and 1.2**) MTDS and SLDS (2012-2016):seeks to build competence and education of small farmers within the strategic goals for agriculture (**Components 1,2 and 3**) NAP (2009-2015): promotes climate adaptation measures for improved the food security and livelihoods of the poor through increased resilience of their farm production areas (**Components 1, 2 and 3**). TNC 2017: recommends urgency of adaptation measures in the west and south-west where the most vulnerable agriculture populations settle (**Components 1 and 2 with emphasis on Component 1)** Revised NEMS and NEP (2015): seeks to minimize environmental risks and to support sustainable livelihoods and food security among other areas (**Components 1.1, 1.2, and 2.1,2.2)** SASAP for Agriculture and Fisheries Sectors (2018-2028): seeks to ultimately reduce poverty, improve livelihoods, environmental and human health (**Components 1.1,1.2; 2.1;2.2, 3.1.2)** IPRASP (2003): supports institutions and programs for development for poverty reduction and for longer-term social development (**Components 1, 2, and 3**). NDC under the UNFCCC (2015) - an increase in renewable sources of power in the electricity generation mix, specifically a 35% RE target by 2025 and 50% by 2030 based on a mix of geothermal, wind and solar energy sources. St. Lucia's NDC also underscores the country's commitment to integrating appropriate adaptation measures into national and sectorial development strategies **(Components 1 and 2)**.

Environmental and Social Policy Risk Concerns of the AF	Project formulation process and proposed actions well aligned with the ESAF
Participatory approach for environmental risk reduction at community levels and for transparency in access and equity of benefits of the project.	Participants and beneficiary communities fully informed through focus groups meetings during formulation. Field visits for site selections included technical staff from DAFNC, (WRMA, DEAS, DOF, ASED) to ensure low or no environmental risks in establishing RWHS. They were accompanied by community persons for transparency in selection of the respective clusters of farmers to receive water, giving adequate consideration to mixed clusters, as well as clusters of women and youth in working in groups.
Gender equity in participation and benefits (social and economic).	Male and female were well represented in all the sessions even though male out number female 2:1 in farming. In the case of water for irrigation the capacity of the RWHS systems per unit were the same irrespective of the recipient.
Does not involve conversion or degradation of critical natural habitats or other protected areas.	The project activities will contribute to protection of habitats through reduction in sedimentation and siltation on the coastlines, and the promotion of farm practices that reduces the risk of incursion into more marginal and high risk areas.
Avoid pollution and maximize energy efficiency.	Generally GHGs are from the clearing of land however this project does not include clearing new lands for the activities. Additionally, Project also uses renewable energy for climate adaptation practices on the farms which will have a mitigation co-benefit of reducing the carbon footprint of the farms and assisting in meeting the NDC target since implementation will run into the first NDC implementation period. The project activities will build organic soils and reduce possibilities of pollution from agri-chemicals. Through the use of solar energy for agro-processing, pumping water and cooling greenhouses with further saving on carbon footprints, the project will contribute to improving energy efficiency of the farms.
No negative effects on public health.	The project through the organic farming practices will contribute to better health and reduce risks of some the popular NCDs and other types of ailments associated with the use of agri-chemicals in farming.
Promote lands and soil conservation.	Component 1 is strongly focussed on climate adaptation measures to improve land management and soil conservation in the small farming systems. Component 2 will improve drainage in low lying farms and with co-benefits for reduced siltation and flooding and land degradation at the river mouth.
Protect or strengthen social cohesion or the affected communities.	The consultation process will continue and be strengthened during project implementation through community-based participatory approaches and the facilitation of organisations and groups to strengthen adaptive capacities at community levels for cohesion, ownership and responsibility. The sharing and the protection of the built structures will also engender ownership of the project of the longer term agro-ecosystem services (water users groups; climate adaptation groups, national agro-processers organisation and Producer Cooperative).
Promote local decision making during all project stages with special attention to marginalized and vulnerable groups.	The consultation process, including the participatory rural assessments conducted during project development, which included many field visits, established a strong relationship and trust between the DAFNC, (DEAS,WRMA, DOF AESD) and the agricultural communities. Based on the level of participation and the demonstrated commitment of the farmers and the communities to work with the project formulation team, all persons including those deemed marginalized will continue to feel that their participation and inputs into the decision-making processes are valued. Additionally the community will continue to have a voice in the implementation of the project thorough the national committee, and engaging with the various support personnel to the project as described in the implementation arrangements.
Capacity building and skills development in the communities of a local skill base and increase local content.	Component 3 includes the preparation of farmer friendly material for training, demonstration and sharing at community through leaflets, flyers, skits and other graphics that will enhance the understanding of the project beneficiaries of these elements of the Project.
Learning and awareness raising.	The project is strongly community-based in its approach and include skills such as agro-processing for small-scale businesses or homebased convenient to women; production of bio-products which will be on demand by the farming community and which with the capacity building of the project will generate farmers who will

Environmental and Social Policy Risk Concerns of the AF	Project formulation process and proposed actions well aligned with the ESAF
	be able to produce these soil building products on the farm using simple facilities (covered sheds) and farm waste, legume cuttings and easily available plants for fertilizer teas etc. Farmers will also benefit from training in different types of improved land management (Components1 and 2) and in the building of greenhouses suited to environmental conditions and using local material (Component 2). Component 3 provides this opportunity to direct beneficiaries through printed material provided and disseminated as well as through the wider community through the learning and interpretation at the two agro-parks.
Create employment opportunities sourced from the communities, skilled labour and traditional knowledge.	Employment opportunities will be created at the community level; demand for compost, mulch and fertilizer teas is expected to increase; increased production through year-round water will create opportunities for small-scale *middle men* in the marketing chain and in small-scale agro-processers either as processers or sellers of the processed goods and an increased source of fresh food supply for the tens of rural women who sell or gain employment through the activities in the Castries and other local fresh market place.
Ensure coherence with and support of related objectives of broader sustainable development policies strategies and plans established at the national and local levels.	Based on the extent to which the policies and strategies of broader development initiatives have been integrated into the project activities including the SASAPs (2018) and the MTDSP (2012-2016)- it is expected that outputs of the Project will contribute to the strengthening of policy and strategy and to opportunities for upscaling climate adaptation practices in agriculture including the introduction innovative and climate smart technology leveraged by built climate resilience, with many social benefits at the community levels.

6.19 In-keeping with CDB's Environmental and Social Review Procedures (ESRP) and the general provisions of grant agreements, GOSL will be required to submit evidence of compliance with, all relevant environmental planning and building permits requirements and licences, before disbursement of funds for these works.

Grievance Mechanism

6.20 The Implementing Entities', Office of Integrity, Compliance and Accountability (OICA) has responsibility for a comprehensive Strategic Framework for Integrity, Compliance and Accountability and associated policy. The policy ensures that CDB adheres to the highest standards of integrity, ethics, compliance and accountability, with zero tolerance for fraud corruption and other corrosive conduct. The Policy and processes for complaints ensures confidentiality and anonymity. It specifically addresses complaints relating to adverse environmental and social impacts arising from its projects and requirements to adhere to the highest standards for environmental and social safeguards and accountability in the projects it finances. Complaints pertaining to all operations, including the Adaptation Fund's financed projects activities can be directed to the Bank's OICA. The Projects Complaints Mechanism (PCM), is authorised to manage the receipt, registration and handling of complaints and requests related to the Environmental and Social Safeguards. The PCM will conduct investigations into any complaint and where applicable to pursue early resolution of the subject matter. CDB Fraud and Corruption Reporting

6.21 At the project level, a complaints register will be established by the PMU. This will be supported by, a prominently displayed notification on the MOA webpage, with – email address and telephone contact to register any complaint arising from the project implementation. It will also provide a hyperlink to CDB's OICA webpage. The unit will be supported by the CEO of the DEAS who will collaboratively work with the PMU to help resolve complaints. While complainants should use the implementing entity's grievance mechanism, the AF's Ad hoc Complaint Handing Mechanism (ACHM) may also be used in the event that parties would have failed to reach a mutually satisfactory solution through the implementing entities' grievance mechanism within a year. Complaints to the AF will be submitted in writing either (i) by email to afcomplaints@adaptation-fund.org or (ii) by hard copy to the Adaptation Fund Board Secretariat, 1818 H Street NW, N7-700, Washington, DC 20433, United States of America. In addition to the prominent display on the Ministry, as well as GOSL websites, the grievance mechanism will be publicised through community

consultations and meetings. Project PSAs to be aired on radio and television, will also notify of the grievance mechanism under the project and encourage reporting to GOSL, CDB and AF.

Part III_D. Describe the Monitoring and Evaluation Arrangements and Provide a Budgeted M&E Plan. Include Breakdown of How Implementing Entity's Fees will be Utilised in The Supervision of the Monitoring and Evaluation Function

6.22 The project M&E will be undertaken at various levels in line with the roles and responsibilities of the Project Implementation Arrangements. The Ministry of Agriculture, Fisheries, Physical Planning, Natural Resources and Cooperatives will be accountable for the successful delivery of the Project according to AF Operational Guidelines and Responsibilities will be delegated to the PMU in the DAFNC that will be tasked with the conduct of the day-to-day operations of project implementation (an Indicative Implementation Chart is presented at Appendix IX). During the first three months of the project, the Ministry of Agriculture will be engaged in post approval activities including the procurement of consultants for the PMU and developing draft operational procedures.

6.23 The PMU will hold monthly meetings, ensure minutes are accurately documented and approved by all participants. The PMU will also make arrangements for six monthly meetings of the PSC and ensure that minutes are documented and approved. The documents will cover complete summaries of all relevant outputs from all Components that could increase efficiencies or require corrections at the level of the PSC. As necessary extra-ordinary meetings of the Project Management Committee and the PSC will be convened in a timely manner.

6.24 All the reports from the Project Manager to the PSC will be signed, after they have been presented and approved. Annual Project Reports, will, include the following (a) progress made towards project objective and cumulative project outcomes relative to baseline data, indicators and end of project targets (b) project outputs and state of outcomes for each Component (c) lessons learnt in all three Components (d) annual expenditure reports and Audits and (e) impact on livelihood security, incomes and employment.

6.25 The following M&E activities will be undertaken:

A Project Inception Workshop will be held within three months of project start with, relevant persons and institutions directly or indirectly involved in the project. These would include those directly involved in the Project Implementation Arrangements, farmers and other stakeholders important to the demonstration of ownership of the Project and to transparency in access and equity. The Report of this Workshop will be submitted through the Department of Sustainable Development to the appropriate bodies including the Implementing Entity. This Report is a key reference document that will be shared with participants to formalise any understanding or agreements reached during the Workshop.

6.26 The Agenda of the Inception Workshop will address the following:

Provide an overview of the Project including the Results Based Management Framework; reporting, M&E requirements; work plan and budget and the financial reporting procedures and obligations and arrangements and audits. (b) Facilitate discussions to assist all partners to fully understand and take ownership of the Project (c) Provide an understanding of roles and responsibilities within the project's decisions – making structures (d) Clarify lines of communication and how to deal with conflicts or grievances (e) Provide for focus group session to review project components and examine the proposed four-year Work plan and make recommendations if any on the first- year Annual Work Plan and Implementation and Procurement Chart, (f) Agree on a methodology for tracking progress against indicators, outputs and targets identified in the Project inclusive of a role for beneficiaries in data collection, (g) present draft operational procedures (h) present the Project Steering Committee.

6.27 Following on the Inception Workshop the PMU will finalise and put into operation the following M&E practices.

(a) Revised Annual Work plans by Components prepared by the PMU describing in detail the deliverables in terms of outputs, the activities that would be undertaken and the results expected. The PMU will provide an abbreviated copy of the Work plan for the PSC, and the Designated National Authority for ease of monitoring. Persons in DAFNC who should be familiar with the Work Plan include the Permanent Secretary, the Chief Agriculture Policy Officer and the CEO of the DEAS.

(b) Field visits will be undertaken regularly at least monthly and at times more regularly when necessary. These should primarily be visits to the sites in the company of the farmers involved and field officers. Some of these visits should coincide with the practical demonstration sessions to observe exposures to learning by doing and the evidence of awareness of CC and climate adaptation and the reasoning behind building climate resilience within the farming populations.

(c) Consultations, PRAs, surveys (particularly to observe changes in baselines) and focus group meetings will preferably be tied to the six-monthly inventory updates.

(d) Audits carried out in line with the requirements and standards of the GOSL and the NIE as earlier described.

TABLE 11: MONITORING AND EVALUATION ACTIVITIES

Activities	Timelines	Cost (USD)	Responsible Parties
Project Inception Workshop	March 2019	10,000	DAFNC,CDB-Department of Sustainable Development
Establish Project Steering Committee	March 2019	0	Department of Sustainable Development DAFNC/PMU
Finalise Operational Procedures	March 2019	0	DAFNC/PMU
Progress Reports	Monthly Bi-annual	4,000	PMU
Financial Reports	Monthly Bi-annual	6,000	DAFNC/PMU
Site Visits	Monthly	2,000	DAFNC/PMU/PSC/SDE
Project Performance Reports	Annual	2,000	DAFNC/PMU/CDB
Consultations/Meetings on Project state implementation	Annually	6,000	PMU/CDB
Mid-term Review/Evaluation	November 2020	10,000	DAFNC/PMU/CDB
Terminal Evaluation	July 2022	10,000	DAFNC/PMU/CDB
Financial Audits	Annually	30,000	DAFNC/PMU/CDB

6.28 Project Evaluation: Two Project evaluations are planned, a Mid-Term Review after the first 18 months into the Project implementation and a Terminal Evaluation, six months before the scheduled closing date of the four-year Project. This is to allow for adequate time to finalise and formalise the exit strategy for the Project in particular, relative to the management of the green agro-parks. The Terminal Evaluation will be conducted under the leadership of the Independent Evaluator identified by CDB with the three-general criteria; degree to which the Project was logical and adequate, its performance and its success as shown below.

TABLE 12: PROJECT EVALUATION CRITERIA

Monitoring and Evaluation	Criteria
Relevance: Degree to which the objective of the project is relevant to resilient agriculture with climate change and climate variability in Saint Lucia.	The design of the project and its adequacy. Was there a logical approach to project planning and implementation**.**
Performance The progress made by the Project relative to the objective.	Efficiency- Was the project planned and undertaken in a cost-effective manner and were the best options selected for the expected outputs? Effectiveness-Were the assumptions and risks identified on target and will the expected outputs/activities produce the results/outcomes? Timeliness - Were the outputs timely and the expected quality/quantity relative to the expected outcomes?
Success The extent to which the project has brought about change.	Impact – How have the project outcomes impacted the objectives of each component and overall towards resilience to climate change? Sustainability- Are there indicators of project sustainability and can they be described?

Part III-E. Include a results framework for the proposal, including milestones, targets and sex-disaggregated targets and indicators as appropriate.

TABLE 13: PROJECT RESULTS FRAMEWORK " BUILDING RESILIENCE FOR ADAPTATION TO CLIMATE CHANGE AND CLIMATE VARIABILITY IN AGRICULTURE IN SAINT LUCIA" - ABRIDGED VERSION[42]							
	Narrative Summary	**Indicators**	**Baseline**	**Target 2020**	**Target 2023**	**Means of Verification**	**Assumptions (external Factors or Risks)**
Goal	To build resilience in Saint Lucia's agriculture sector for livelihoods security through enhanced adaptive capacities for CC and CV.						
Objective	To increase the resilience of rural farm communities in Regions 2 and 7, increasing farm productivity, water and livelihood security and reducing vulnerability to natural hazards, climate variability and change.	Number and types of public and community institutions with the capacity to plan and adapt to risk of climate vulnerability and change. Number of farm families with reduced risk from extreme climate events.	Vulnerable farm communities with low adaptive capacities and poor life chance potential.		2,400 farms and 7,200 farm families directly benefiting from the project. 2,400 farms indirectly benefitting from the project. (disaggregated by sex and age of farm holder).	Direct interviews; project reports	GOSL maintains commitment to project objectives.
Impact	To contribute to enhanced national capacity to plan and implement climate resilient and adaptive actions in the agricultural sector, to transform the lives of the rural population.	Comprehensive national land use plans for land capability of the agricultural sector. Agricultural sector data management system and information portal.	Poor land use planning and management. Absence of comprehensive agricultural data management and information system. Inappropriate farm management practices for CV and change. Declining agricultural productivity and livelihood security.		Increased public awareness of climate impacts on the agricultural sector. Increased productivity from regions 2 and 7. Increased adoption of practice (agricultural farm techniques, water technology, cropping systems) across the rural farming sector.	Economic and social reports. Sector bulletins published by the Ministry. Poverty assessments, survey of living conditions.	GOSL maintains commitment to project objectives.
Outcome 1	Increased farm productivity with improved livelihood security and incomes and new farm areas brought under production in the project areas.	Percentage change in total number of targeted farms recording improved levels of production including from new areas brought under production.	Low adaptive capacities for building resilience in farming systems to adapt to the vulnerabilities to droughts and intense rainfall on slopes and susceptibility to land slips, debris flow and soil erosion.	Revised baseline for adaptive capacities available from inventory and needs assessments of targeted farmer households and DAFNC.	100 % of targeted farmlands with DRRM treatment to reduce vulnerability to risk from landslips and water shortages guided by EIA and EMP.	Reports from regular field assessments (of land slips and soil erosion after intense rainfall event, reduction in losses on the farms).	No major natural disaster.
			To be determined by KAP-G Study.	Overlay maps of farms and landslips for agreed sites for RWHS and landslips treatment available.	100% of targeted area for new lands brought under production.	Reports from regular field assessment (to include numbers of targeted farmers recording change in size of plots of the individual farms and production data).	New production areas are productive.

[42] A detailed Results Framework is provided at Appendix VII.

TABLE 13: PROJECT RESULTS FRAMEWORK " BUILDING RESILIENCE FOR ADAPTATION TO CLIMATE CHANGE AND CLIMATE VARIABILITY IN AGRICULTURE IN SAINT LUCIA" - ABRIDGED VERSION[42]							
	Narrative Summary	**Indicators**	**Baseline**	**Target 2020**	**Target 2023**	**Means of Verification**	**Assumptions (external Factors or Risks)**
				30 % of targeted farms, with improved adaptive capacities evidenced by treated sites (disaggregated by sex and age of farm holder).	.5.2 Six monthly farm records showing improved farm income.	Reports of sessions and participation by gender and youth.	Farmers willingness to provide production and income data.
				50 % percent of targeted DAFNC staff with improved adaptive capacities actively involved in CCA using FFS.	100 % percent of targeted DAFNC staff with improved adaptive capacities actively involved in CCA using FFS.	Report to the PSC by the PMU (verbally or through discussions).	DAFNC staff are actively using FFS.
Outputs	Reduced landslips, and soil erosion on farms through creation of updated maps, vulnerability analysis, and field practices for DRR/DRM and FFS.	Overlay Maps of farming areas and landslips in the targeted area and codes for treatment produced and being used.	Less than 1 percent of farmers in project area planting on contours with cross drains only visible treatment.	Updated landslip maps and farm overlay maps created, DRRM codes from vulnerability analysis in participatory approach, 100 CDRM field days / workshops in six built training and demonstration facilities.	DRRM measures completed across 1000 hectares in 600 CDRM field days and workshops and 1000 technical leaflets disseminated in the project area.	Overlay Maps	Active farmer participatory approaches utilized No major natural disasters effective farmer participatory approaches.
	Access to on-farm water from RWHS and bare slope catchment with drip irrigation integrate with built soil resilience using compost and other organic material.	90-100 on-farm RWHS, Five (5) RWHS for cocoa production and two (2) community drip irrigation established and the number of capacity building workshops and field days for water management for water use efficiency.	Estimated 70 percent entirely rain fed and mostly on hillside, another estimated 20 percent rain fed and supplemented with water pumped or carried from the river.	conducted (disaggregated by sex, youth, subsector), maps, and water security for 20-60 farmers on 30 hectares from slope catchment and rain with drip irrigation and 30 farmers from rooftop also with drip.	40-60 fully functional slope catchment farmers and 90-100 on-farm rooftop RWHS with drip irrigation, over 200 hectares, water for the two main seedling nurseries and standalone community systems for small livestock.	Project reports	National Water Users' Group established and active Farmers are available for training sessions. Farmers willing to provide supplementary labor at established labor rates.

TABLE 13: PROJECT RESULTS FRAMEWORK " BUILDING RESILIENCE FOR ADAPTATION TO CLIMATE CHANGE AND CLIMATE VARIABILITY IN AGRICULTURE IN SAINT LUCIA" - ABRIDGED VERSION[42]							
	Narrative Summary	**Indicators**	**Baseline**	**Target 2020**	**Target 2023**	**Means of Verification**	**Assumptions (external Factors or Risks)**
	Farmers and DAFNC staff trained in improved land management for climate resilience.	500 farmers and extension officers trained for production and utilisation of CCA practices.	To be determined by KAP-G Study.	75 participatory workshops for extension officers and farmers.	105 participatory field days and workshops for 1,500 farmers conducted by agriculture extension officers on water security.	Project reports.	No major natural disasters.
ACTIVITIES FOR COMPONENT 1 LISTED IN APPENDIX							
Outcome 2:	Increased productivity and competitiveness in resilient small farming systems with improved livelihood security increased income, employment generation and household food security.	Percentage change in farm productivity, number and type of diversified value chains by sex and age, percentage change in participation in domestic supply value chains.	To be determined by KAP-G Study.	30 % of targeted farmers on 12 hectares of intensive production sites with built resilience to CC integrated with solar power for enhanced production practices.	100 % percent of targeted farmers on 30 hectares of intensive production with built resilience to CC and CV integrated with solar power for enhanced production practices in crops, livestock and aquaculture.	Six monthly reports (including surveys of selected households).	Markets are sustained and importers maintain an interest in larger purchases from local production.
		Number of persons and percentage change in incomes disaggregated by gender and youth participating in diversified agro-processing value chains powered by solar energy.	To be determined by KAP-G Study.	Enhanced efficiency in secondary production value chains in HACCP certified agro-processing facility powered by solar with access by small-scale processers including those among the most vulnerable and marginalized households in the country.	Enhanced efficiency in secondary production value chains in HACCP certified agro-processing facilities powered by solar with access by small-scale processers, including those among the most vulnerable and marginalized households. Ease of access to 70-100 small farmers in intensive production systems.	Six monthly and annual reports.	No issues with installation, maintenance or natural hazards impacting the solar systems.

TABLE 13: PROJECT RESULTS FRAMEWORK " BUILDING RESILIENCE FOR ADAPTATION TO CLIMATE CHANGE AND CLIMATE VARIABILITY IN AGRICULTURE IN SAINT LUCIA" - ABRIDGED VERSION[42]							
	Narrative Summary	**Indicators**	**Baseline**	**Target 2020**	**Target 2023**	**Means of Verification**	**Assumptions (external Factors or Risks)**
Outputs:	One (1) green agro-parks established in region 7 in the west of the project area and one (1) in region 2 in the north east on a total of 34.4 hectares.	Two green agro-parks established comprising 16 collapsible greenhouses installed; 5 RWHS; and 4 outdoor facilities in place.	Less than 1 percent of small farmers using climate smart and intensive practices in greenhouses and less so in open field.	Land management improved through land drainage and aquaculture ponds in disuse desilted, lined and fully functional with diversified value chains.	Farmers including youth in aquaculture actively involved in improved production and diversified value chains.	Project reports; field visits and facilities inventory.	No major natural disaster
				Estimated 12 hectares established and estimated crop 20-30 farmers in full production supported by 4 outdoor built CCA training facilities and 3 greenhouses.	Estimated 30 hectares established and an estimated 70-100 farmers covering all three subsectors in production supported by 8 built outdoor training facilities, 16 green houses with aquaponics and five restored aquaculture ponds.	Project reports; field visits and facilities inventory.	No major natural disaster
				1 green agro-park fully operational showing records of tours.	2 agro-parks fully operational and showing records of tours.	Project reports; field visits and facilities inventory.	No major natural disaster.
				Two kiosks completed for gastronomy input to the farm tours product linked to the aquaculture ponds.	Four kiosks completed and YAEP youth trained in and agri-business in fish marketing and gastronomy.	Project reports; field visits and facilities inventory.	Tourism sector continues to grow, and farm tours remain vibrant.

TABLE 13: PROJECT RESULTS FRAMEWORK " BUILDING RESILIENCE FOR ADAPTATION TO CLIMATE CHANGE AND CLIMATE VARIABILITY IN AGRICULTURE IN SAINT LUCIA" - ABRIDGED VERSION[42]							
	Narrative Summary	**Indicators**	**Baseline**	**Target 2020**	**Target 2023**	**Means of Verification**	**Assumptions (external Factors or Risks)**
	Two HAACP certified agro processing production, training and certification facilities using renewable energy established on two sites for post-harvest handling of fresh and processed foods.	Two green HACCP certified agro-processing facility; numbers of persons disaggregated by sex and age benefitting from the agro-processing facilities; Special equipment for SLNRWP Women Cocoa producers procured.	None using renewable energy or specifically benefitting small farmers and vulnerable and marginalized persons dependent of selling small fresh or initially processed packages for livelihood.	Inventory of small scale agro processors completed, and implementation work plan confirmed. 1 solarized agro-processing facility in production and capacity building.	2 solarized agro-processing facility in production and capacity building for different value chains and using HACCP practices.	Inception and six monthly reports; Record of meetings; field visits.	Agro-processors willing to participate. Agro-processers will show interest in certification for greater benefits from labelling marketability of the products.
			To be determined by KAP-G Study.	At least 40 small-scale agro-processers trained in facility.	300 small-scale agro-processers using fresh produce space regularly and 100 percent of the Saint Lucia Network of Rural Women using the services (disaggregated by sex and age).	Report of six monthly and annual household surveys (questionnaires) on income and employment generated specific to farm households.	Market for small sized packages of fresh and initially processed farm products for livelihood of women and rural youth remain vibrant.
				Household survey of beneficiaries with positive change in incomes and employment generation and improved security of livelihood, inclusive of 70 targeted SLNRWP women.	Household survey of beneficiaries with positive change in livelihood security, incomes, and employment generation inclusive of all 70 targeted SLNRWP women (disaggregated by sex of household head).	Survey results	All SLNRWP members will make the time to benefit from the training and will organise to make full use of the training.
ACTIVITIES FOR COMPONENT 2 LISTED IN APPENDIX							
Outcome 3:	Established information and communication systems to support adaptive capacities for resilience of small farming systems, improved livelihood security, income generation and climate change/DRR awareness.	Number of persons disaggregated by sex and age actively displaying improved adaptive capacities at the institutional and local levels.	To be determined by KAP-G Study.	Number and type of capacity building sessions undertaken with DAFNC staff and in farming systems to be detailed in work plan.	Number and type of capacity building sessions undertaken with DAFNC staff and in farming.	Six monthly and annual reports; Baseline and Final KAP-G.	Good weather conditions.

TABLE 13: PROJECT RESULTS FRAMEWORK " BUILDING RESILIENCE FOR ADAPTATION TO CLIMATE CHANGE AND CLIMATE VARIABILITY IN AGRICULTURE IN SAINT LUCIA" - ABRIDGED VERSION[42]							
	Narrative Summary	**Indicators**	**Baseline**	**Target 2020**	**Target 2023**	**Means of Verification**	**Assumptions (external Factors or Risks)**
				Functional gender responsive monitoring and reporting data systems in place, for capture and analysis of built resilient and lessons leant.	Adequate information is disseminated to prepare strategic policies and action plans to improve decision making.	Six monthly and annual reports; Baseline and Final KAP-G.	Staff and farmers continue to be available.
Outputs:	Baselines and capacity building for adaptation and resilience	Functional web portal established linked to DAFNC website; 40 field day of climate adaptation monitoring-farmer field school; 28 training sessions on technical guidelines for agro-processing; 705 field days /including workshops on water and soil building practices; Robust master database which captures climate resilient information established and accessible; 2 training workshops on economic analysis and climate change on agricultural crops conducted.	Downscaled data and analysis weak or unavailable in the agriculture sector and specifically for farming systems.	Baselines of need assessment for building adaptive capacities for CC and CV undertaken in collaboration with Department of Statistics.	At least five six monthly updates through focus groups and rapid appraisal on adaptive capacities, livelihood security, incomes, employment in beneficiaries undertaken and entered in database.	Project reports, Ministry of Agriculture reports; project newsletters and web-portal information; training records; direct interviews project training records.	Good weather conditions; targeted individuals will be responsive to training and capacity building efforts; government or institutions do not assign sufficient priority to project; beneficiaries are resistant to changes in practices.
				Data Management and information system in DAFNC redesigned for input of CC, CV and CCA data and a web portal for greater awareness.	Data management system for climate change adaptation to build climate resilience in agriculture fully functional including online services.		DAFNC IT staff available for oversight and the Central Planning Unit is fully involved in the process towards assimilation of data into Central Planning data.

TABLE 13: PROJECT RESULTS FRAMEWORK " BUILDING RESILIENCE FOR ADAPTATION TO CLIMATE CHANGE AND CLIMATE VARIABILITY IN AGRICULTURE IN SAINT LUCIA" - ABRIDGED VERSION[42]							
	Narrative Summary	**Indicators**	**Baseline**	**Target 2020**	**Target 2023**	**Means of Verification**	**Assumptions (external Factors or Risks)**
				Six technical workshops and field days for DEAS staff to build adaptive capacities for knowledge transfer and one five-day policy workshop for DAFNC staff to conduct economic analyses of impacts of the CCA of the project.	Ten technical workshops and field days for all extension staff in awareness and to build adaptive capacities for knowledge transfer and two five-day works to assess adaptive capacities in economic analyses of climate adaptation completed.		DAFNC and DEAS staff available
		Detailed Gender Assessment completed.	To be determined by Gender Assessment.	Assessment completed and data gathered to further inform the project.	Lessons learnt and documented from KAP-G baseline and end of project Studies.	Project final report, annual reports; household survey, direct interviews.	Responsiveness to surveys
		Consultancy to Conduct Baseline, KAP-G Studies for the sector.	To be determined by KAP-G Study.	Baselines assessment carried out to strengthen sector data	Lessons learnt and documented from KAP-G baseline and end of project Studies.	Project final report, annual reports; household survey, direct interviews.	Responsiveness to surveys
	Rehabilitated infrastructure to facilitate activities for greater awareness on climate change and climate resilience in farming systems.	Rehabilitated building in Region 7 (west south west) and at the agro-park site in the north completed fitted with solar energy and space for learning centers.	No other such facility in the country.	Designs available in 6 months after project inception and building completed by end of year 1.	Building fully operational and accessible to beneficiaries, wider national population and agro-tourism sector.	Site visit; project reports.	Delays in construction.

TABLE 13: PROJECT RESULTS FRAMEWORK " BUILDING RESILIENCE FOR ADAPTATION TO CLIMATE CHANGE AND CLIMATE VARIABILITY IN AGRICULTURE IN SAINT LUCIA" - ABRIDGED VERSION[42]							
	Narrative Summary	**Indicators**	**Baseline**	**Target 2020**	**Target 2023**	**Means of Verification**	**Assumptions (external Factors or Risks)**
	Two Climate Change Interpretation and Learning Centres	Reports of inauguration of the Centers and quarterly activities in the CCILLC. Percentage of users regarded as CC literate.	No other such facility exists in country.	CCILLC of floor space to accommodate (i) two 10x10 climate control grow rooms (ii) Conference area - 50 persons (iii) walls that will support graphics, photographs and other exhibits of built adaptive capacities and social and environmental resilience at different levels in the project area.	CCILC established in facility the agro-park in north eastern part of the project area (Region 2) with floor space to host reception area and conference room.	Site visit; project reports; CCILLC visitors register; KAP survey.	Rainfall stations in project area are managed.
				3000 persons passed through the production areas and CCILLC and the CCILC, with greater awareness of CC and CV.	At least 5000 persons passed through and Two Biennial Climate Change and Climate Adaptation Competitions.	Site registers; project reports.	Sufficient interest in the learning centres.
ACTIVITIES FOR COMPONENT 3 LISTED IN APPENDIX							

Part III-**F. Alignment of Project with AF Objectives – Results Framework**

TABLE 14: ALIGNMENT OF PROJECT WITH AF RESULTS FRAMEWORK

Project Objective(s)	Project Objective Indicator (s)	Fund Outcome	Fund Outcome Indicator	Grant Amount in USD
To increase the resilience of rural farm communities in Regions 2 and 7, increasing farm productivity, water and livelihood security and reducing vulnerability to natural hazards, climate variability and change.	Number and types of public and community institutions with the capacity to plan and adapt to risk of climate vulnerability and change. Number of farm families with reduced risk from extreme climate events.	Outcome 5. Increased ecosystem resilience to CC and variability	5. Ecosystem services and natural assets maintained or improved under CC and variability-	**9,858,570**
		Outcome 3. Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.1 %age of targeted population aware of predicted adverse impacts of CC and of appropriate responses.	
		Outcome 6. Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	6.2 %age of targeted population with sustained climate-resilient livelihoods. 6.1 %age of households and communities having more secure access to livelihood assets.	
		Outcome 7: Improved integration of climate- resilience strategies into country development plans[43].	Outcome 7:1 CC priorities are integrated into national development strategy.	
Project Outcome(s)	**Project Outcome Indicator (s)**	**Fund Output**	**Fund Output Indicator**	**US$**
1 Increased farm productivity with improved livelihood security and incomes and new farm areas brought under production in project area.	**1.1** Percentage change in total number of targeted farms recording improved levels of production including from new areas brought under production and of level of reduced losses and damage from climate change and climate variability events.	Output 5. Vulnerable physical, natural and social assets strengthened in response to CC impacts including variability.	5.1 Number and type of natural resource assets, created, maintained or improved to withstand conditions resulting from CV and change (type of assets).	**3,053,781**
2. Increased productivity and competitiveness in resilient small farming systems with improved livelihood security increased income, employment generation and household food security.	2.1 Percentage change in farm productivity, number and type of diversified value chains by sex and age, percentage change in participation in domestic supply value chains.	**2.1.1** Output 3. Targeted population groups participating in adaptation and risk reduction awareness activities. **2.1.2** Output 6 Targeted individual and community livelihood strategies strengthened in relation to CC impacts, including variability.	**2.1.1.1** Output 3.1.1 Number and type of risk reduction actions or strategies introduced at local level **2.1.2.1** Output 6.1.1 No and type of adaptation assets (physical as well as knowledge) created in support of community livelihood	**2,824,545**
3. Established information and communication systems to support adaptive capacities for resilience of small farming systems, improved livelihood security, income generation and climate change/DRR awareness.	Number of persons disaggregated by sex and age actively displaying improved adaptive capacities at the institutional and local levels.	Output 3. Targeted population groups participating in adaptation and risk reduction awareness activities Output 7: Improved integration of climate-resilience strategies into country development plans	3.1.1 Number and type of risk reduction actions or strategies introduced at local level Output 7.1: Number, type and sector policies introduced or adjusted to address CC risks.	**2,024,470**

[43] Refer to paragraph 5.71 for how the project contribute to AF Outcome 7.

G. Detailed with budget notes, a budget on the Implementing Entity management fee use, and explanation and breakdown of the execution costs.

TABLE 15: BUDGET AND NOTES

Investment Category	Activities	Total AF US$	Notes
Component1: Building resilience and sustainability of farming systems through interventions for water security, soil conservation and management.	1.1 Conduct vulnerability analysis, update landslide maps, conduct inventory of farms and prepare overlay farm map, establish codes for DRRM treatment and FSS to build climate resilience in farming systems, update maps.	850,000	Primarily in Region 6 and 7 with 13 watersheds, with multiple landslips, history of loss of lives, estimated 500 farms over an estimated 1000 hectares of farmland to be addressed. Based on the scars of the landslips, need to restrain, divert and trap debris flow to rivers internal paths and roads to the farms as well which often become blocked, and prevent farmers reaching the farms after intense rain events the cost of inputs and labour is expected to expensive. This activity will be supported by a local expert in Vulnerability and hazard risk analysis and capacity building for 300 days @300US per day over three years (see TOR) and guided by the EIA/EMP.
	1.2 Establishment of 90-100 on-farm RWHS, estimated 200 hectares, with drip irrigation for an estimated 800 crop farmers and an estimated 150 livestock farmers.	1,072,000	Drip irrigation infrastructure US$3000 /ha (600,000)and RWHS at US$ 4,000 installed (100x4000 =(400,000) plus conveyance on estimated 200 hectares (16000). Standalone tanks (70,000 gallons) 4x $8,000(32,000) ;10 mobile tanks x$400 (4,000) Pumps x 2 (20,000).
	1.3 Design and construction of infrastructure for slope harvesting in La Bourne Region 1 & 2 and drip irrigation for 30 hectares. 40-60 farmers will benefit.	375,982	Requires excavation –mini dams, ponds, minor concrete works, silt traps, back filling. Already fitted with soil probe, water level recorders, soil gauge. 30 ha. drip irrigation at US$3000per hectare, 50 storage tanks x$4000 and ARCGPS Software (US$ 10,000).
	1.4 Construction of six outdoor facilities for production and practical demonstration of soil building material over an estimated 200 hectares of farm land.	60,000	Beneficiaries will vary in the access to water and landslips which will be provided based on the need assessment. However, all farms in the project area will have access to training and utilisation and the soil building material produced in the six facilities (6 x10,000).
	1.5 Capacity building and training	200,000	Includes material for the compost building, green material and worm culturing.
	1.6 Tillers and other small farm equipment for hillside farmers.	100,000	
	1.7 Two vehicles to transport the two teams.	40,000	These vehicles are absolutely necessary as the team will not have full time access to any other vehicles.
	1.8 Contract labour for landslide rehabilitation activities at $37 per day; incentives for farmers estimated 500 farmers @ $37 per day.	270,000	Building drains, contours, tree planting, gabion baskets and dams, restraining barriers etc. Payments made on completion of job. Estimated as 10 days required from each farmer (5000x$37) plus contract labour at same rate to undertake treatment on the farm and additional funding for areas outside of the boundary of the farm that pose a threat to the farms through landslips and debris flows.
	1.9 Restoration of grassland for use in DRRM for landslips on hillsides and for activities of the SLNRWP.	30,000	This activity will be undertaken by the DOF Restoration is necessary to provide planting material for grass barriers on hillsides in DRRM and for craft (top of plant) and cosmetics and oils (from the roots). 16X2500X48 ECD

Investment Category	Activities	Total AF US$	Notes
	1.10 Five (5) RWHS for cocoa production areas for SLNRWP and soil building support.	40,000	5x 4000 for RWHS; 3 hectares x 3000 for drip irrigation and 5 pumps x1000 plus soil building and other agronomic support.
	1.11 Independent Engineering supervisory services.	21,799	Consultancy services to ensure quality in the infrastructure work done prior to disbursement of funds.
Subtotal Component 1		**3,053,781**	
Component 2: Establishing green agro-parks, including the use of solar energy for increased efficiency in resilient farming systems.	2.1 Internal access roads, parking, signage, drainage and fencing the area of 14 hectares.	100,000	One green agro-park using intensive production practices integrated with renewable energy established in the west south-west on 14.4 hectares. Internal access, parking and signage to accommodate farm tours.
	2.2. Install six collapsible greenhouses with (aquaponics) systems and RWHS and drip irrigation Solarisation (25 kWp Solar PV Systems and one 5 kW inverter with battery back-up for each).	238,614	2 collapsible greenhouses (30ftx60ftx10ft) @ $7,407 4 collapsible greenhouses installed with solar cooling at US 49,000 (196,000) 3 RWHS storage tanks with drip irrigation @$4,000 installed plus drip irrigation and conveyance, timers and tension meters (5,000); 12 aquaponics tanks with lining at $400 and filters and 3 pumps x$1000 plus land preparation (3,000). Imported greenhouses with cooling and installation would be at a cost of US$122,000.00.
	2.3 Land preparation	5,000	5 hectares at 1,000.00 per hectare.
	2.4 Five (5) RWHS and drip irrigation an estimated 5 hectares of open field.	47,200	Five RWHS installed at $4000 installed (5X3000) for drip irrigation plus tension meters and timers (16 tension meters and 16 timers) $1,200 and conveyance/lines (6000) plus 5 pumps x 1,000,
	2.5 Build four (4) outdoor facilities for soil building production and utilisation demonstration.	80,000	Construction of four outdoor facilities for production and utilisation of soil building material 4 x 10,000 plus machinery and implements for training.
	2.6 Establishing systems in livestock (goats) with protein banks and in-house feeding and watering.	200,000	Climate adaptation practice promoted by FAO and IICA and World Bank Climate Change Portal for unfavourable weather, energy conservation, water use efficiency and feeding. Two climate smart in house feeding facility built.
	2.7 Upgrade of five (5) aquaculture ponds.	200,000	Includes procurement at US$51,000.00 each and additional cost for desilting of ponds and installation of the lining.
	Subtotal –Region 7 Production area	**870,814**	
	Region 2 Second agro-park established on 20 hectares 2.8 Prepare site map and site for the establishment of production areas, building for agro-processing facility, offices and climate change interpretation and learning centre and kiosks for to accommodate farm tours.	40,000	DAFNC through the PMU and with the necessary support of the Ministry of Infrastructure will undertake these activities.
	2.9 Fencing and internal roads and external works.	160,000	This production area is an estimated 3 hectares of greenhouses with aquaponics and also being promoted as part of the farm tour income generation product. The area will therefore have internal access roads and kiosks at strategic points to allow visitors to taste the fresh produce, particularly vine fruits and tree crops and to view the farming activities.

Investment Category	Activities	Total AF US$	Notes
	2.10 Ten collapsible greenhouses with 10 aquaponics system, 5 RWHS, irrigation with drip and solar pump, t tension meters, timers and pumps growing leafy vegetables (with solar for cooling for four at a cost of US$49,000 each).	267,000	The locally built greenhouses have been well-tested in Saint Lucia. They have a life expectancy of two years and will offer the opportunity to train a cadre of small farmers in the construction of these greenhouses. Imported greenhouses of the same size and life expectancy with cooling and installation cost US$122,000.00.
	2.11 Twelve hectares of intensive open field production of estimated 30- 35 small farmers established in crops and livestock and support with small machinery.	100,000	Farmers already on the site will be encouraged to grow selected commodities for a coordinated approach to production planning and marketing with a view to reducing the high food import bills. All farmers operating on the site will be required to use climate adaptation practices and other GAPs.
	2.12 Six (6) RWHS with pumps for open field in open field and with drip irrigation for the crops.	72,000	6 RWHS at 4000 ($24, 000); 12x3000 (36,000) for drip irrigation, timers and tension meters (6000) and 6 pumps (6,000) for open field.
	2.13 Trough provision for water for livestock from 2 RWHS.	10,000	2 RWHS (2 x 1000 pumps) for livestock and tree crops.
	2.14 Land preparation.	9,000	Land preparation at 750 per hectare
	2.15 Construction of four (4) outdoor facilities with space for on farm and community-based production and practical demonstrations in soil building for resilience with climate change and climate variability.	100,000	Production of compost, fertilizer teas, vermi-composting and mulch for land management and soil building for climate resilience and one structure for vermi-culture to grow worms for the aquaponics and the vermicomposting.
	2.16 Operations (maintenance of grounds, parking areas, internal roads, kiosks).	200,000	
	Subtotal – Region 2 Production area	**958,000**	
	2.17 Construct one green HACCP certified agro-processing facility to accommodate 15 persons for training and for small scale production at Region 2.	476,000	Building to house the agro-processing facility; office space for a manager and reception area/learning centre. Building cost 306, 000; solarisation (installation of 25 kWp Solar PV System (150,000) plus back -up batteries at 1300 each x 3.
	Equipment and operations for Region 2		The facility will provide the regular equipment required for agro-processing
	2.18 Agro-processing activities equipment- Region 2.	40,000	Stoves, refrigerators, utensils, blenders etc.,
	2.19 SLNRWP Women cocoa producers and processing at Region 2.	10,000	Special equipment provided for SLNRWP processing of cocoa into chocolate.
	2.20 Operations related to the agro-processing facility at Region 2.	100,000	Budget is to cover at least two years of activity before the project termination date.
	2.21 Operations of office and learning centre and other services –Region 2.	100,000	Budget is to cover the last two years of the project.
	Equipment and operations for agro-processing facility at Region 7		Operations over Three years
	2.22 Agro-processing Region 7.	50,000	Stoves, refrigerators, utensils, blenders etc.,
	2.23 Agro-processing for SLNRWP in cocoa production and processing Region 7.	20,000	As for Region 2 cocoa processing require special equipment. The group involves 70 women in small scale processing.

	2.24 Operations related to the agro-processing facility at Region 7	150,000	Budget to cover an estimated 3 years assuming facility will be ready at the beginning of year 2.
	Agro-processing	**946,000**	
	2.25 Independent Engineering supervisory services.	49,731	Consultancy services to ensure quality in the infrastructure work done prior to disbursement of funds.
Subtotal Component 2		**2,824,545**	
Component3: Knowledge management and transfer for capacity building to institutional and local level adaptive capacities.	1. Baseline KAP Study inclusive of Gender Assessment and the inclusion of a Gender Specialist Consultant.	240,000	Cost of gender specialist at US300 per day for 160 days plus per diem and air fares and related cost for the conduct of the required activities.
	2. Planting of 705 Field days and workshops in efficient management and maintenance of the RWHS and irrigation systems and efficient use of water and in building resilience in soils including data collection and monitoring for better farmer appreciation.	285,000	Field days and workshops in water and soil building at average 705 x $900 (235,000) for components 1 and 2. Under Component 2: 100 field days/workshops average $500.00 ($50,000)
	3. Workshops and sessions in community building and organizational approaches for ownership**.**	20,000	Under Component 3 ten sessions at an average cost of $2 000.00 (20,000)
	4. Farmer field school approaches in climate adaptation monitoring.	30,000	Forty field days.
	5. Training in standards and technical guidelines for agro processing.	56,000	28 sessions at an average cost of $2000 each.
	6. Training of staff/guides on climate awareness and methodologies to transfer knowledge and understanding on climate awareness.	20,000	In support of agro-tourism linkages with the project. Training will be as necessary but will be onsite
	7. Capacity building in economic analyses of the impact of climate change on agriculture crops.	20,000	Under contract with IICA/UNECLAC or FAO To cover 20 days plus air plus per diem in two visits
	8. Capacity building of DAFNC staff in climate change adaptation, awareness and resilience.	10,000	In collaboration with SALCC-Farm School.
	9. Preparation of policy brief on land-use to protect concrete built resilience in agriculture and to prepare an Agriculture Disaster Management Plan**.**	20,000	To be undertaken with support of local consultants.
	10. Operations - of DAFNC Unit.	100,000	Computers, paper printers, ink, desks and other support.
	11. Web portal design services.	30,000	Web portal linked to the DAFNC website. Cost is to develop material for website dedicated to building resilience in the agriculture sector including articles and publications on specific lessons learned of interest to the OECS and wider Caribbean region in particular.
	12. Database design services.	30,000	DAFNC master data base to be redesigned to be more farmer friendly in accessing data collected by the DEAS and making provision for management of climate change and climate adaptation data and lessons learnt.

	13. Laboratory equipment to measure to control temperature, soil water capacity, fertility, irrigation control, CO2, gr0wers computers and other office equipment.	200,000	Includes graphic's and learning material for walls of conference room equipment, chairs microphones, screens etc., facility for cafeteria/snack room/lunch room.
	14. Rehabilitation of building to host all knowledge management and agro-processing facility and training rooms for farmers - Region 7.	835,000	Cost provided by the Ministry of Infrastructure Includes all external works, electrical and drainage includes 15 percent contingency on building and the cost of solarisation.
	15. Solarisation of the building at Region 7.	86,720	25k W Solar PV System installation and Back up batteries (3x 1,300)
	17.Engineering supervisory services	41,750	Consultancy services to ensure quality in the infrastructure work done prior to disbursement of funds.
Subtotal Component 3		**2,024,470**	
Total		**8,297,936**	**7,902,796 plus 5 inflation (395,140)**
Project Execution		**855,310**	
NIE		**705,325**	
GRAND TOTAL		**9,858,570**	
Projected Calendar			

PROJECTED CALENDAR	
Milestones	**Expected Dates**
Start of Project Implementation	October 2019
Mid Term Review (Planned)	March 2021
Terminal Evaluation	September 2022
Project Programme Closing	May 2023

Include a disbursement schedule with time-bound milestones relative to project inception and annual reporting requirements.

TABLE 16: DISBURSEMENT SCHEDULE

	Upon Agreement Signature	One year after Project start	Two Years after Project start	Three Years after Project start	Total
Scheduled date	Oct. 2019	Sept. 2020	Oct. 2021	Sept. 2022	
Payment amounts from Project Funds	3,760,785	2,260,785	1,260,785	1,015,581	8,297,936
Execution Costs	291,544	341,544	141,544	80,678	855,310
Implementing Entity Fee	219,223	192,475	193,404	100,223	705,325

TABLE 17: BREAKDOWN OF EXECUTION COSTS

	With signature	One year after Project start	Year 2	Year 3	Total
Project Manager 48 months	67,868	67,868	67,868	65,717	269,321
Finance/Admin /HR 46 months	26,667	31,111	31,111	28,960	117,849
Design and Management of Climate Control rooms (20 days in two visits @US500 per day +per diem and travel	-	9,400	9,145	-	18,545
Agro-park development manager for 45 months.	26,000	26,000	26,000	17,349	95,349
Knowledge management 40 months	14,111	20,778	20,778	18,627	74,295
Agro processing 36 months (Region 7)	-	27,445	27,445	25,294	80,184
Agro-processing 18 months (Region 2)	-	-	17,445	26,541	43,986
Monitoring and Evaluation	15,000	25,586	30,000	12,849	83,435
Support Services	19,496	19,000	18,000	15,849	72,345
Sub Total	**169,142**	**227,188**	**247,792**	**211, 187**	**855,310**
Grand Total					**855,310**

TABLE 18: INDICATIVE FUNDS FOR THE NATIONAL IMPLEMENTING ENTITY

Funds	With signature	One year after Project start	Year 2	Year 3	Total $US
Schedule	19-Oct	Oct 2020	21-Oct	Oct 2022	
Coordination and Management	54,056	54,056	54,056	53,997	216,164
Oversight and management of project development and project implementation	45,288	40,797	34,777	34,508	155,371
Financial Management including audits	42,812	42,812	42,812	42,812	171,248
Information and communication management	24,416	24,416	19,416	14,416	82,665
Overall Administration and support costs	19,969	19,969	19,969	19,969	79,877
TOTAL	**186,541**	**182,050**	**171,030**	**165,703**	**705,325**

PART IV- Endorsement by the Government and Certification by the Implementing Entity

PART IV: PROJECT ENDORSEMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the Government

Record of endorsement on behalf of the Government

Enter Name, Position, Ministry	Date: Month, day, year

B. Implementing Entity Certification

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (National CC Policy and Adaptation Plan (2002); Second (2012) and Third National Communications (2017) to the UNFCCC; National Adaptation Plan 2018, Sectoral Adaptation Strategy and Action Plan for Agriculture and Fisheries Sectors (2018-2028) and the Nationally Determined Contribution among others) and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy and Gender Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.
Name and Signature Implementing Entity Coordinator
Date: (Month, Day, Year)
Tel. and email:
Project Contact Person: Telephone and Email

APPENDIX I

HYDRO-METEOROLOGICAL EVENTS IN SAINT LUCIA AND IMPACTS ON THE AGRICULTURE SECTOR

Year	Event	Total Damage and Loss (XCD)	Types of Damage
2016	Hurricane Matthew	24,575,336.57 (agriculture only available from NEMO-Saint Lucia)	Loss of crops, livestock fishing boats sank with damages to engine; landslips taking irrigation systems and other farm assets, siltation and sedimentation, destruction of river banks due to siltation
2013	Christmas Eve Trough	34,630,000	Crops severely affected, loss of all livestock for some farmers, destruction of aquaculture ponds from siltation, destruction of river banks, sedimentation and flooding from poor drainage in low lying areas with impacts on the nearshore fisheries
2010	Hurricane Tomas	907,816,940 (agriculture only UNECLAC analysis from Official Government data)	Many landslides extensive soil erosion, heavy siltation cause major destruction to river banks and major destruction in forest areas-, high siltation affecting coral reefs, seagrass and sea floor systems.
2007	Hurricane Dean		Landslides
2005	Heavy rainfall		Landslide
2004	Hurricane Ivan	28,254,744	
2004	Tropical Storm Bonnie		Landslide
2002	Tropical Storm Lili	20,000,000	
1998	Tropical Wave	621,499.5	Landslides
1996	Tropical Wave	12,444,444	
1994	Tropical Storm Debby	230,000,000	Landslides and crops
1980	Hurricane Allen	250,000,000	Landslides
1967	Tropical Storm Beulah	2,000,000	
1966	Tropical Cyclone	750,000.6	
1963	Hurricane Edith	750,000.7	
1960	Hurricane Abby	3,383998.7	

Source: Ministry of Agriculture, Fisheries, Physical Planning, Natural Resources and Cooperatives

GENDER ASSESSMENT

Saint Lucian Context

1.01 The Population Census (2010) recorded an estimated 28.8% of the population living below the poverty line and 40.3 % of the population as being vulnerable to poverty. However, Saint Lucia recorded a reduction in poverty over the period 2006 and 2016 from 28.8% to 25.0%.[44] This decline was most pronounced in the rural areas of the country with a reduction from 41% to 32.9%. Despite this reduction, poverty in rural Saint Lucia remains high in the context of agro-ecological zones, and is manifested in agricultural communities. The poverty gap fell nationally by 1.5 % between 2006 and 2016 to 7.5 %. On the basis of the Labour Force Survey (LFS) Multidimensional Poverty Index (MPI)[45], in 2017, 45% of persons were deprived in at least 25% or more of the 11 deprivation indicators. On the basis of the 2016 SLC-HBS, the level of multidimensional poverty was computed to be 28%. The MPI included dimensions of citizen security, food security and health insurance along with three indicators on CC vulnerability[46]. In addition to high levels of income and multidimensional poverty, inequality[47] continues to be an ongoing concern, and is influenced by access to resources and the disconcertingly high level of unemployment across population groups, particularly among females, many of whom are heads of poor and/or vulnerable households.

Gender in Saint Lucia

1.02 The Saint Lucia National Report of Living Conditions 2016[48] found the following gender differences:

(a) There was a higher percentage of female heads of households with no education as compared to male heads of households.

(b) Household size of female-headed households was larger than household size of male-headed households, in particular among poor households.

(c) There is a higher participation among males in the labour force. The participation rate for males was 78.2 % as compared to 67.4% for females. Higher unemployment rates were observed for women. Unemployment in 2016 stood at 21.3 percent, with females experiencing higher levels of unemployment compared to their male counterparts (23.5% versus 19.4 %).

1.03 Labour market segmentation was evident in Saint Lucia. A higher percentage of men were in agriculture, hunting, forestry, fishing, transport, storage and communication, and construction. While the service industries employed a higher percentage among women in general. A higher percentage of women worked as professionals, clerical support workers, and in sales and services. Men worked more as skilled agricultural workers, in craft and related trades and in plant and machine operations.

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[44] Saint Lucia National Report of Living Conditions - Summary Report (2016:2). This Report was prepared with CDB's support under the Enhanced CPA Programme.

[45] The MPI is an index designed to measure poverty through the measurement of deprivations. Multidimensional poverty refers to two main characteristics. Firstly, it includes people living under conditions where they do not reach the minimally nationally agreed standards in indicators of basic functioning, such as being healthy, or being vulnerable to health risk, and being educated and informed. Secondly, it refers to people living under conditions where they do not reach the minimum standards in several aspects at the same time. In this regard, the MPI combines two key pieces of information to measure acute poverty, the incidence of poverty, or the proportion of people (within a given population) who experience multiple deprivations and the intensity of their deprivation – the average proportion of (weighted) deprivations they experience.

[46] Enhanced CPA Report (2016: 209).

[47] CPA (2006) and the Enhanced CPA (2016) reported a Gini Coefficient of 0.4 which translated to the poorest 20% of the population enjoying 5.7% of expenditure compared to almost 50% enjoyed by the richest 20%.

[48] Saint Lucia National Report of Living Conditions 2016 Final Report (December 2018). This Report was prepared with CDB's support under the Enhanced CPA Programme. https://www.stats.gov.lc/wp-content/uploads/2019/01/Saint-Lucia-National-Report-of-Living-Conditions-2016-Final_December-2018.pdf

1.04 In addition, the CDB Country Gender Assessment for Saint Lucia[49] from 2015 revealed that females outperform males in the education system but occupational segregation of the labour market still shows engagement of females and males in typical occupations based on gender-stereotypes. Furthermore, crime and violence statistics indicate that males are the main perpetrators of crime and violence and that there might be a link to male drop-outs from secondary school.

Gender in the Agricultural Sector in Saint Lucia

1.05 Sex disaggregated data for the agriculture sector is unavailable or outdated. The most recent information available comes from the Census of Agriculture St. Lucia 2007[50] provides some insights. An analysis of farm holdings by sex showed a disparity between male and female holders, with females at 30% and male holders 70%. Low levels of female ownership and tenancy becomes important in matters of accessing credit and finance as documentation (land deed/title) of ownership for purposes of collateral is usually a requirement of lending institutions. Further, more men owned agriculture equipment which supports improved efficiency and productivity such as; trucks/vans, water tanks, pumps and sprinklers, than their female counterparts. The analysis of income data points to a tendency for women to mitigate income loss from other non-agricultural sources, while men seemed better able to derive increased income from agriculture as well as outside of the sector.

1.06 On a regional level, the CDB Country Gender Assessment Synthesis report (2015) for ten Caribbean countries found indications of gender-related barriers. It should be noted that the statistics focus was mostly on formal wage labour and therefore the number of women in subsistence agriculture or working on family farms is not quantified. The report showed that the proportion of males participating in the agriculture sector is higher than females. The analysis suggests that the unequal participation of women and men in agriculture is tied to access to land, credit and other means of production. Also limited access to information and market networks and weak capacity of women's group, might limit their participation in the sector.

Methodology to conduct comprehensive project specific gender assessment

1.07 Given the scarcity of data the project will undertake comprehensive data collection and gender assessment which will be used to provide evidence based guidance for Project activities. The gender assessment for the project areas will include an assessment of barriers that hinder men or women adapting to CC, and ensure that there are no gender-related restrictions in accessing services and benefits of the Project.

1.08 As part of the gender assessment, there will be:

(a) an analysis of gender roles, activities, needs, priorities and risks, with a particular focus on the agricultural sector and its relation to climate change and requirements for adaptation;

(b) an analysis of knowledge, attitudes and practices of females and males with regards to CC variability and adaptation;

(c) a livelihood analysis of how men and women may be affected differently by CC due to culturally established roles such as the gendered division of labor (like caring for children or fetching water/fire wood) or the legal right to landownership or property;

(d) a gender analysis looking at access to resources (material (e.g. finance) and immaterial (e.g. time, information, networks) and assets, activity (paid, unpaid work, sector) and income profile and the underlying factors such as gender norms and power dynamics influencing the former variables; and

[49] The CDB financed Country Gender Assessment Saint Lucia was prepared by Aleah N. Ranjitsingh, Rawwida Baksh and Associates, January 2016.

[50] Paul, Rufina (2007): Gender Dimensions of the Agricultural Sector

(e) the inclusion of an inter-sectionality perspective which will allow the analysis of intersecting variables such as age

1.09 Methodologically the approach will include a desk review, quantitative and qualitative data collection. Targeted focus group discussions will be conducted between different groups of male and female beneficiaries. The time and location of meetings will factor constraints faced by females and males which could hinder participation. The National Gender Bureau will be included in the consultation efforts.

1.10 Outputs of the gender assessment will include:

(a) concrete gender goals and a further integration of gender into planned activities;

(b) a Gender Action Plan outlining gender-related output and outcome indicators, activities, timeframes, responsibilities and data sources;

(c) risk analysis outlining risks and mitigation strategies to allow for equal access to project activities and to mitigate against any harm from the Project, e.g. where improvement of women's situation could lead to men feeling excluded;

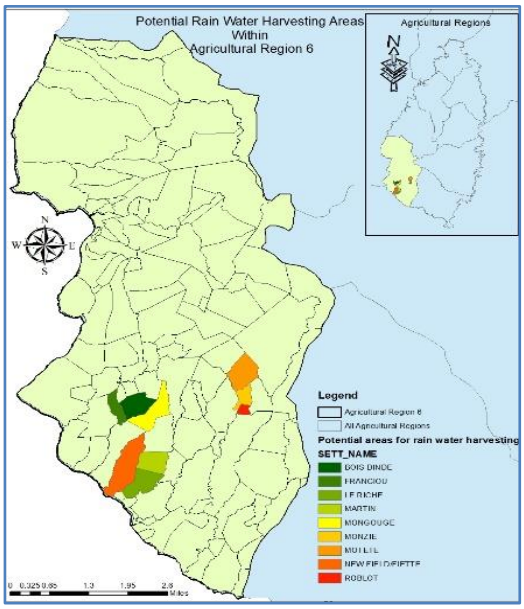
(c) alignment with the Environmental and Social Management Plan.

APPENDIX III

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

1. ASSESSMENT OF THE IMPACT OF RWHS ON IDENTIFIED FARMS IN REGION 6

1.01 The following are the key potential environmental and social impacts (negative and positive) of the implementation of the individual rain water harvesting systems (RWHS) within Agricultural Region 6 with emphasis on the Soufriere Watershed where target farmers have been identified for participation.



2. KEY ENVIRONMENTAL AND SOCIAL IMPACTS OF THE PROPOSED PROJECT - SUMMARY

Environmental

(a) Siltation of water courses during construction of sheds.
(b) Contamination of ground water at springs and water intakes that are the abstraction points for communal potable water supply system.
(c) Noise pollution during construction.
(d) Danger posed to the public of the infrastructure, including sheds and communal tanks, dislodging during storm or extreme events.

Social

(a) Because of praedial larceny concerns, some farmers may prefer to live close to their farms. As such, some structures could be used for habitation.
(b) Exposure of workers to health and safety risks.
(c) Disruption community relations.
(d) Health issues related to contaminated water use for domestic purposes.
(e) Threat of vector borne diseases due to poor water storage.
(f) Over representation of male farmers in project training activities.
(g) Potential exclusion of persons with disabilities.

2.01 The following are the potential positive, social, economic and environmental impacts of the project.

Positive Impacts

(a) Creation of some local employment.
(b) Improved farm yields and hence income from irrigated farming.
(c) Reduced reliance on abstraction from overland rivers for irrigation thereby improving dry season flows and improving water security.
(d) Reduction in the use of diesel irrigation pumps thereby reducing use of fossil fuels and area contamination (land and air).
(e) Reduction in the impacts of droughts or water stress resulting from more extreme dry weather and or unpredictable weather patterns as projected by the CC scenarios for Saint Lucia.
(f) Lower reliance on the use of river water and a reduced tendency to occupy riparian areas to access water.

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

SOURCE	IMPACTS	MITIGATION MEASURES
Environmental Impacts		
Construction Phase Land clearing and construction. Excavation of small trenches for pipe laying to and from the communal tank. Pipe laying.	(a) Increased run-off. (b) Soil loss. (c) Potential for flooding in: Fond St. Jacques, Ravine Claire and the tourism town of Soufriere within the Soufriere Watershed; the Villages of Anse la Raye and Canaries and the Anse Galet river crossing in the Anse la Raye and Canaries Watershed. (d) Traffic disruption.	(a) Careful siting of RWHS (b) Locate RWHS within 50m from rivers. (c) Locate away from water intakes (springs). (d) Minimise land clearance to accommodate RWH Sheds. (e) Adequately consulted and information provided to community.
Construction – RWHS.	(a) Impact of construction on farms previously affected by past landslides and flooding.	(a) Careful siting of RWHS. (b) Target the area with a tree planting and rehabilitation programme. (c) Locate RWHS away from the filled pond in La Tan.
Construction – Excavation for pipe laying.	(a) Noise Nuisance.	(a) Adequate stakeholder consultation.
Construction – RWHS.	(a) Contamination of ground water at springs or water intakes (springs or overland systems) that are the abstraction points for communal potable water supply system.	(a) Careful siting of RWHS. (b) Locate RWHS within 50m from rivers. (c) Locate away from water intakes (springs). (d) Minimise land clearance to accommodate RWH Sheds.
Operations Phase Exposure to natural hazards – landslides, debris flow, flooding.	(a) Damage to structures, loss of crops.	(a) Reinforce and adequately tie stub foundations to ensure firmness and ability to withstand high category storms are not dislodged.
	(a) Improper use of structures for non-agricultural uses in landslide prone areas such as Le Tan, the Migny River slope area, Desraches and the Migny areas.	(a) Enforce use of structures solely for agriculture. (b) Develop disaster management plan for project area.
Water Storage	(a) Proliferation of vector borne diseases.	(a) Apply best management practices for water storage.

Excavation of small trenches for pipe laying to and from the communal tank.	(a) Traffic dislocation.	(a) Adequate stakeholder consultation.
Social Impacts		
Construction of Agro Park facilities, solar power plants and rainwater harvesting plants.	(a) Exposure of workers to health and safety risks. (b) Disruption of community relations.	(a) Contractor to develop health and safety plan, including provision of protective equipment. (b) Contractor to provide code of conduct for workers, including public education of communities about risks and mitigation.
Agro-Park Operation	(a) Improper use of some structures for residential purposes due to the threat of praedial larceny.	(a) Code of conduct for use of facilities. (b) Implement security plan.
RWH	(a) Health issues related to contaminated water use for domestic purposes. (b) Threat of vector borne diseases due to poor water storage.	(a) Public health training of receiving farm holders and their family members (b) Provision of adequate water storage equipment e.g. covered containers.
Training activities	(a) Over representation of male farmers in project training activities. (b) Potential exclusion of persons with disabilities.	(a) Establish quota sampling for trainee selection (minimum 30% females corresponding to demographic representation). (b) Target female farmers in outreach activity. (c) Conduct training taking into consideration, the unique needs of females e.g. Child care, time, location. (d) Include female family members in training to allow for transfer of knowledge and skills. (e) Make allowance for participation of persons with disabilities by providing support e.g. transportation and devices such as “walkers”.

3. ASSESSMENT OF LOCATIONS AND FARM CLUSTERS

3.01 The key potential negative impacts of the construction of individual RWHS on small farms in the Fond St. Jacques area in the Soufriere Watershed (Agricultural Region 6) generally are as follows:

Soil Loss in Areas of Land Clearance and Construction

3.01 Agricultural Region 6 covers close to six (6) watersheds all of which are vulnerable to flooding around main rivers and their tributaries within the lower watershed. Key areas of flooding include the settlement area of Fond St. Jacques, Ravine Claire and the tourism town of Soufriere within the Soufriere Watershed; the Villages of Anse la Raye and Canaries and the Anse Galet river crossing in the Anse la Raye and Canaries Watershed.

3.02 The region is also particularly prone to landslides given its rugged topography, volcanic agglomerate type geology and high rainfall regime. Under extreme weather conditions, significant landslides have occurred in the area. Where landsides occurred along rivers, significant debris flows have impacted rural settlements especially in Fond St. Jacques, Cresslands and Ravine Claire (Soufriere Watershed) and other urban areas.

3.03 Events affecting the area in recent years include: -

(a) Hurricane Tomas in 2010 (Category 2 Hurricane with 60 mph winds and 27 inches of rainfall recorded at Desraches in a 24-hour period) resulted in the loss of several tonnes of soil and large areas of forest. The major areas of landslides are indicated and numbered #1-#8 occurred in the Soufriere Watershed. A significant landslide also occurred in the Canaries Watershed (Colombette Slide) along the main road network as well as several other landslides either in locations along roads and rivers (upper reaches).
(b) The Christmas Eve Trough in 2013 impacted the Canaries Watershed (flooding and mudslides).
(c) Tropical Storm Debbie in 1994 (46 mph winds and heavy rainfall over a 6-hour period) affected the Anse La Raye Watershed with flooding and mudflows. Landslides were also recorded in upper reaches of the watersheds in Agricultural Region 6.

3.04 While Region 6 has regenerated naturally and the Soufriere Watershed supported by a t*ree planting programme (Australian Aid Agency),* the watershed remains naturally vulnerable especially within hillside locations that are traditionally and currently farmed. Within most areas however, adequate siting of individual RWHS can be achieved within *pockets of flat* land. Steep slopes and excavation to create flat land in steep areas should be strictly avoided.

3.05 The proposed structures are simple structures designed purely for ancillary agricultural use including storage of tools, farm inputs and produce. The proposed project will support wooden structures with stub foundations and would involve minimal soil disturbance.

3.06 Given that land parcels in the Fond St. Jacques area are typically large and under family land ownership, several family members may have farms on segments of the same parcel. High density placements should be avoided to limit soil disturbance.

Impact of Construction on Farms Previously Affected by Past Landslides

3.07 In the Soufriere Watershed Agricultural Region 6, there is a strong correlation between areas farmed and where landslides have occurred: - on the slopes surrounding the Migny River to the base of Desraches (labeled # 2and #9); Upper Migny, the Edmund Forest Complex and the Le Tan area to the north of St. Phillip (Map 1). These locations are target areas for tree planting and rehabilitation under other forestry programmes including the IWECO project which will further minimize the impacts of RWHS construction.

3.08 The location of RWHS in these areas should pay close attention to: - Slope (flat to gentle slopes); density of placement (low density), away from water intakes and 50 m away from active rivers and construction in tandem with the proposed rehabilitation and reforestation programme.

3.09 The level of vulnerability is ascribed as very high, high, moderate and low in Table 1. This is based on a subjective assessment using the following factors: -[51]

(a) Steep slopes.
(b) Areas of previous landslides on steep slopes.
(c) Areas of previous landslides on moderate slopes.
(d) Areas in proximity to water intakes (springs and rivers).
(e) Areas along rivers and other waterbodies.
(f) Riparian areas prone to floods and land base sources of pollution.

3.10 These are listed below: -

Landslide # See Map 1	**Location**	**Area Characteristics**	**Level of Vulnerability**	**Comments/ Mitigation Measures**
#1	Ravine Claire	Landslide – no farms are in the landside area.	NA	NA
#2	Ravine Claire	Landslide and Debris Flows. Farms are around this area but not within areas affected by slides. The area is however very steep and only flat locations should be considered.	Moderate	a. Careful selection of locations for the RWHS. • Limit establishment to areas of with land pockets with very gentle slopes. • Locate RWHS within 50m from rivers. • Locate away from water intakes (springs). • Minimise land clearance to accommodate RWH Sheds. • Construct simple wooden structures using stub secured foundations?
#3	Le Tan	Complex of landslides occurred during Hurricane Tomas and Tropical Storm Debbie within farm areas. A potable water supply system exists - intake (spring) which supplies a communal tank in Belvedere. The area is also a site for a large water body which		Guidance a) and b) as in #2 Target the area with a tree planting and rehabilitation programme. Locate RWHS away from the filled pond in La Tan.

[51] The entire Soufriere Watershed experiences high rainfall levels in the wet season, so rainfall was not included as a relative factor influencing vulnerability.

Landslide # See Map 1	Location	Area Characteristics	Level of Vulnerability	Comments/ Mitigation Measures
		was subsequently drained to reduce flooding. This area is intensively farmed with vegetables, root and tree crops. Pockets of flat land exist and can accommodate RWHS sheds. Locations away from rivers (50 m), on flat land, limiting clearance accommodate to stub foundations. This area was declared a disaster zone and sheds should be strictly for agricultural use.		
#4	Ti Boug	Landslides – one farm exists in the slide areas.	Moderate to High	See guidance above – a) to b) in #2. Tree planting programmes should target this area.
#5	Mocha	Landslide. One farm is ahead of the slide and the other below.		Guidance a) to b) and a?
#6	Desraches (Lower)	Large landslide ahead of Migny river. Within this area farms under intensive vegetable cultivation exist.	High	See guidance above. Tree planting programmes should target this area.
#7	Lower Migny	Slides on either side of the Migny River. Several farms exist in this area with locations where sheds are possible. Several small springs exist in the area. A major side along either side of the Migny River resulted in debris flows during Hurricane Tomas in the Fond St. Jacques/ To Bourg areas. A potable water supply system exists. The intake (spring) is adequately fenced and sited away from	High	Pockets of flat land and moderately sloping land can be identified to accommodate RWH systems. Because of the number of farms, attention should be paid to density. Tree planting programmes should target this area. General guidance as above in a) and b) should be considered.

Landslide # See Map 1	Location	Area Characteristics	Level of Vulnerability	Comments/ Mitigation Measures
		farms with a water tank and supply systems.		
#8	Upper Migny	Large slide and exposure of several springs. Target farms exist. Topography is very steep and shed construction could be very constrained.	Very High Risk	This area should very carefully assessed given its vulnerability to landslides and challenge of slope.
# 8b		This area is elevated and cultivated in pockets. A river tributary exists in this area with a river crossing along the main road. This was the source of debris for the debris flow which engulfed the rural settlement in Fond St. Jacques during Hurricane Tomas.	Medium	Pockets of flat land can be considered following standard guidance. RWHS should be kept away from the Migny Tributary.
#9	Edmund Complex	Large slides No target farms are in this area.	Medium (based on location of farms).	Standard Guidance applies and area rehabilitation in farm locations would reduce landslide threats.

Noise Pollution

3.11 Since the proposed RWHS are simple structures, it is not anticipated that noise pollution would be a significant issue. Given the importance of the Soufriere Watershed as a habitat for the Saint Lucia parrot, noise should be minimized.

Contamination of ground water at springs or water intakes (springs or overland systems) that are the abstraction points for communal potable water supply system

3.12 It is not anticipated that rivers and springs will be compromised or contaminated by the proposed RWHS designed for farm irrigation purposes. Soil disturbance would be minimal and as such sedimentation of water sources would be minimal.

Danger posed to the general public by dislodged infrastructure including storage tanks during storm events

3.13 While the RWHS construction are simple structures, the stub foundations should be reinforced and adequately tied to ensure firmness so that these temporary structures can withstand high category storms and are not dislodged.

Risk to human security and safety

3.14 The project proposes that the use of the structures will be ancillary to agriculture -related uses such as storage of inputs and crops. Many landslide prone areas are in remote areas such as Le Tan, the Migny River slope area, Desraches and the Migny areas around #8b slide. As such, structures should be used solely for agriculture and adequate evacuation plans developed for farm areas during extreme weather events.

4. ASSESSMENT OF THE IMPACT OF RWHS ON IDENTIFIED FARMS IN REGION 2 – LA BOURNE SYSTEM

4.01 A communal type RWHS is proposed for the La Bourne Community in Region 2. The project will involve the use of existing roofs for a residential farm community for the RWHS. These will be connected to a central communal tank for use by the community for farming irrigation purposes.

4.02 The system will involve the installation of pipes and the mounting of the water tank. Key potential environmental impacts include: -

(a) Engineering safety of the communal system. This should meet the engineering standards used by the Water and Sewage Company to ensure the safety of the general public

(b) The laying of the distribution lines to and from the communal tank could affect road infrastructure as lines may need to be buried and as such would require some excavation of small trenches. This could have impacts on soil loss. In some cases, the laying of pipes could cross the public road and disrupt traffic and the movement of people. Like other projects impacting infrastructure, the community should be adequately consulted and informed.

(c) Protocols need to be established for handling potential overspills in periods of high rainfall and intake.

(d) Disaster Protocols need to be established to handle possible breakage, toppling and overflow of a large quantity of stored water

(e) Stored water needs to be managed to safeguard vector borne diseases and adequate health measures established should the water be used by the community of farmers for domestic purposes, especially if potable water supply intakes are affected by storms. RWHs could be used for domestic purposes as an alternative.

(f) The La Bourne system was designed and located by a technical team from the Departments of Agriculture (Engineering Division) and Forestry along with the Water Resources Management Agency and as such was guided by sound technical assessment.

4.03 The positive impacts of Communal RWHS are similar to the positive impacts for the individual systems proposed for Region 6 in section I of this report.

5. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

5.01 Guided by the mitigation measures outlined in Table 1 and i-vi above, the location of farm RWHS structures should be assessed and approved by the Departments of Agriculture and Forestry in collaboration with the Water Resources Management Agency.

5.02 A Technical Steering Committee involving the said agencies and the IWECO project along with the locally based Disaster Committee should form part of the technical team for site identification, assessment and structured monitoring.

5.03 A reasonable time frame and frequency for monitoring should be established to track the potential effects of the projects and positive impacts, and used to improve the project as well as guide learning for duplication or full roll out of the project into other agricultural regions.

5.04 The Technical Committee should collaborate with active local Community based organizations (CBBs) like the Fond St Jacques Development Committee that are actively involved in environmental, social and economic development projects for the community.

5.05 Landslide Inventories for Hurricane Tomas and Tropical Storm Debby should be used for effective guidance in the location of RWH infrastructure.

5.06 The ESMP will be updated when the results of the gender assessment (TOR in Appendix VI (i)) are available.

6. CONCLUSION

6.01 The environmental impacts outlined above represents the *'do nothing scenario'* and natural vulnerability. With the outlined mitigation interventions and environmental management process, the said impacts can be mitigated even when the vulnerability is described as *'very high, high and moderate'*. In many locations, there may be basins of flat land even on farms where the general topography is steep.

6.02 The situation in the identified watershed represents a very typical situation for Saint Lucia generally - the level of vulnerability in upland or interior locations being high for landslides due to steep terrain and high rainfall, and flood vulnerability high in lowland areas especially around rivers.

6.03 The project will greatly improve water security for farm purposes leading to a general positive impact for the economic and social development for rural areas against a broader backdrop of declining agriculture (production, employment and farmer participation), declining agricultural exports and losses suffered due to extreme weather events.

6.04 Saint Lucia's over all Climate Change Scenarios (Climate Studies Group 2009) point to increasing drought situations. The general scenario for Saint Lucia is summarized below: -

Temperature

(a) Minimum temperatures have increased at a rate of ~0.16 ^{o}C per decade, and maximum temperatures at ~0.20 ^{o}C per decade.

(b) The warming trend is expected to continue. The country is projected to be warmer by up to 1.2 ^{o}C by the 2030s, 2.1 ^{o}C by the 2060s, and 3.6 ^{o}C by the end of the century.

(c) Sea surface temperatures in the Caribbean are projected to warm, perhaps up to 2 ^{o}C by the end of the century.

(d) The projected rate of warming is marginally more rapid for December, January, February (DJF) and September, October, November (SON).

(e) The frequency of very hot days and nights will increase, while very cool days and nights will decrease.

Rainfall

(a) There is a likelihood that the country will be drier (in the mean) by the end of the century.

(b) Global Climate Models show a median decrease of up to 22% for annual rainfall, while the Regional Climate Model suggests a decrease of up to 57%.

(c) Climate change will likely make the dry period early in the year and June-July drier.

(d) Hurricane intensity is likely to increase (as indicated by stronger peak winds and more rainfall) but not necessarily hurricane frequency.

Sea Level Rise

Caribbean Sea levels are projected to rise by up to 0.24 m by mid-century.

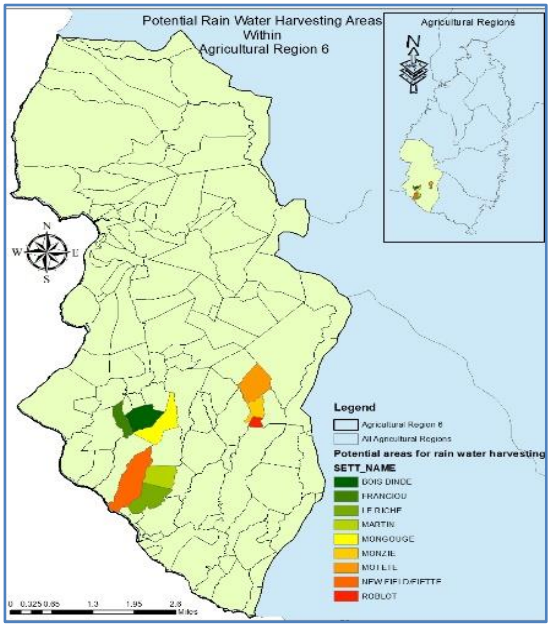
APPENDIX IV

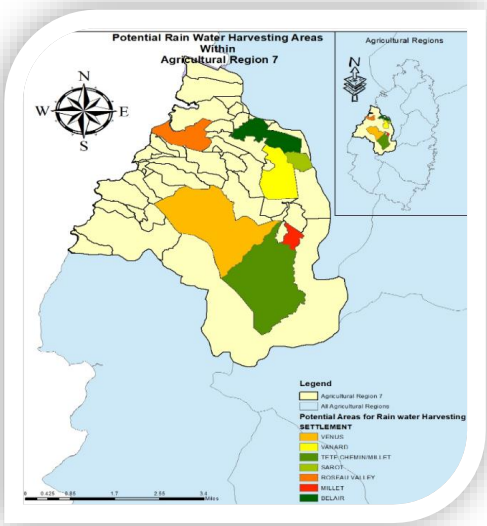
PROPOSED SITES AND CLUSTERS FOR RWH FROM BARE SLOPE AND ROOFTOP ON-FARM AND FROM PUBLIC BUILDINGS

Project Area	Community	Description
North	La Bourne/bare slope Bare Slope harvesting	Estimated 30 hectares B (ha) of mostly contiguous farms (crops and livestock) reaching 40-60 farmers. Excavations - contour drains/ mini-terraces (reverse slope)mini-dams, and ponds with silt traps. Minor Concrete works; Backfilling and supplementary works. On-farm drip irrigation for 30 ha; 90 milimetres. Pet pipes and connections; 50 storage tanks with installation; ARCGPS Software.
West and south west	Fillette and Morne Sion/Lower Mongouge	On farm rooftop rainwater harvesting with storage and drip irrigation system including on farm storage systems for 30 ha of active cluster of an estimated 100 small farmers, highly vulnerable to dry spells on hillside farms with shallow and fragile soils with young population showing tendency towards rural –urban drift.
	Mongouge 2 Morne Tet Roblot-Debreuille Maze	On-farm rooftop harvesting with storage and drip irrigation for active cluster of farmers growing sweet potato, other root crops, vegetables good markets on 50 hectares for 300 farmers.
	Barthe	DAFNC propagation station for tree crops – 2 ha of drip irrigation with timers and tension meters.
	River Doree	YAEP in River Doree: On-farm rooftop harvesting on farm for 15 youth with storage and drip irrigation for 10 ha acres of integrated farming including PAS and livestock (poultry, pigs, small ruminants) vulnerable to drought conditions Irrigation with drip, one water tank, two pumps (one to pump from the river and the other to pump on the farms and storage for 14 ha at River Doree/Black Bay Farmers' Cooperative.
	Venus and Tete chemin/ Region 6 and Region 2	Five roof top/on farm harvesting with storage and drip irrigation for 15 women from the SLNRWP growing herbs in clusters- estimated 3 hectares with drip irrigation conveyance storage and two groups in groups in clusters in Canaries, Soufriere and Region 2 (Baboneau) in cocoa bean production.
	Belair and Marc	Two groups of farmers numbering 50 who experience frequent dry spells due to rapid runoff and drainage problems.
	Morne du Don Balata	On-rooftop harvesting with storage and drip irrigation for 80 farmers on 25 hectares of crop and livestock.
	Mongouge	Standalone Rooftop RWHS from the Public school. Due to the high cost of the conveyance 8 mobile tanks will be provided for filling at the point of storage. (Storage with 2 x 30,000 gallons tank installed) at Community Centre and Public School.
	Roblot (Post Office)	Stand-alone RWHS system rooftops of the Roblot Post office by houses close to a cluster of farmers. (Storage for 2 x 30,000 gallons) (2x 4,000 US$ installed) plus on-farm irrigation infrastructure and eight mobile tanks.
	Rural Development and Livestock Project for Poverty Reduction	30 Small livestock farmers with four and under animals. Provision will be made for farmers in convenient clusters of four who will access water from rooftop storage. Farmers will be assisted to fetch water in small containers such as small mobile plastic tanks at an agreed volume. For sustainability these 30 small farmers will be encouraged to form an organization. Another 40 farmers with above 4- and under 20 small ruminants who fall directly under the Veterinary and Livestock Division will also receive water through mobile tanks.

The proposed communities and GPS coordinates of sites for RWHS in Region 6.

GPS Coordinates of some sites, Reg. 6 (Source: WRMA)		
ID **Name**	**North**	**West**
1Mongougecommunity	13.80161	-61.0447
2 Mongouge primary school	13.79813	-61.0446
3 Small farmer, downstream school.	13.79708	-61.0446
4 Laffeuillee Family	13.78122	-61.0502
5 Morne Sion, endpoint/ Fillette	13.78271	61.055
6 Upper Fillette/ low Mongouge	13.79127	-61.0522
7 Debreuille/ Roblot Post office	13.79161	61.0265
8 Roblot Govt. Comb. School	13.78637	-61.0299
9 Youth in Agriculture (YAEP)	13.76439	-61.037





APPENDIX V

NOTES ON TECHNICAL IN- KIND SUPPORT FORESEEN FROM GOSL-DAFNC AND POST-PROJECT SUSTAINABILITY

1.01 The details of the full in kind support from the Government of Saint Lucia in human resources assigned to the Project implementation is shown below. Due to the heavy support of the GOSL/DAFNC in kind contribution in human resource, the Project Manager will prepare an exit strategy for the project for sustainability of the quality of the human resource post project. The strategy will be reached in consultation with PMU staff, Project Management Committee and in consultation with the Directors of the DEAS, DOF, WRMA, AESD and the Chief Agriculture Planning Officer in Central Planning of the DAFNC. The project provides the following context for further details on the strategy that could enhance sustainability, at the time of project termination.

Expertise/Skills Provided by GOSL	**Duration of Assignment with the Project**	**Cost to OSL US$**
Community Development and gender specialist to provide skills to enhance community participation and to build organization skills in three groups (YAEP, SLNRWP, Water users' Association and the four Climate Change Groups as well as to provide skills in conflict resolution assigned through scheduled lateral transfer from the Ministry of Social Justice, Equity, Empowerment and Youth.	12 months over 36 months	11,111
Procurement Officer by lateral transfer from an appropriate Ministry in the public service for 42 months.	42 months	55,056
Executive Secretary for 48 months.		44,445
Eight technical staff comprising the two Project Team Leaders operating in two teams (water engineers, soils engineers, foresters with extension and cartography skills and senior agriculture extension officers.	48 months	359,550
Eight technical field officers to the two Project Support Team.	48 months	359,550
Support staff from Policy Unit to Component 3 (database, web-portal and CCILLC activities).	42 months	31,111
Research scientist (laboratory) from DAFNC/Research and Development.	36 months	35,000
Two Senior Extension Officers from Region 2 and Region 7 assigned to Production sites in Agro-park (40 months each).	40 months x2	80,000
TOTAL IN KIND CONTRIBUTION		**975,823**

1.02 Post-project sustainability foreseen is as follows:

Component 1

1.03 The project activities under Component 1 are expected to be achieved during project implementation. Of significance is that an important net benefit of these activities is the improved adaptive capacity within the DAFNC that will be fully integrated into the Annual Work Plan of the

DAFNC to ensure that the benefits of improved adaptive capacity in the Department are managed for the sustainable livelihood security of the farming sector in other geographic area of the country with problematic land-use threats from climate change and climate variability. The process will therefore be a reintegration of DAFNC staff into the DAFNC Work Programme and will not result in any additional cost to the DAFNC in regard to human resources. Properly organized and managed farmers will be able to benefit from the enhanced adaptive capacities for climate resilience resulting from the project activity. The two vehicles will be reserved in the DAFNC to continue to provide transportation for the field work. The management of the six soil building facilities will also be integrated into the Annual Work Plans of the DEAS as part of its capacity building in climate adaptation for longer term resilience in soils.

Components 2 and 3

1.04 The project outputs to be managed for sustainability under these Components are (**1**) the two green production sites including the production and utilization training in soil building material for climate resilience (**2**) and the two green agro-processing facilities and (**3**) the climate change database and web-portal and the CCILLC and the CCILC located in the Agro-parks. These are outputs which are central and critical to knowledge management and transfer of climate adaptation practices for sustainable climate resilience in agriculture for livelihood security and income generation in rural communities and are best managed under the Central Planning Unit of the DAFNC. The intention is to maintain the integrity of the two Agro-park sites for learning and awareness and future options for on-going built resilience with productivity and livelihood security in agriculture that impacts the small farming systems.

1.05 In line with the project document, a single Producer Cooperative will be in place and ready to take over the operations of the two green production sites and the facilities to ensure the practices for climate resilience are maintained. Provisions will be made in the by-laws governing the operations of the Cooperative for such practices. The two Senior DEAS Officers from the project will remain with the respective production sites in Region 2 and Region 7 with responsibility to provide extension advice and services to the farmers and general oversight on area to ensure its attraction for farm tours. In the case of Region 2 this officer would also assume responsibility for continuation of the organization of the farm tours. In the case of Region 7 the DEAS staff will collaborate with the CCILLC on the organization and quality of the farm tours in general. The Agro-park development Manager is tasked with facilitating a smooth process before project termination, within his/her TOR.

1.06 The agro-processing facilities will fall naturally under the Central Planning Unit as this is also where the Marketing and agro-processing Unit is placed in the organizational structure of the DAFNC. In this case, the DAFNC will meet the cost of the two mangers of the two agro-processing facilities who are especially suited for a HAACP certified facility offering training in technical standards that satisfy meet SLBS, MOH and international certification.

1.07 Relative to the management of the database for climate change adaptation and climate resilience and the web portal, these two functions would have already been integrated in the Central Planning through the portal link to the DAFNC website and also the data collection and baselines already integrated into the master database in the DAFNC, (see Component 3 in budget notes) also staffed by officers assigned to the project from the Central Planning Unit. There is therefore relative ease of continuity at no additional cost as the office space is already fully equipped. This option at no additional cost to the DAFNC would also apply to the research scientist in the CCILLC who is also from the DAFNC and who would have been working directly with the knowledge management and transfer team under the DAFNC.

1.08 Based on the above except for the two agro-processing managers and the tour guides there should be no new cost to the DAFNC for the human resource required for sustainability and impact of the project activities and convenient ease of integration into the organizational structure of the DAFNC. In addition, there is potential for revenues to the GOSL from farm tour visits, promotion of the CCILLC at national and regional level for Conferences and learning and interpretation and reflection on climate change adaptation and climate resilience in agriculture. Training and scheduled production times in the

agro-processing facilities could also include consideration for revenue earning based on ability to pay as could be the sale of soil building material to large and medium scale farms and on amounts exceeding prescribed volumes.

APPENDIX VI (i)

GENDER SPECIALIST
DRAFT TERMS OF REFERENCE

1. OBJECTIVES

1.01 Provide gender sensitisation and awareness, building consultancy services in project communities and enhance the integration of gender considerations in overall project activities.

2. DURATION OF ASSIGNMENT

2.01 The duration of the assignment is 55 days over the first year.

3. SCOPE OF SERVICES

3.01 Under the operational and technical supervision of the Project Manager of the Project "Building Resilience for Adaptation to Climate Change and Climate Resilience in Agriculture in Saint Lucia", the Consultant will carry out the following tasks:

(a) Develop a work programme geared towards capacity development in mainstreaming gender considerations in the work of the Project Management Team, Project Steering Committee and with other institutions participating in the Project. It should include:

(i) Gender sensitisation training (men and women): raising awareness about gender concepts, its social construction, its influence on resources, opportunities and power, gender analysis and mainstreaming concepts. Emphasis should be placed on gender equality as a concept to create equal responsibilities, rights and opportunities for women and men.

(ii) Develop and conduct training sessions on how to integrate gender into the agricultural sector, giving practical guidance to participating institutions.

(iii) Provide technical support and guidance on the design, measures and indicators for reporting on gender equality and how these can be integrated in the project management monitoring and reporting system.

(b) Collaborate with participating institutions responsible for Monitoring and Evaluation of the Project to design the Monitoring and Evaluation Framework to enhance the measurement of sex-disaggregated data and gender results, and the development of reporting mechanisms to ensure reporting on gender is fully captured.

(c) Work collaboratively with the Consultant responsible for designing and conducting the baseline Knowledge Attitude Practice and Gender assessment study to ensure that all elements related to gender are fully captured.

(d) Work collaboratively with the Community Development Officer to ensure that there is gender-responsive community engagement.

(e) Provide related assistance such as support for visibility and advocacy actions including; project newsletters and web page information as required at agreed intervals to the Project Management Team on project activities over the period of the Consultancy.

4. QUALIFICATIONS AND EXPERIENCE

4.01 The qualifications and experience required to fulfil the draft TOR are as follows:

(a) A post-graduate degree in Gender studies, Sociology or related subject.

(b) A minimum of ten years' experience working in the area of gender analysis and a minimum of five years' experience working on inter-linkages between gender and agricultural sector development in developing countries. Work on these issues in the Caribbean context would be an asset.

(c) Excellent command of English with good writing and communication skills.

(d) Ability to communicate in patois would be an asset.

AGRO-PARK DEVELOPMENT MANAGER
TERMS OF REFERENCE

1. DURATION

1.01 The duration of the assignment is 45 person months.

2. SCOPE OF SERVICES

2.01 Under the technical and operational supervision of the Project Manager of the Project "Building Resilience for Adaptation to Climate Change and Climate Resilience in Agriculture in Saint Lucia", the individual will carry out the following tasks

(a) Familiarise himself/herself with the Project Document, particularly Component 2 as well as the sites selected for the establishment of the two green agro-parks.

(b) Review the Work Plan and adjust as necessary to complete the rehabilitation of the building at Roseau by the end of the first quarter of Year 2 and the second building in Region 2 by the end of year 2.

Roseau – Region 7

(c) Prepare a detailed site plan of the total production areas for crops, livestock and the aquaculture ponds, taking into consideration space for parking, internal access, and the building and outdoor facilities for production and utilisation of soil organic material on the site at Roseau. This plan must also take into consideration the installation of six aquaponics with cooling fans, three Rainwater Harvesting System (RWHS) from rooftop runoff for the covered areas and five RWHS and drip irrigation in open field production as described in the projects document.

(d) Coordinate with the Ministry of Infrastructure and agree on a timetable and the arrangements for the rehabilitation of the WINBAN Building at Roseau, as well as the building at the site of the second Agro-park in Region 2, using the final building plans prepared by the Ministry.

(e) Coordinate with the Project Management Team and the Ministry of Infrastructure on land drainage to be undertaken at Roseau as described in the project document.

(f) In collaboration with Project Manager/Coordinator and the Head in Agriculture Region 7, agree on the selection of an Extension officer from the Department of Extension and Advisory Services (DEAS) to be assigned to the production area activities including land drainage and land preparation for farming at Roseau.

(d) With the support of the Extension Officer assigned, conduct an inventory of farmers already on the site and select additional beneficiaries for the production area, keeping in mind the provisions for the youth of the YAEP (aquaculture and crops), and the focus on leafy vegetables, sweet potatoes and vine fruit for the crop subsector in open field and in aquaponics systems, and on goats for livestock for improved productivity from land-use and livelihood security of the beneficiaries.

(e) Arrange through the Project Management Unit (PMU) the procurement of the RWHS storage tanks and drip irrigation infrastructure, the solarized aquaponics systems and the lining for aquaculture ponds for Youth Agriculture Entrepreneurship Project in a timely manner, also

taking into consideration other support equipment such as timers, tension meters, filters and solar pumps as described in the project document.

(f) Participate in the selection of the Manager of the green agro-processing facility and review list for local procurement of solar energy equipment for the facility.

(g) Provide oversight on the activities of the agro-processing facility and receive the monthly reports on the training and production activities of the facility, and of the beneficiaries of the facility according to the Terms of Reference of the Manager.

Region 2

(a) In collaboration with the Project Manager and the Head in Agriculture Region 2 agree on the selection of a Senior Extension officer from the DEAS to be assigned to the production area activities at the Agro-park in Region 2.

(b) Prepare a detailed site plan for the Agro-park including the building, areas for outdoor facilities for compost production and other soil building material as for the first agro-park and as detailed in the Project Document. The site plan must include internal access roads and interpretation stop points to accommodate farm tours and stop points for interpretation.

(c) Provide oversight on the conduct of an inventory and needs assessments of adaptive capacity building for farmers already on the site, and guide selection of additional beneficiaries focusing on women, youth and vulnerable, and marginalised farmers in the area for improved productivity on land-use and improved livelihood security of the beneficiaries.

(d) Prepare an attractive and efficient layout for the production area to accommodate ten aquaponics systems with cooling fans and rooftop RWHS, and ten hectares of open field production focusing on climate adaptation practices in leafy vegetables, tomatoes, sweet potatoes, and vine fruits, tree crops and an area for livestock (goats) and beekeeping.

(e) Arrange through the PMU for the timely delivery of ten aquaponics systems, four RWHS systems with five RWHS systems drip irrigation equipment over an estimated ten hectares of open field production and additional RWHS for livestock. Note other support equipment such as timers, tension meters, filters and solar pumps as described in the project document.

(f) Review the entire work plan for the management of both of the production sites and adjust as necessary, including production planning for coordinated marketing to the major local buyers.

(g) Assist the beneficiaries to establish marketing contracts in the domestic markets through invitations to the sites to observe the operations and to promote the importance of climate resilience in agriculture

2.02 In addition, the individual will:

(a) Work closely with the Department of Agriculture Fisheries Natural Resources and Cooperatives on the regularisation of Crown land leases to the beneficiaries on the respective farm lots that are on Crown lands.

(b) Serve on the Project Management Committee and as a member of the Project Management Team, attend all monthly meetings and be prepared to report on the progress and challenges

of establishing the production areas and the collaboration with the Knowledge Management Component, particularly for production data collection.

(c) Prepare quarterly and six monthly reports for the Project Manager on capacity building and on practical demonstrations undertaken on the production areas.

(d) Receive monthly reports prepared by the two Extension Officers including Reports of monthly meetings with beneficiaries.

(e) Prepare a final Report on lessons learnt to enhance the capacity building programme of the Knowledge Management and the CCILLC in building resilience in agriculture in Saint Lucia.

(f) Prepare an exit strategy for the continuity of the two production areas of the Agro-park to be managed under a single producer cooperative post project.

3. QUALIFICATIONS AND EXPERIENCE

3.01 The Agro-park Development Manager should have at a minimum a first degree in the Agricultural Sciences, preferably crops, with a background in agri-business. Extensive work experience in greenhouse technology, a knowledge of aquaponics, and the ability to apply traditional knowledge in farming systems and work with small or resource poor farmers are required. Knowledge and experience in extension and communication is essential. Good writing and communication skills, in the English language are also required. Patios spoken in Saint Lucia would be an asset. The individual should be available for at least 40 months, should have his/her own transportation and will be reimbursed for travel at the GOSL travel rates paid to the DAFNC staff.

AGRO-PROCESSING MANAGER
TERMS OF REFERENCE

1. DURATION

1.01 The duration of the assignment is 36 person months.

2. SCOPE OF SERVICES

2.01 Under the operational and technical supervision of the Project Manager of the Project "Building Resilience for Adaptation to Climate Change and Climate Resilience in Agriculture in Saint Lucia", the individual will carry out the following tasks:

(a) Familiarise himself/herself with the Project Document, particularly Component 2, and the operations of the agro-processing facilities at the two agro-park sites.

(b) Undertake the responsibility of satisfying and securing the technical standards and other requirements for HACCP Certification for both facilities.

(c) Liaise with the Saint Lucia Bureau of Standards (SLBS) and the Ministry of Health to determine types of and levels of technical standards and certification that the facility could use to train beneficiaries in order to improve incomes and employment generation from agro-processing.

(d) Review the work plan and adjust as necessary to undertake capacity building and production of small –scale processing in the facilities, suited to small-scale processers. Note the products identified in the project formulation by small-scale processors as of interest and the special request for processing and upgrade of packaging of cocoa beans by the Saint Lucia Network of Rural Woman Producers.

(e) Prepare and deliver the programme for training and capacity building in agro-processing from post-harvest handling in fresh produce quality control to secondary processing.

(f) Prepare a production schedule to meet demand for use of the facility, contribute to the reduction of gluts and avoid down time or conflicts in the use of the facility.

(g) Design a method to follow the market performance, of the products processed, competitiveness in prices, packaging and taste in order to enhance incomes and employment generation among beneficiaries.

(h) Design a method to identify and test the differences, if any between fresh produce grown in organic soils and produce grown utilising conventional practices (parameters may include taste, nutrient content, shelf life and special requirements in processing) with implications for health and cost-effectiveness.

(i) Prepare and be personally responsible for a production schedule for selected green product(s) or a brand to create an income generating stream, using fresh produce from the green production area that will make the agro-processing facility self-sufficient in its operational costs, post project.

(j) Provide training and information to allow women and other small or microprocessors to operate from home while satisfying the requirements and standards of the SLBS.

(k) Provide oversight on all production processes undertaken in the facility, ensuring that particularly quality control and labelling, and health and safety guides are followed.

(l) Prepare cost effective estimates of the production processes for different products to assist beneficiaries in decision-making on best incomes and employment generation chains.

(m) Manage a programme for maintenance of equipment and/or update of equipment.

(n) Prepare material (leaflets) to assist the Knowledge Management Component to promote renewable energy integration in small scale processing for cost efficiency, resilience and for contribution to a reduction in the carbon footprints in Saint Lucia.

(o) In collaboration with the CCILLC and Component 3, calculate carbon emissions reductions through the use of solar energy in the facility.

(p) Prepare monthly reports on training delivered, and production, disaggregated by gender, youth, and institutions (schools, caterers); and lessons learnt and new training needs required.

(q) Participate in monthly meetings of the PMU and be prepared to give performance assessments in the facility.

(r) Prepare six monthly reports for the PMU input to the Project Steering Committee.

3. QUALIFICATIONS AND EXPERIENCE

3.01 At least a first degree in the Food and Nutrition or Agro-industry and at least six years of experience working in an agro-processing facility. Experience in small-scale agro business or SMEs would be an asset. Knowledge of the domestic market and the regional market for the products, and of the farm processes relative to seasons of harvests are essential. Good communication skills are also essential. Good writing skills and knowledge of patios spoken in Saint Lucia would be an asset. The individual should be available for at least 36 months, should have his/her own transportation and will be reimbursed for travel at the Government of St. Lucia travel rates paid to the Department of Agriculture Fisheries Natural Resources and Cooperatives staff.

APPENDIX VI (iv)

KNOWLEDGE MANAGEMENT SPECIALIST
TERMS OF REFERENCE

1. DURATION

1.01 The duration of the assignment is 40 person months.

2. SCOPE OF SERVICES

2.01 Under the Operational and Technical supervision of the Project Manager the Knowledge Management Specialist will:

(a) Familiarise himself/herself with the Project Document, particularly Component 3 and the CCILLC in Component 2. Component 3 is cross cutting and attention needs to be given to the capacity building activities in Components 1 and 2.

(b) Provide oversight on the inventory and needs assessment to set baselines in adaptive capacities in climate change adaptation and to build climate resilience in the agriculture sector. This will require working with the Project Team Leaders to agree on the best methodology to capture the information, taking into consideration the ease of electronic storage of the data.

(c) Provide reminders to Project Team Leaders on six monthly and annual updates of the inventory.

(d) Have responsibility for preparing a contractual arrangement to establish a database for climate change and climate resilience in agriculture, which provides data on climate change and climate variability, built adaptive capacities in the natural resources in the farming systems and improved livelihood security, (production, incomes, and employment generation) resulting from project activities.

(e) Be contractually obligated to design and establish a farmer friendly climate change and climate variability and climate adaptation web portal for agriculture in the Department of Agriculture Fisheries Natural Resources and Cooperatives (DAFNC) focused on building resilience in farming systems.

(f) Provide oversight on the efficient management of the website with the support of the Information Technology Manager in the DAFNC.

(g) Manage the database and the web portal to provide data and information on lessons learnt as a result of the project activities and changes in farm production and in incomes of the beneficiaries.

(h) Prepare the schedule of training and capacity building activities under the three Components and facilitate the smooth implementation of these training activities at different levels in the project through reminders to the respective Component Team Leaders, and receive copies of quarterly reports with lessons learnt.

(i) Have personal responsibility for arrangements for the capacity building in Department of Extension and Advisory Services (DEAS) and for the policy officers in the Central Planning Unit.

(j) Collaborate and make arrangements through the Ministry of Social Justice, Empowerment, Equity and Youth to provide support in the formation of organisations as proposed Component 3 including providing training in conflict resolution.

Climate Change Interpretation and Learning Laboratory Centre

(a) Manage conferences and cultural events on climate change adaptation and resilience of the farming systems as directed by the Project Manager.

(b) Design a Conference Room to provide a graphic story of climate change and climate variability, climate adaptation and lessons learnt in building resilience in agriculture in Saint Lucia.

(c) With the support of the Agriculture Research and Development Plant Scientist assigned from the Department of Research and Development, establish two climate control grow rooms for following different climate variables on selected food crop varieties. This will include the design of the two rooms, maintenance of the rooms, selection of irrigation and growing systems and the selection of the crop varieties to be tested for drought or temperature resistance.

(d) In collaboration with the Project Manager follow up on preliminary inquiry to engage the interest of the UWI –Mona Climate Studies Group, including two one-month visits to the Climate Change Interpretation and Learning Laboratory Centre (CCILLC), to ensure best decision-making on the design and selection of climate control equipment, and to provide guidance on data collection, interpretation and statistical significance to climate variations in open field conditions.

(e) Collaborate with the Media Unit in the DAFNC on the hosting of the biennial Annual Competitions on climate change and climate variability to build resilience in agriculture. Collaborate with the Media Unit in the DAFNC for their support on preparation of leaflets, videos and other training and communication material for promotion and awareness building on climate change and climate resilience in agriculture in the CCILLC.

Operational

2.02 The individual will be responsible for:

(a) Timely submissions of monthly training or capacity building schedules that will require arrangements for coffee breaks/lunches by the Administrative Unit.

(b) Preparing six monthly summary reports for submission to the Project Manager.

(c) Participate in field visits of the Project Management Unit and the Project Steering Committee.

(d) Participate in the monthly meetings of the Project Management Committee.

3. QUALIFICATIONS AND EXPERIENCE:

3.01 A minimum first degree in Communications or Knowledge Management with at least five years working experience in agriculture/climate change or sustainable development. Alternatively, the individual should have as a minimum a first degree in agriculture science/climate change sustainable development in agriculture, with at least five years working experience in knowledge management transfer and data base management at a senior level.

3.02 Excellent report writing skills including the use of graphics and good presentation skills are requirements.

DESIGN AND MANAGEMENT TECHNICAL ASSISTANT – CLIMATE CONTROL GROW ROOMS TERMS OF REFERENCE

1. DURATION

1.01 The duration of the assignment is 20 days in two visits.

2. SCOPE OF SERVICES

2.01 The individual will carry out the following tasks:

(a) Review the project document, carefully noting the evidence of climate change and climate variability in agriculture and the projections for a worsening situation in water shortages for the farm from direct rainfall, and the likelihood of adverse impacts of small but longer term variations on food and feed crop varieties.

(b) Review the design for the climate control grow rooms and the selection of equipment for climate control.

(c) Review the irrigation control systems, and special requirements in the production of growing media (compost, fertilizer teas and vermicomposting and possible side effects on the environment of the room).

(d) Confirm agreement on data collection, in particular the type of plant data collected, and interpretation of this data relative to performance, flowering, seed yield and harvest.

(e) Make recommendations for best methods for testing the system for usefulness in climate adaptation in the farming systems and the changes that could enhance its usefulness.

3. QUALIFICATIONS AND EXPERIENCE

3.01 Experience as a plant scientist/plant physiologist at the level of at least a post graduate degree for at least five years, and with good experience working in climatology and with the management of climate control grow rooms or in-situ tracking of impact on agriculture biodiversity as well as in the practical application/interpretation of findings to guide climate adaptation for sustainable production through drought resistant varieties in open field or greenhouse conditions is required.

APPENDIX VI (vi)

DISASTER REDUCTION RISK MANAGEMENT SPECIALIST (FARM LEVEL) TERMS OF REFERENCE

1. DURATION

1.01 The duration of the assignment is 300 days over 36 months with 200 days in the first 12 months.

2. SCOPE OF SERVICES

2.01 This individual will:

(a) Review the Project document and oversee implementation of the work plan

(b) Review and assess the available landslip maps and data and evaluate their usefulness to support the work in collaboration with the Project Team Leaders focusing on Region 6.

(c) Provide leadership to the Project Team Leaders for the field work to update the landslip map(s) conduct inventory of farms in the areas and prepare overlay maps, rank slips and identify farms to benefit from the project activity.

(d) Prepare the work plan for the first 18 months of the project activities and subsequently prepare six monthly progress reports.

(e) Work closely with the Project Team Leaders, and using a participatory approach, take the lead to use the most suited climate change adaptation practices for hillsides and for the areas, to conduct the disaster risk reduction management activities in the areas identified to reduce the vulnerability to landslips over the first 12 months of the activity(ies).

(f) Prepare a report of work undertaken, achievements and lessons learnt for the Project Management Unit.

(g) Prepare recommendations for the Project Team Leaders to continue the work over the next 12 months, with monthly one-week visits to the sites to observe the progress in built resilience on the hillside farms, and in the Department of Agriculture Fisheries Natural Resources and Cooperatives staff and the farmers.

(h) Provide oversight for the preparation of a final report by the Project Team Leaders including maps and the concrete outputs and outcomes of the project activities.

(i) Prepare a Final Report with recommendations for further work to reduce landslips in the area.

3. QUALIFICATIONS AND EXPERIENCE

3.01 The individual must possess a post graduate degree in GAPS (land-use, land management for hazard risks from landslips/agroforestry land-use planning) or another relevant subject. A minimum of ten years' experience working in the area of landslips and land management for farming on hillsides is required. Excellent command of English, including good writing skills and verbal communication skills are required. Ability to communicate in patois spoken in Saint Lucia would be an asset.

ECONOMIST - CLIMATE CHANGE ADAPTATION IN AGRICULTURE
TERMS OF REFERENCE

1. DURATION

1.01 The duration of the assignment is 20 days in 2 visits of 10 days.

2. SCOPE OF SERVICES

2.01 Working under the direct supervision of the Project Manager and in close collaboration with the local Adaptation Fund Focal point, the individual will prepare a programme of work to undertake the following:

(a) Conduct two five-day workshops on economic analyses of selected climate change adaptation strategies in agriculture in Saint Lucia.

(b) Prepare a programme of work for 12 consecutive months to collect data from project outputs as appropriate, and any other necessary data to determine the most effective and efficient climate change strategy of the project.

(c) Prepare a breakdown of the first mission/visit of five days and the second and final mission/visit after 12 months to conduct another workshop using the data collected to determine the most effective climate adaptation strategy for building resilience in the environment and for improving the income generation and livelihood security of the selected population and geographic areas of the project area.

(d) Make a presentation on findings on the final day of the mission and an assessment of adaptive capacities in Department of Agriculture Fisheries Natural Resources and Cooperatives to continue this work integration in climate resilience programming in agriculture.

(e) Prepare a Final Report with findings and recommendations within a month of completion of the assignment.

APPENDIX VI (viii)

BASELINE AND KNOWLEDGE, ATTITUDE AND PRACTICE STUDIES AND ACCOMPANYING GENDER ANALYSIS IN BUILDING RESILIENCE FOR ADAPTATION TO CLIAMTE CHAGNE AND CLIAMTE VARIABILIT IN AGRICULTURE IN SAINT LUCIA

DRAFT TERMS OF REFERENCE

1. BACKGROUND

1.01 A baseline study, a Knowledge, Attitude and Practice (KAP) study on climate variability (CV) and climate change (CC) in relation to agriculture as well as a gender assessment are to be conducted for the "Building Resilience for Adaptation to Climate Change and Climate Variability in Agriculture in Saint Lucia". The Ministry of Agriculture, Fisheries, Physical Planning, Natural Resources and Cooperatives now seeks to engage the services of an eligible consulting firm (the Consultant) for the provision of the consultancy services to undertake separate Baseline and KAP studies and a gender assessment for the Project covering each project community.

2. OBJECTIVES

2.01 The overall objectives of each consultancy are to determine benchmarks for the Project's Results Framework performance indicators (baseline study), as well as to establish what is known, believed and done in relation to CV and CC in agriculture in the beneficiary communities of the project (KAP study). The baseline and KAP studies will be complemented by a gender analysis of the beneficiary communities to inform project design and to assist in measuring gender results. The objective of the gender analysis is to assess the differential needs, priorities, roles and responsibilities, access to resources, and opportunities of women, men, youth and vulnerable groups in the beneficiary communities and how these differences impact on CV and CC adaptation initiatives in agriculture.

2.02 The specific objectives of each component of the study are summarised below:

(a) **Baseline and Update Studies:** the studies will be used to provide baseline values for project indicators at the outcome level and output levels for the Projects' (Monitoring and Evaluation) activities. More specifically to establish a basis from which future performance measurements can be calculated and provide critical reference points for assessing changes and impact resulting from the Project, to include the following:

(i) Determine baseline conditions disaggregated by criteria such as sex, age, disability status, etc. for the project's Monitoring and Evaluation Framework indicators and the Adaptation Fund (AF) Results Framework.

(ii) Assess the conditions against the baseline established in the baseline dis-aggregated by criteria such as sex, age, disability status, etc. for the project's Monitoring and Evaluation Framework and AF Results Framework indicators.

(iii) Provide a reference point for routine monitoring to determine progress and make adjustments to best serve intended project beneficiaries.

(iv) Provide an update based on the point of reference established in the baseline study on how effective the project was in serving the intended beneficiaries.

(v) Evaluate baseline information obtained in year one of the project against the status at project completion. This information will also be used for evaluation purposes at the end of the evaluation period.

(vi) Assess the measurability of the project outcome indicators and targets and make recommendations on refining and/or adding same.

(vii) Establish, from a social and gender lens, key socio-economic and environmental indicators and baselines as they relate to climate variability and CCA in agriculture in the beneficiary communities.

(viii) Provide a profile of the partner agencies to include their capacities, roles and the level of support offered within the project beneficiary communities.

(ix) Provide a profile of the changes in the partner agencies capacity, role and level of support offered by the relevant agencies within the project beneficiary communities at project completion.

(x) Promote stakeholder participation, and provide a catalyst for discussion and motivation among community members and project partners on the most appropriate means of action.

(b) **CV/CC KAP Assessment Baseline:** this will provide a mechanism for collecting baseline information on what is known, believed and done in relation to CV and CCA across the project communities. This information will also be used to inform the Project's M&E and Knowledge Management and Public Education and Awareness activities. More specifically, the KAP will seek to do the following:

(i) Provide information that can be used for the design of specific messages and targeted behavior change interventions within the specified communities.

(ii) Increase the availability of information on the communities' current awareness of, experiences of, and responses to natural disasters and climate change.

(iii) Establish benchmarks, disaggregated by criteria such as sex, age, disability status, etc. for the targeted beneficiary communities with respect to their CV and CC knowledge, attitudes and practices.

(iv) Identify key gaps in the communities' and/or different community groupings' capacity to understand, mitigate and adapt to natural hazards and CV and CC impacts, including gaps in their linkages to external support systems.

(v) Provide recommendations on the most appropriate strategies for the implementation of CV and CC knowledge management and public education components of the project based on the findings of the KAP study.

(vi) Shape knowledge management and communication strategies by focusing communication objectives and content of media materials based on the communication preferences of different social groupings.

(vii) Assist with the identification of priority areas for action with respect to CV and CC awareness within the specified communities.

(c) **CV/CC KAP Assessment 2023:** this will provide a mechanism for collecting updated information on what is known, believed and done in relation to CV and CCA across the project communities. This information will also be used to inform future project activities in the beneficiary communities and may have applicability at the national level. More specifically, the KAP will seek to do the following:

(i) Provide information that can be used for the design of specific messages and for further targetting behavior change interventions within the specified communities post project.

(ii) Increase the availability of information on the communities' current awareness of, experiences of, and responses to disasters and climate change and identify whether there are differences based on sex, age, disability status.

(iii) Identify key gaps in the communities' and/or different community groupings' capacity to understand, mitigate and adapt to natural hazard CV and CC impacts, including gaps in their linkages to external support systems.

(v) Review progress with the implementation of recommendations on the most appropriate strategies for the implementation of CV and CC knowledge management and public education components of the project based on the findings of the baseline KAP study.

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(v) Assist with the identification of priority areas for action with respect to CV and CC awareness within the specified communities.

(d) **Gender Assessment Baseline:** Using differential participatory and consultative methodologies as well as quantitative methods, a comprehensive gender analysis of the Project communities/beneficiaries should also be undertaken to complement the baseline and KAP studies. It will be considered to consult male and female beneficiaries separately to allow a voice for both, also time and location of meetings will consider constraints faced by females and males. The National Gender Bureau will be included in the consultation efforts. Outputs of the gender assessment will be:

(i) Concrete gender goals and a further integration of gender into planned activities
(ii) A gender Action Plan outlining gender-related output and outcome indicators, activities, timeframes and responsibilities and data sources
(iii) A risk analysis outlining risks and mitigation strategies to allow for equal access to project activities and to mitigate against any harm from the Project, e.g. where improvement of women's situation could lead to men feeling excluded.
(iv) An alignment with the Environmental and Social Management Plan

The gender analysis is expected to do the following:

(i) With a focus on ensuring that the project design and results framework are sufficiently gender-responsive, assess in the Project communities:

(aa) Gender roles and responsibilities, priorities and risks which might be different for males and females, with a particular focus on the agricultural sector and its relation to climate change and requirements for adaptation.
(bb) Gender division of labour.
(cc) Gender-related differences in education.
(dd) Gender differentials in access to or control over resources (material (e.g. finance) and immaterial (e.g. time, information, networks) and assets, activity (paid, unpaid work, sector) and income profile and the underlying factors such as gender norms.
(ee) Gender-related differences in power and decision making.
(ff) Differential needs regarding CV and CC, including knowledge, attitudes and practices of females and males with regards to climate change variability and adaptation.
(gg) The inclusion of an intersectionality perspective which will allow the analysis of intersecting variables such as age

(ii) Provide baseline data on the Saint Lucia Network of Rural Women Producers regarding their alignment with the Projects activities.

(iii) Provide recommendations on how to not perpetuate existing gender inequality within the Project and to enhance gender equality through the Project in terms of, for example, access to Project benefits and design of training activities.

(iv) Provide baseline data to enhance the Results Framework of the Project.

(e) **Gender Analysis Post Project:** Using differential participatory and consultative methodologies as well as quantitative methods, and based on the baseline project gender analysis, a beneficiary assessment of the Project should be undertaken with a particular focus on youth and gender-related impacts. Using the Projects Results Framework and Gender Analysis Results Baseline, the analysis is expected to assess access to project benefits and outcomes as well as the projects contribution to gender equality.

3. SCOPE OF SERVICES AND METHODOLOGY

3.01 The Consultancy Team's scope of work in relation to the assignment, includes but is not limited to, the following activities:

(a) Comprehensive desk review of existing reports, studies/papers, newspaper reports as well as other documents from the government on national policies and strategies on agriculture and Climate Change in Saint Lucia. This includes the community CV and CC reports and KAPs and/or studies at the level of the agricultural regions.

(b) Update content analysis review of national, regional and international agencies with existing and past projects having an agriculture and Climate Change focus in Saint Lucia, based on the baseline study.

(c) Conduct community sensitisation sessions, in collaboration with the Project Management Unit (PMU), Community Development Officer, Agriculture Extension Officers and the Gender Specialist, to ensure that the communities are kept fully abreast of this activity.

(d) Conduct interviews and focus group discussions with beneficiary communities leaders and project partners, including selected Ministries, Departments and Agencies; civil society organisations; private sector and international development partner representatives; within the project areas in Saint Lucia.

(e) Document critical changes in the local culture within the context of the project and with particular reference to CV and CC coupled with their norms, habits, roles, and responsibilities from a gender perspective.

(f) Carry out field visits to all project sites in beneficiary communities and facilitate participative consultations (including separate focus group discussions for women and men, boys and girls, senior persons and special needs persons).

(g) Utilise qualitative research methods to facilitate "Recall" of baseline conditions with key informants as required. The findings should be triangulated with other data sources to enhance validity.

(h) Design and implement representative population household surveys to measure any changes in risk factors, (including barriers to community capacity strengthening and natural hazard reduction), to capture the prevalence of various risks.

(i) Identify any changes in knowledge gaps, attitudes and practices towards natural hazards, climate change, and their impacts, and explore the gender nuances where these areas are concerned.

(j) Organise validation sessions in the sub-project communities and present the findings on the updated baseline and KAP studies to the Project communities for their input and validation. The information should be segregated based on the communities in which the activities are

conducted in order to ensure that the information shared in the session is relevant to each community.

3.02 In carrying out this assignment, the Consultant will utilise a combination of quantitative and qualitative participatory approaches. The Baseline Studies will be conducted in the project communities. Based on the implementation progress of the projects, the Consultant may be required to reconstruct the baseline conditions using secondary data, administrative records and/or recall interviews with key informants. Further, since a number of similar studies and research activities may have been undertaken in the project communities over the past decade, the Consultant should draw upon existing research and data where possible, before repeating similar questions that have been asked already in the target communities.

3.03 Appropriate representation that includes the private sector, public sector, civil society, including relevant media houses at the local and national levels, international organisations and the residents in the project area, including men and women, boys and girls, senior residents and special needs residents; and other vulnerable groups, should be consulted. The Consultant are expected to carry out this assignment in accordance with international best practice for conducting Baseline studies that include KAP and Gender Analysis.

4. PLACE OF WORK AND IMPLEMENTATION ARRANGEMENTS

4.01 The Project Manager (PM) will have overall responsibility for coordinating the administrative and logistic arrangements for the consultancy and will facilitate the work of the Consultancy Team. This will include, making introductions to project stakeholders, making arrangements with the PMU in Saint Lucia, to provide logistical support for the conduct of the site visits, arranging meetings with the sub-project beneficiaries, representatives from the public, private sector and community based organisations, and key stakeholders identified by the Consultant who are sources of information required to complete the activities outlined in this Terms of Reference (TOR), assisting with any operational issue(s) which may arise; and providing background information, data and documents on the project relevant to the completion of the assignment, in electronic format.

4.02 The Consultants will be required to carry out the duties listed in the scope of work of this TOR. In relation to computing hardware and related equipment, software and supplies required for the implementation of the assignment, the Consultant will be responsible for providing and/or cover the cost of these items. The Consultant will also be required to make all the necessary transportation arrangements during the conduct of the assignment. The Consultant is required to work collaboratively with the staff of the PMU and the project stakeholders. Organisation and delivery of the stakeholder sharing sessions are to be done in collaboration with the PM. The Consultant will be required to work in the beneficiary communities, to meet with stakeholders, collect baseline data and conduct focus group meetings. This will require that the Consultant be based, for administrative purposes especially during the data collection phase of the assignment, at the PMU offices.

5. QUALIFICATIONS, SPECIALISED KNOWLEDGE AND EXPERIENCE

5.01 The Consulting Team will comprise experts with practical experience in organising and conducting internationally accepted good practice, Baseline and KAP studies and gender analysis.

(a) Qualifications – the team should comprise experts with graduate degrees and post graduate qualifications in Social Sciences, and Applied Research or Development Studies or Gender or Environmental Studies and Evaluation or Project Management. Full Curriculum Vitae for key personnel should be provided.

(b) Experience - at least seven years proven experience in carrying out gender sensitive Baseline and DRM/CCA KAP studies for DRR and CC projects or Community Based projects.

Practical experience in the use of participatory rural appraisal tools for data collection and in conducting Baseline and KAP Studies is required. Local and regional experience on similar assignments, familiarity with community-driven projects and an understanding of the Saint Lucian cultural context will be considered assets.

(c) Language - Excellent spoken and written English. Fluency in Saint Lucian creole would be an asset.

(d) Other Skills - Excellence in computer and analytical skills, and communication, including the ability to relate well to persons at the technical and non-technical levels.

6. DELIVERABLES AND REPORTING REQUIREMENTS

6.01 The Consultant will be required to provide the following:

(a) **Inception Report**: This should include a Baseline Plan with an outline of the approach or methodology and execution timetable for the Baseline and KAP Study with Comprehensive Gender Analysis. The Reports shall be submitted for review to the PMU. One copy in electronic format, should be submitted to the PMU at (PMU e-mail address to be specified) for review and comment by relevant stakeholders seven days after commencement of the assignment.

(b) **Data Collection Tools**: the tools to be used during the survey are to be submitted for review and approval within five days after acceptance of the Inception Report.

(c) **Draft Baseline and Knowledge, Attitude and Practice Study with Accompanying Gender Analysis Report:** both documents (the draft study and draft report) will respond to Section 3.01 of the TOR. One copy of each document, should be submitted in electronic format to PMU for review and comments by relevant stakeholders six weeks after the approval of the data collection tools.

(d) **Validation Workshops**: This includes organisation and delivery of a dissemination and validation workshop for the participating communities and key stakeholders. This workshop should provide a forum for stakeholders to validate the findings from the Baseline and KAP study as well as the Gender Analysis. One copy of the report on the workshops held for each sub-project should be submitted, in electronic format, to PMU for review and comments by relevant stakeholders seven days after the workshop.

(e) **Draft Final Baseline and Knowledge, Attitude and Practice Study with Accompanying Gender Analysis Report:** both documents (the draft final study and draft final report) should incorporate the comments from the validation workshop and this should be submitted electronically to the PMU for comments by all stakeholders seven days after the stakeholder meetings.

(f) **Draft Summary Baseline and Knowledge, Attitude and Practice Study with Accompanying Gender Analysis Report**: the draft summary report should include the major findings of the Baseline and KAP study and the Gender Analysis, challenges, and recommendations. One copy in electronic format should be submitted to PMU for review and comments by all stakeholders seven days after the receipt of comments on the draft final report and study at item (e) above.

(g) **Final Baseline and Knowledge, Attitude and Practice Study with Accompanying Gender Analysis Report**: both final documents (study and report) should take into account the comments from key stakeholders coordinated by the PMU on the Draft Final Study and

Report. They should be submitted within two weeks of receiving comments coordinated by the PMU, one hard copy of each document and one copy in electronic format.

(h) **Final Summary Baseline and Knowledge, Attitude and Practice Study with Accompanying Gender Analysis Report**: the final report should take into account the comments on the Draft Summary Report at item (f) above. It should be submitted seven days of receiving comments coordinated by the PMU, one hard copy of each document and one copy in electronic format.

6.02 The electronic copies of the reports listed at (a), (c) and (h) above should be submitted in Microsoft Word to e-mail address at [PMU e-mail address to be specified] while the tools listed at 6.01(b) should be submitted in either Microsoft Word or Excel format. Copies of presentations made at the Validation workshops should be submitted in PowerPoint format.

7. DURATION

7.01 The consultancy services are to be completed over a period of three months.

DRAFT TERMS OF REFERENCE SERVICES TO BE PROVIDED BY THE CONSTRUCTION ENGINEERING SUPERVISION CONSULTANTS

1. OBJECTIVE

1.01 The objective of this consultancy is to assist the Project Management Unit in the tendering process necessary for the procurement of a contractor, rehabilitation and construction of buildings, inclusive of contractor supervision and contract administration throughout the project implementation process.

2. SCOPE OF SERVICES

2.01 The consultant(s) shall be solely responsible for the timely completion of supervision reports, and the effectiveness of contractor supervision. The tasks will include, but not be limited to:

(a) Assisting PMU during the Tender Period. This includes conducting a site visit with tenderers, responding to queries raised by tenderers during the Bid Period, evaluating tender submissions and presenting a comprehensive Tender Evaluation Report with recommendations to the PMU who will lead the negotiation process with the first-ranked contractor and providing assistance with establishing a contract with the contractor.

(b) Carrying out the supervision services related to the construction of infrastructure and associated works.

(c) Representing the interests of Government of Saint Lucia (GOSL) *vis-à-vis* the Contractor in any matter related to the construction contract and the proper execution thereof.

(d) Furnishing for the use of the Contractors, all necessary ground and topographic controls for work area limits.

(e) Reviewing and recommending for approval, the Contractor's work schedule or revisions thereto including a critical path diagram for the construction of the Project and any such plans or programmes that the Contractors is obliged to furnish for the Engineer's approval. The consultant(s) shall also prepare an initial disbursement schedule based on the approved work schedule.

(f) Assessing the adequacy of all inputs such as materials and labour provided by the Contractor and his methods of work in relation to the required rate of progress and, when required, take appropriate action in order to expedite progress.

(g) Examining and making recommendations on all claims from the Contractor for time extension, extra compensations, work or expenses, or other similar matters.

(h) Negotiating new rates with Contractors for additional work and making requisite recommendations for approval, should the rates set out in the contract not be applicable.

(i) Certifying work done for payment and determining the amount to be added to, or deducted from, payments to the Contractor for any additional work or work omitted.

(j) Computing quantities of approved and accepted work and materials, and checking and certifying the Contractor's payment certificates. The consultant(s) shall also maintain up-to-date records of remaining quantities to be incorporated in the work, and the cost estimates.

(k) Arranging the execution of works related to the provisional sums in the construction contract and determining the value of such works within the scope of the said contract.

(l) Reporting periodically on the progress of works, the Contractor's performance, and quality of works.

(m) Proposing and presenting for approval any changes in the plans deemed necessary for the completion of works including information or any effect the changes may have on the contract amount and the time of completion of the Project, and prepare all necessary. Variation Orders including altering plans and specifications and other details. Inform the employer of problems or potential problems which might arise in connection with any construction contract and make recommendations for possible solutions;

(n) Maintaining an approved representative responsible for the site during all times the Contractor is working, to supervise the work and to issue instructions, as required.

(o) Furnishing timely assistance and direction to contractors in all matters related to interpretation of the contract documents.

(p) Preparing and maintaining inspection and engineering reports and records to adequately document the progress and performance of the infrastructure works.

(q) Reviewing all Contractor's working drawings, shop drawings, erection drawings, and drawings for temporary works, and act as appropriate thereon.

(r) Ensuring the receipt of, and maintaining as permanent records, all warranties required under terms of the contract documents for materials and equipment accepted and incorporated in the Project. Ensure that as-built drawings shall be prepared for all works as the work progresses; the consultant(s) shall be responsible and shall notify the contractor(s) defects in his work and stop operations connected with the defective works until the defects are rectified.

(s) Inspecting the safety and environmental protection aspects of construction works and methods to ensure that every reasonable measure has been taken to protect life, environment and property.

(t) Participating in an inspection of the works, made jointly by representatives of GOSL and the Contractor, upon 97% completion of the works and following a written request of the Contractor. Should the works not be acceptable, the Contractor shall be informed in writing of the items that need to be rectified.

(u) Performing any and all other items of works not specifically mentioned above, but which are necessary and essential to successfully supervise and control the construction activities in accordance with the plans, specifications and terms of contract. The consultant's responsibility for the site supervision of the works shall continue until the Contractor has completed all outstanding works to the satisfaction of GOSL; and

(v) Carrying out the necessary inspection, specifying and supervising any remedial works to be carried out as well as participating in the final inspection and preparing the Recommendation of Final Acceptance with its effective date, to be signed by the Project Coordinator.

3. REPORTING REQUIREMENTS AND DELIVERABLES

(a) Provide **As-Built Drawings and Site Documents**: Within one month of the issue of the certificate of practical completion provide GOSL with one full size set of 'as-built' reproducible plans on showing final details of the works as completed, together with all data, records, and catalogued.

APPENDIX VI (x)

DRAFT TERMS OF REFERMCE - PROJECT MANAGER

1.01 The Project Manager (PM) will be responsible for ccoordinating and monitoring all aspects of the implementation of the Project. The PM will be an *ex-officio* member of PSC. The PM duties will include, but will not be limited to:

(a) Preparation and submission to the Permanent Secretary, DAFNC, Project Steering Committee, the DNA and CDB the annual work plans for the Project.

(b) Coordinate and manage the Project team and project activities to ensure the deliverables of the Project in accordance with the project document.

(c) Direct and supervise the day-to-day operations of the Project, guided by the project documents and the annual work plans.

(d) Monitoring and evaluation of the Project, in a manner consistent with the Project's M&E Framework.

(e) Manage the consultants to be recruited, and short-term experts and technical assistants under the project in a timely manner and with clear Terms of Reference and deliverables and the ssubmission to DAFNC- and CDB of all Consultant's Reports.

(f) Prepare periodic project activity and plans and technical reports for the necessary reporting of the Project.

(g) Provide oversight of the Budget and technical control of the results produced by consultants and short term experts.

(h) Make provision for the periodic monitoring and evaluation at Project staff level in participatory processes at the local level.

(i) Ensure that activities and procurement schedules are carefully planned and executed and that there is adherence to CDB's procurement procedures.

(j) Maintain a consultative relationship with the Permanent Secretary in the Departments of Agriculture and the Department of Sustainable Development and the AF Focal Point.

(k) Develop close working relationships with all project participants and stakeholders including NGOs, government departments, private sector, and Local Government officials) to achieve a shared vision of the Project and its objectives; Representation of GOSL in all its dealings with all consultants, suppliers and contractors.

(l) Participation and reporting on formal community participation including discussions at public meetings arranged as part of the requirements of the consultancies.

(m) Incorporation of gender aspects of the project at strategic points during project implementation.

(n) Establish and update on a monthly basis, a project implementation schedule (Gantt chart) showing project progress against the baseline.

(o) Convening, at least monthly, meetings with the contractor(s) and engineering consultants, for the purpose of coordinating activities.

(p) Submit to CDB, quarterly reports on the investment cost of the Project in the format shown in such form or forms as may be specified by CDB within four weeks after the end of each quarter, commencing with the quarter following PM's assignment.

(q) Expedition of the submission to CDB of claims for disbursement/reimbursement with regard to all components financed from the Loan.

(r) Control the budget and introduce safeguards acceptable to CDB to prevent funds and assets misuse.

(s) Keep accounts on project-related expenditure and disbursement activities; this should include the quarterly submission of the projected quarterly expenditure of the project to the end of construction.

(t) Advertise for, and assist, in the selection and engagement of the short-term consultants listed below.

(u) Ensure that all contractual obligation are adhered to and make all necessary arrangements to ensure implementation meets projected targets.

(v) Liaise with CDB on all relevant technical, financial and administrative aspects of the Project.

(w) Submit to CDB (within three (3) weeks after the end of each month), the monthly reports prepared by the engineering consultants on the progress of the works.

(x) Submission to CDB of the Civil Works Implementation Completion Report and as-built drawings referred to in the Reporting Requirements contained in CDB's Appraisal Report, within two (2) months after the date of issue by the engineering consultants of a certificate of practical completion of the last Civil Works contract; and

(y) Preparation and submission to CDB of a Project Completion Report by the deadline specified in the Reporting.

APPENDIX VI (xi)

SHORT TERM CONSULTANTS
TERMS OR REFERENCE

(a) Expert in water and irrigation engineer who will work closely with Water Resources Management Agency and Agriculture Engineering Soils Department (AESD) in the activities to be undertaken in Component 2.

(b) Agronomist and post -harvest handling specialist who will work closely with the Division of Extension Services, AESD, and in collaboration with Caribbean Agriculture Research and Development Institute, Sir Arthur Lewis Community College-Farm School and Research and Development on Component 1. This specialist will be sub contracted for at least 30 months to ensure that the activities Component 1 are well established and all necessary processes for documentation and mapping in line with the project document have been integrated in the programme of the Department of Agriculture Fisheries Natural Resources and Cooperatives.

(c) Organisation and Community Development Specialist to enhance community participation and to build skills in small project preparation, conflict resolution.

(d) Knowledge Management Specialist with expertise in website design and database management.

(e) Green Agro-park Development Manager with technical background in agriculture and a field of engineering.

(f) Technical Assistants –to support supervision of physical work related project activities and the tight schedule for the installation of the RWHS and irrigation with drip as well as the activities in Component 1, the execution Costs make provision of a total of 130 person months for young technical assists to temporarily increase capacity of the services of the Division of Agriculture and Advisory to implement the field activities. The Project will use young graduates from the School of Agriculture with the necessary skills who will benefit from this experience.

NATIONAL PROJECT STEERING COMMITTEE
DRAFT TERMS OF REFERENCE

1. BACKGROUND

1.01 The implementation of this Project will influence, and be influenced by, the activities of various stakeholders including government departments and agencies, Non-Governmental Organisations and development partners. The Project Steering Committee (PSC) will be the main decision-making body for the Project and provide managerial oversight, advice, guidance and direction on project implementation. It will be responsible for facilitating the seamless implementation of the Project by promoting information-sharing and inter-agency cooperation among government departments and agencies, development partners and other stakeholders, reviewing project status and progress, and addressing issues that may arise. PSC will comprise:

2. SCOPE OF SERVICES

2.01 The Project Steering Committee (PSC) will be responsible for:

(a) Providing strategic direction acting as the key body in the Project governance structure and ensuring that project deliverables are time bound, satisfy outputs and achieve the outcomes and that funds are efficiently utilised (See project implementation arrangements above).

(b) Providing advice on policy taking into account issues, which might arise during project implementation.

(c) Reviewing and adopting the Annual Work plans and budgets prepared by the Project Manager/Coordinator in conformity with the project objectives and subject to the rules of the Adaptation Fund.

(d) Reviewing the six-monthly performance reports from the Project Manager, prepared in a manner that facilitates monitoring and assessments of outputs and outcomes, justification of expenditures, approval of budgets and Work plans or amendments and any other higher level decisions that might change project direction or funding arrangements and budget.

(e) The Project Steering Committee (PSC), when necessary is expected to call Extra-Ordinary Meetings.

3. COMPOSITION OF THE PROJECT STEERING COMMITTEE

3.01 The composition of the membership of the PSC will permit coordination and enhance synergies between the project and other climate adaptation projects in the country particularly those in agriculture including fisheries, biodiversity, water and renewable energy. The PSC will be chaired by the Permanent Secretary of the Department of Agriculture Fisheries Natural Resources and Cooperatives and the Project Manager will serve as Secretary/Rapporteur. Membership will include the Adaptation Fund Focal point in Saint Lucia, representatives from the following Ministries of Government (Ministry of Ports Infrastructure and Energy; Ministry of Social Justice, Empowerment, Equity and Youth; Ministry of Education, Innovation, Gender Relations and Sustainable Development; Saint Lucia Bureau of Standards), Gender Relations Division, United Nations Development Programme-Small Grants Programme-GEF-Saint Lucia Country Coordinator; representatives of - Farmer organisations, the Saint Lucia Network of Rural Women Producers, Saint Lucia Agriculture Forum for Youth. This list is not exhaustive and will be reviewed and expanded to include other key stakeholders during the Project Inception Workshop. The PSC will provide Advisory support to the Project Manager and Team, in addition to the regularly scheduled six monthly meetings. The members of PSC shall be persons whose qualifications and experience are acceptable to the Caribbean Development Bank.

APPENDIX VII

LIST OF PARTICIPANTS AT NATIONAL CONSULTATION

Name	Organisation	Contact
Aaron Donovan	Region 7	2846344
Ambrose Laurent	Farmer /Region 8	
Terrence Gilliard	NURC	7252253
Adlin Eudovic	Ministry of Agriculture	4885222
Alicia George	Ministry of Agriculture	4597188
Andrew Brown	Farmer/Region 7	7273898
Anthony Herman	BFC	
Antonia Jagroop	Ministry of Agriculture	7255875
Albertha Hippolyte	Farmer/Region7	4524900
Anela Jean-Marc	GEFSGPUNDP	
April Deterville	Corporate Planning Unit	4686156
April Deterville	Corporate Planning Unit	4686154
Auria King-Cenac	Veterinary Livestock SD	7253281
Barry Innocent	Ministry of Agriculture	7252445
Brent Theophile	IICA	4516760
Bron La Feuille	Extension Office	7170447
Bynta Ernest	Technical Assistant	7217203
Beverley Charlemagne	Farmer	Farmer
Charlin Louisy	Ministry of Agriculture	4684101
Charmaine Augustine	Farmer/ Region 7	
Cecilia Joseph	Farmer	5190787
Charis Auguste	Veterinary	7253685
Christine Gaston	Farmer	
Cletus Alexander	Ministry of Agriculture	7254515
Craig Charles	Black Bay Farmers Coop	4880122
Cyra St Croix	Farmer/Region 7	5187281
Diana Augustine	Farmer/ Region 7	
Diana Charles	Region 7	
Cyra St Croix	Farmer/Region 7	5187281
Diana Augustine	Farmer/ Region 7	
Diana Charles	Region 7	
Cornelius Williams	Ministry of Agriculture	7204885
Donalyn Vitae	SLHTA	
Mr. Donnelley	Department of Forestry	
Donnette Charley	Ministry of Agriculture	4684101
Dorothy AnSon	Farmer	4684101
Decosta Pierre	Renwick and Co. Ltd	5180146
Dale Bernard	Ministry of Agriculture	5192415
Dunstan Demille	Massy Stores	2852403
Edwin Henry	/Region 8	
Elgitha Ferdinand	Statistician	452 2337
Elmina Toussaint	Farmer/Region 8	7254109
Elizabeth Glasgow		
Eloy Alexis	Ministry Region	
Elvis Herelle	SALCC Farm &Farmer	7180648
Evans Johnny	Farmer/Region 8	

Francis Blanchard	Farmer	7303086
Francis Khodra	Ministry of Agriculture	4846557
Francis Toussaint	Farmer Region 7	7216956
Franklyn Fergus	Farmer	7252981
George Alcee	OECS	
George Charles	Farmer	7146192
Gregory Dickson	Farmer	4848574
Giles Romulus	GEF SGP UNDP	
Hazel Moque	Farmer	
Humber Albert	Farmer/Region 7	
Hyacinth Forde	Ministry of Agriculture	7255228
Ines Celestin	Farmer	
Isiah Charles	Farmer	
Joan Norville	OECS	
Junior Mathurin	WRMA	
Kaymar Prophet	Ministry of Agriculture	4522526
Kevin Mondesir	Ministry of Agriculture	7254171
Kisha Jacobs	Region 8	468410
Jeremiah Edmund	Ministry of Agriculture	4684104
Jeshurun Andrew	Division of Forestry	7301299
Kemuel Jn Baptiste	DAFNC	
Joel Ramine	WRMA	4522526
John Calixte	Department of Agriculture	7148573
Jonathan Carasim	AESD	
Julian Brice	Farmer	7150076
Julius Thomas	Farmer/Region 7	5786138
Lazarus Constantine	Farmer/Region 3	
Lincoln Prospere	Region 6	7146192
Lorna St Anje	Monchy	5197690
Luther Tyson	WRMA	
Margaret Antoine	Farmer/ Region 7	4866974
Margritha Moise	Farmer/ Region 8	
Martin Satney	Technical Assistant	285-2059
Mervin Engeliste	WRMA	7249781
Merldan James	Farmer	7179648
McGovern Felix	Farmer	7303086
Morales Clifford	Farmer	4614531
Maureen Moise	Farmer	
Natasha Edgar		4681561
Natasha Joseph	Region 8	
Natasha Joseph	Central Statistics Office	
Neranda George-Maurice	SDES/AF Coordinator	
Nereus Mitchel	Farmer	
Nesta Moise	Farmer/Region 8	
Nicholas Jacob	FVM	
Nola Phillip	Farmer	
Merldon James	Farmer	

Michael Nole	Farmer	
Miguel Montoute	WRMA	
Peter Norville	WASCO	4573907
Phils Louis	Ministry of Agriculture	7255367
P. Anthia Joshua	Ministry of Agriculture	7251171
Retina Isembert	Farmer/region 7	7186074
Rafael Felix	Farmer	7162985
Rebecca Rock	Forestry	7305336
Ronald Pilgrim	Subcontractor	
Sarita Peter	Department of Fisheries	4684183
Shanna Emmanuel	Department of Fisheries	4684140
Shermaine Clauzel	CARPHA	452255
Shervon DeLeon	Scientific Coordinator/CARPHA	4522501
Teckla Gordon	Farmer	7146305
St George James	SALCC Farm& Farmer	2854943
Stephen Douglas	Farmer /Region 8	
Terrence Gilliard	NURC	7209180
Therosa Desir	Saint Lucia Marketing Board	4523214
Shem Willie	of Meteorological Services	7292490
Urania Joseph	Ministry of Equity	7160008
Yvonne Francis	Region 8	
Warren George	Farmer	
Yana Osman	Farmer	7129775
Zimoln Prospere	Extension Officer	

APPENDIX VIII

PROJECT RESULTS FRAMEWORK: BUILDING RESILIENCE FOR ADPATATION TO CLIMATE CHANGE AND CLIMATE VARIABILITY IN AGRICULTURE IN SIANT LUCIA							
	Narrative Summary	**Indicators**	**Baseline**	**Target 2020**	**Target 2023**	**Means of Verification**	**Assumptions (external Factors or Risks)**
Goal	To increase the resilience of rural farm communities in Regions 2 and 7, increasing farm productivity, water and livelihood security and reducing vulnerability to natural hazards, climate variability and change.	Number and types of public and community institutions with the capacity to plan and adapt to risk of climate vulnerability and change. Number of farm families with reduced risk from extreme climate events.	Vulnerable farm communities with low adaptive capacities and poor life chance potential.		2400 farms and 7200 farm families directly benefiting from the project. 2400 farms indirectly benefitting from the project.	direct interviews; project reports	GOSL maintains commitment to project objectives
Impact	To contribute to enhanced national capacity to plan and implement climate resilient and adaptive actions in the agricultural sector, to transform the lives of the rural population.	Comprehensive national land use plans for land capability of the agricultural sector. Agricultural sector data management system and information portal.	Poor land use planning and management; Absence of comprehensive agricultural data management and information system; Inappropriate farm management practices for climate variability and change; Declining agricultural productivity and livelihood security.		Increased public awareness of climate impacts on the agricultural sector; Increased productivity from regions 2 and 7; Increased adoption of practice (agricultural farm techniques, water technology, cropping systems) across the rural farming sector.	Economic and social reports; Sector bulletins published by the Ministry; Poverty assessments; survey of living conditions.	GOSL maintains commitment to project objectives
Outcome 1	Increased farm productivity with improved livelihood security and incomes and new farm areas brought under production in the project areas.	Percentage change in total number of targeted farms recording improved levels of production including from new areas brought under production.	Low adaptive capacities for building resilience in farming systems to adapt to the vulnerabilities to droughts and intense rainfall on slopes and susceptibility to land slips, debris flow and soil erosion.	Revised baseline for adaptive capacities available from inventory and needs assessments of targeted farmer households and DAFNC.	100 % of targeted farmlands with DRRM treatment to reduce vulnerability to risk from landslips and water shortages guided by EIA and EMP.	Reports from regular field assessments(of land slips and soil erosion after intense rainfall event,. reduction in losses on the farms)	No major natural disaster.
			To be determined by KAP-G Study.	Overlay maps of farms and landslips for agreed sites for RWHS and landslips treatment available and	100% of targeted area for new lands brought under production	Reports from regular field assessment (to include numbers of targeted farmers recording change in size of plots of the individual farms and production data)	new production areas are productive
				30 % of targeted farms, with improved adaptive capacities evidenced by treated sites.	.5.2 Six monthly farm records showing improved farm income	Reports of sessions and participation by gender and youth	Farmers willingness to provide production and income data

				50 % percent of targeted DAFNC staff with improved adaptive capacities actively involved in CCA using FFS	100 % percent of targeted DAFNC staff with improved adaptive capacities actively involved in CCA using FFS	Report to the PSC by the PMU (verbally or through discussions)	DAFNC staff are actively using FFS.
Outputs	Reduced landslips, and soil erosion on farms through creation of updated maps, vulnerability analysis, and field practices for DRR/DRM and FFS	Overlay Maps of farming areas and landslips in the targeted area and codes for treatment produced and being used.	Less than 1 percent of farmers in project area planting on contours with cross drains only visible treatment	Updated landslip maps and farm overlay maps created, DRRM codes from vulnerability analysis in participatory approach, 100 CDRM field days / workshops in six built training and demonstration facilities	DRRM measures completed across 1000 hectares in 600 CDRM field days and workshops and 1000 technical leaflets disseminated in the project area	Overlay Maps	Active farmer participatory approaches utilized No major natural disasters effective farmer participatory approaches
	Access to on-farm water from RWHS and bare slope catchment with drip irrigation integrate with built soil resilience using compost and other organic material	90-100 on-farm RWHS, Five (5) RWHS for cocoa production and two (2) community drip irrigation established and the number of capacity building workshops and field days for water management for water use efficiency	Estimated 70 percent entirely rain fed and mostly on hillside, another estimated 20 percent rain fed and supplemented with water pumped or carried from the river	conducted (disaggregated by sex, youth, subsector), maps, and water security for 20-60 farmers on 30 hectares from slope catchment and rain with drip irrigation and 30 farmers from rooftop also with drip	40-60 fully functional slope catchment farmers and 90-100 on-farm rooftop RWHS with drip irrigation, over 200 hectares, water for the two main seedling nurseries and standalone community systems for small livestock	Project reports	National Water Users' Group established and active Farmers are available for training sessions Farmers willing to provide supplementary labor at established labor rates
	Farmers and DAFNC staff trained in improved land management for climate resilience	500 farmers and extension officers trained for production and utilization of CCA practices	To be determined by KAP-G Study.	75 participatory workshops for extension officers and farmers	105 participatory field days and workshops for 1500 farmers conducted by agriculture extension officers on water security	Project reports	No major natural disasters
ACTIVITIES							
COMPONENT 1 ACTIVITIES FOR	1.1 Conduct vulnerability analysis, update landslide maps, conduct inventory of farms and prepare overlay farm map, establish codes for DRRM treatment and FSS to build climate resilience in farming systems, update maps.						
	1.2 Establishment of 90-100 on-farm RWHS, estimated 200 hectares. with drip irrigation for an estimated 800 crop farmers and an estimated 150 livestock farmers						
	1.3 Design and construction of infrastructure for slope harvesting in La Bourne Region 1 & 2 and drip irrigation for 30 hectares. 40-60 farmers will benefit.						
	1.4 Construction of six outdoor facilities for production and practical demonstration of soil building material over an estimated 200 hectares of farm land						

	1.5 Capacity building and training						
	1.6 Tillers and other small farm equipment for hillside farmers						
	1.7 Two Vehicles to transport the two teams						
	1.8 Contract labor for landslide rehabilitation activities at $37 per day; incentives for farmers estimated 500 farmers @ $37 per day						
	1.9 Restoration of grassland for use in DRRM for landslips on hillsides and for activities of the SLNRWP						
	1.10 Five (5) RWHS for cocoa production areas for SLNRWP and soil building support						
	1.11 Engineering supervisory services						
Outcome 2:	Increased productivity and competitiveness in resilient small farming systems with improved livelihood security increased income, employment generation and household food security	Percentage change in farm productivity, number and type of diversified value chains by sex and age, percentage change in participation in domestic supply value chains	To be determined by KAP-G Study.	30 % of targeted farmers on 12 hectares of intensive production sites with built resilience to CC integrated with solar power for enhanced production practices.	100 % percent of targeted farmers on 30 hectares of intensive production with built resilience to CC and CV integrated with solar power for enhanced production practices in crops , livestock and aquaculture	Six monthly reports (including surveys of selected households)	Markets are sustained and importers maintain an interest in larger purchases from local production.
		Number of persons and percentage change in incomes disaggregated by gender and youth participating in diversified agro-processing value chains powered by solar energy.	To be determined by KAP-G Study.	Enhanced efficiency in secondary production value chains in HACCP certified agro-processing facility powered by solar with access by small-scale processers including those among the most vulnerable and marginalized households in the country.	Enhanced efficiency in secondary production value chains in HACCP certified agro-processing facilities powered by solar with access by small-scale processers, including those among the most vulnerable and marginalized households. Ease of access to 70-100 small farmers in intensive production systems	six monthly and annual reports	No issues with installation, maintenance or natural hazards impacting the solar systems

Outputs:	One (1) green agro-parks established in region 7 in the west of the project area and one (1) in region 2 in the north east on a total of 34.4 hectares.	Two green agro-parks established comprising 16 collapsible greenhouses installed; 5 RWHS; and 4 outdoor facilities in place.	Less than 1 percent of small farmers using climate smart and intensive practices in greenhouses and less so in open field	Land management improved through land drainage and aquaculture ponds in disuse desilted, lined and fully functional with diversified value chains	Farmers including youth in aquaculture actively involved in improved production and diversified value chains	Project reports; field visits and facilities inventory	No major natural disaster
				Estimated 12 hectares established and estimated crop 20-30 farmers in full production supported by 4 outdoor built CCA training facilities and 3 greenhouses	Estimated 30 hectares established and an estimated 70-100 farmers covering all three subsectors in production supported by 8 built outdoor training facilities, 16 green houses with aquaponics and five restored aquaculture ponds	Project reports; field visits and facilities inventory	No major natural disaster
				1 green agro-park fully operational showing records of tours	2 agro-parks fully operational and showing records of tours	Project reports; field visits and facilities inventory	No major natural disaster
				Two kiosks completed for gastronomy input to the farm tours product linked to the aquaculture ponds	Four kiosks completed and YAEP youth trained in and agri-business in fish marketing and gastronomy	Project reports; field visits and facilities inventory	Tourism sector continues to grow and farm tours remain vibrant
	Two HAACP certified agro processing production, training and certification facilities using renewable energy established on two sites for post-harvest handling of fresh and processed foods	Two green HACCP certified agro-processing facility; numbers of persons disaggregated by sex and age benefitting from the agro-processing facilities; Special equipment for SLNRWP Women Cocoa producers procured.	None using renewable energy or specifically benefitting small farmers and vulnerable and marginalized persons dependent of selling small fresh or initially processed packages for livelihood	Inventory of small scale agro processors completed, and implementation work plan confirmed 1 solarized agro-processing facility in production and capacity building	2 solarized agro-processing facility in production and capacity building for different value chains and using HACCP practices	Inception and six monthly reports; Record of meetings; field visits	Agro-processors willing to participate Agro-processers will show interest in certification for greater benefits from labelling marketability of the products

			To be determined by KAP-G Study.	At least 40 small-scale agro-processers trained in facility	300 small-scale agro-processers using fresh produce space regularly and 100 percent of the Saint Lucia Network of Rural Women using the services	Report of six monthly and annual household surveys (questionnaires) on income and employment generated specific to farm households	Market for small sized packages of fresh and initially processed farm products for livelihood of women and rural youth remain vibrant.
				Household survey of beneficiaries with positive change in incomes and employment generation and improved security of livelihood, inclusive of 70 targeted SLNRWP women	Household survey of beneficiaries with positive change in livelihood security, incomes, and employment generation inclusive of all 70 targeted SLNRWP women	Survey results	All SLNRWP members will make the time to benefit from the training and will organize to make full use of the

	ACTIVITIES
ACTIVITIES FOR COMPONENT 2	2.1 Internal access roads, parking, signage, drainage and fencing the area of 14 hectares
	2.2. Install 6 collapsible greenhouses with (aquaponics) systems and RWHS and drip irrigation Solarisation (25 kWp Solar PV Systems and one 5 kW inverter with battery back-up for each)
	2.3 Land preparation
	2.4 Five (5) RWHS and drip irrigation an estimated 5 hectares of open field
	2.5 Build four (4)outdoor facilities for soil building production and utilization demonstration
	2.6 Establishing systems in livestock (goats) with protein banks and in-house feeding and watering
	2.7 Upgrade of five (5) aquaculture ponds
	2.8 Prepare site map and site for the establishment of production areas, building for agro-processing facility, offices and climate change interpretation and learning center and kiosks for to accommodate farm tours
	2.9 Fencing and internal roads and external works
	2.10 Ten collapsible greenhouses with 10 aquaponics system, 5 RWHS, irrigation with drip and solar pump, tension meters, timers and pumps growing leafy vegetables (with solar for cooling for 4 at a cost of US$ 49,000 each)
	2.11 Twelve hectares of intensive open field production of estimated 30- 35 small farmers established in crops and livestock and support with small machinery

	2.12 Six (6) RWHS with pumps for open field in open field and with drip irrigation for the crops						
	2.13 Trough provision for water for livestock from 2 RWHS.						
	2.14 Land preparation						
	2.15 Construction of four (4) outdoor facilities with space for on farm and community-based production and practical demonstrations in soil building for resilience with climate change and climate variability						
	2.16 Operations (maintenance of grounds, parking areas, internal roads, kiosks)						
	2.17 Construct one green HACCP certified agro-processing facility to accommodate 15 persons for training and for small scale production at Region 2						
	2.18 Agro-processing activities equipment- Region 2						
	2.19 SLNRWP Women cocoa producers and processing at Region 2						
	2.20 Operations related to the agro-processing facility at Region 2						
	2.21 Operations of office and learning center and other services –Region 2						
	2.22 Agro-processing Region 7						
	2.23 Agro-processing for SLNRWP in cocoa production and processing Region 7						
	2.24 Operations related to the agro-processing facility at Region 7						
	2.25 Engineering supervisory services						
Outcome 3:	Established information and communication systems to support adaptive capacities for resilience of small farming systems, improved livelihood security, income generation and climate change/DRR awareness	Number of persons disaggregated by sex and age actively displaying improved adaptive capacities at the institutional and local levels.	To be determined by KAP-G Study.	Number and type of capacity building sessions undertaken with DAFNC staff and in farming systems to be detailed in work plan.	Number and type of capacity building sessions undertaken with DAFNC staff and in farming	Six monthly and annual reports; Baseline and Final KAP-G	Good weather conditions
				Functional gender responsive monitoring and reporting data systems in place, for capture and analysis of built resilient and lessons leant.	Adequate information is disseminated to prepare strategic policies and action plans to improve decision making.	Six monthly and annual reports; Baseline and Final KAP-G	Staff and farmers continue to be available

Outputs:	Baselines and capacity building for adaptation and resilience	Functional web portal established linked to DAFNC website; 40 field day of climate adaptation monitoring-farmer field school; 28 training sessions on technical guidelines for agro- processing; 705 field days /including workshops on water and soil building practices; Robust master database which captures climate resilient information established and accessible; 2 training workshops on economic analysis and climate change on agricultural crops conducted	Downscaled data and analysis weak or unavailable in the agriculture sector and specifically for farming systems	Baselines of need assessment for building adaptive capacities for CC and CV undertaken in collaboration with Department of Statistics	At least five six monthly updates through focus groups and rapid appraisal on adaptive capacities, livelihood security, incomes, employment in beneficiaries undertaken and entered in database	Project reports, Ministry of Agriculture reports; project newsletters and web-portal information; training records; direct interviews project training records	Good weather conditions; targeted individuals will be responsive to training and capacity building efforts; government or institutions do not assign sufficient priority to project; beneficiaries are resistant to changes in practices
				Data Management and information system in DAFNC redesigned for input of CC, CV and CCA data and a web portal for greater awareness	Data management system for climate change adaptation to build climate resilience in agriculture fully functional including online services		DAFNC IT staff available for oversight and the Central Planning Unit is fully involved in the process towards assimilation of data into Central Planning data.
				Six technical workshops and field days for DEAS staff to build adaptive capacities for knowledge transfer and one five day policy workshop for DAFNC staff to conduct economic analyses of impacts of the CCA of the project	Ten technical workshops and field days for all extension staff in awareness and to build adaptive capacities for knowledge transfer and two five day works to assess adaptive capacities in economic analyses of climate adaptation completed		DAFNC and DEAS staff available
		Detailed Gender Assessment completed	To be determined by Gender Assessment	Assessment completed and data gathered to further inform the project	Lessons learnt and documented from KAP-G baseline and end of project Studies.	Project final report, annual reports; household survey, direct interviews	Responsiveness to surveys
		Consultancy to Conduct Baseline, KAP-G Studies for the sector	To be determined by KAP-G Study.	Baselines assessment carried out to strengthen sector data	Lessons learnt and documented from KAP-G baseline and end of project Studies.	Project final report, annual reports; household survey, direct interviews	Responsiveness to surveys

	Rehabilitated infrastructure to facilitate activities for greater awareness on climate change and climate resilience in farming systems	Rehabilitated building in Region 7 (west south west) and at the agro-park site in the north completed fitted with solar energy and space for learning centers	No other such facility in the country	Designs available in 6 months after project inception and building completed by end of year 1	Building fully operational and accessible to beneficiaries, wider national population and agro-tourism sector	Site visit; project reports	delays in construction
	Two Climate Change Interpretation and Learning Centers	Reports of inauguration of the Centers and quarterly activities in the CCILLC Percentage of users regarded as climate change literate	No other such facility exists in country	CCILLC of floor space to accommodate (i)two 10x10 climate control grow rooms (ii)Conference area - 50 persons (iii) walls that will support graphics, photographs and other exhibits of built adaptive capacities and social and environmental resilience at different levels in the project area	CCILC established in facility the agro-park in north eastern part of the project area (Region 2) with floor space to host reception area and conference room	Site visit; project reports; CCILLC visitors register; KAP survey	Rainfall stations in project area are managed
				3000 persons passed through the production areas and CCILLC and the CCILC, with greater awareness of CC and CV	At least 5000 persons passed through and Two Biennial Climate Change and Climate Adaptation Competitions	Site registers; project reports	Sufficient interest in the learning centers
ACTIVITIES FOR COMPONENT 3							
ACTIVITIES FOR COMPONENT 3	1. Baseline KAP and Gender Study and the inclusion of a Gender Specialist						
	2. Planting of 705 Field days and workshops in efficient management and maintenance of the RWHS and irrigation systems and efficient use of water and in building resilience in soils including data collection and monitoring for better farmer appreciation						
	3. Workshops and sessions in community building and organizational approaches for ownership						
	4. Farmer field school approaches in climate adaptation monitoring						
	5. Training in standards and technical guidelines for agro processing						
	6. Training of staff /guides on climate awareness and methodologies to transfer knowledge and understanding on climate awareness						

	7. Capacity building in economic analyses of the impact of climate change on agriculture crops
	8. Capacity building of DAFNC staff in climate change adaptation, awareness and resilience
	9. Preparation of policy brief on land-use to protect concrete built resilience in agriculture and to prepare an Agriculture Disaster Management Plan
	10. Operations - of DAFNC Unit
	11. Web portal design services
	12. Database design services
	13. Laboratory equipment to measure to control temperature, soil water capacity, fertility, irrigation control, CO2, gr0wers computers and other office equipment
	14. Rehabilitation of building to host all knowledge management and agro-processing facility and training rooms for farmers - Region 7
	15. Solarisation of the building at Region 7
	17.Engineering supervisory services

APPENDIX IX

Indicative Implementation Chart 2019-2023

Component 1: Building resilience and sustainability of farming systems through interventions for water security, soil conservation and management

Output 1	Activities	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	Milestone indicator	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	Milestone indicator	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	Notes
1.1	Review Component and prepare Annual Work Plans									Work plan					Revised Work plan					DAFNC /PMU
1.2	Conduct farm inventory and needs assessment for adaptive capacities; vulnerability analysis and water security.									Inventory and maps completed										
	Prepare updated map land slippage focussing on Regions 6 overlay maps of farms and sites/clusters for improved water security.									Maps of landslips and overlay farm map					Report of maps fully in use					
	Initiate process to procure RWHS systems and Two ARCGPS Software									Procurement order					ARCGPS in use					
	Six facilities for production and utilization completed									Three facilities completed					Six facilities completed					
	Capacity building in production and utilization of soil building material at selected facilities on selected days									200 farmers participating					550 farmers reached					Target is 750
	Workshops and on-farm demonstrations and activities on land management and soil erosion control to reduce landslips									40 field days and					500 field days sessions held					Target is 60-100 sites
1.1.2	Field day to launch program on CCA practices in land management and soil erosion control									Report of event										
1.2	Workshops and on-farm demonstrations on installation of RWHS, drip irrigation and soil building									27 RWHS and drip					65 RWHS with drip					Target is 90-100 RWHS and drip covering about 220 hectares

Annual work plan

Inventory and mapping

Building adaptive capacities in land management

Community based capacity building

Procurement

Field day Launch of CCA for Land Management

Indicative Implementation Chart 2019-2023																					
Component 2: Establishing green agro-parks , including the use of solar energy for increased efficiency in resilient farming systems																					
Output 2	Activities	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	**Milestone indicator**	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	**Milestone indicator**	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	Collaborators with PMU and Notes
2.1	Review Component and agree on Work plan									Work plan										
2.2	Prepare site plan for building, food production area and visitor parking									Site plan approved										Approval from Infrastructure
	Rehabilitate building with provision for installation of RE, rooftop RWHS, agro-processing facility other services in floor plan									Building approved										Agro-processing facility& other services in floor space plan
	Undertake drainage works including clearing of the river mouth and RWHS of overflows									Drainage complete										
2.3	Inventory of farmers already on the site including youth in aquaculture and farm plan									Report of inventory										
	Establish infrastructure for 9 RWHS and drip irrigation for 5 hectares of production (open field and 6 greenhouses), and 2 facilities for in-house feeding for goats									RWHS and irrigation established										
	Install 6 greenhouses (6 aquaponics tanks) with 3 RWHS, and pumps and cooling fans														6 Systems installed					4 greenhouses solar cooling fans
	Upgrade 5 aquaculture ponds at agro-park														5 ponds upgraded					
	15-20 farmers on site fully involved in climate resilient farming practices									Farmers and farm plans					15-20 active farmers					
2.4	HACCP- Agro-processing facility offering technical training and production space									Approved facility					Persons 45 benefitted					28 sessions x15 beneficiaries
	Design for learning and interpretation Centre and laboratory approved																			
	Official opening of agro-park Region 7																			
2.5	Site plan for green agro- park in 2 and facilities completed (agro-processing facility with RE, and 4 outdoor soil building facilities									Site plan approved					Facility d fully functional					
	15 RWHS and irrigation established for 18 hectares including 10 green houses with aquaponics, pumps and including 4 cooling fans.									Production infrastructure in place					50 farmers in production					4 greenhouses with solar cooling fans and tanks for aquaponics
	Workshops and field days in green agro parks in intensive farming integrated with CCA									Training program					100 w/shops					Target of 100 sessions
	Official opening of green agro-park at 1&2																			

Annual work plan

Establish agro-parks

Capacity building

Indicative Implementation Chart 2019-2023																					
Component 3: Knowledge management and transfer for capacity building to institutional and local level adaptive capacities																					
Output 3	Activities	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	**Milestone indicator**	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	**Milestone indicator**	1st qtr.	2nd	3rd qtr.	4th qtr.	Notes
3.1	Baselines established on adaptive capacities with gender assessment, for review of delivery of concrete outputs and capacity building									Report of baseline										6 -8 months
3.2	Program prepared and delivered to train DAFNC staff (economists and extension staff)									Copy of program for awareness					Report of 10 days session on economic analyses					
3.3	Training and capacity building for SLNRWP in cocoa processing into chocolates									30 women trained					70 women trained					
3.4	Arrangements in place for reading of all rainfall stations and WRMA and DMS providing downscaled rainfall data.									Rainfall data					Rainfall data					
3.5	Data database for CC in agriculture created and incorporated in redesigned DAFNC master database including production data, lessons learnt, technology packages, videos and other training material and special publications for sharing with OECS and wider Caribbean									Data base in place					Learning material available					
3.6	Website portal for climate change and climate resilience in agriculture incorporated in MOA website														Website up					
3,7	Activities to support the learning and interpretation Centre and laboratory in Region 7 agreed on														Material available					
3.8	Organizational building for National Agro-processers Association for Women, small-scale agro processers and water users groups, Producer Cooperative and community-based CCA groups,									Report of 3 sessions to initiate process					Minutes of 3 meetings of organizations					.
3.9	Support Producer Cooperative to manage the production areas									Report of capacity building meetings					Registration and articles of the Association					

Baselines for adaptive

Knowledge management process

Capacity building

Indicative Implementation Chart 2019-2023

Project Management Unit – Operations - Procurement Chart

Components	Activities	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	**Milestone**	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	**Milestone indicator**	1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	**Budget**
PMU	Gender specialist																			**130,000**
1.1	Procure ARCGPS Software for vulnerability analysis									ARCGPS										**10,000**
1.2	Procure equipment to establish bare slope RWHS									receipts					receipts					**375982**
1.3	Procure irrigation infrastructure with drip for 200 hectares of farmland									receipts					receipts					**60,000**
PMU	Procure agro-processing manager for Region 7 and Region 2									receipts					receipts					**60,000 (7)** **30,000 (2)**
2.2	Procure 25 RWHS 30,000 gallons' storage tanks									receipts					receipts					**120,000**
2.2	Procure 50 RWHS storage tanks									receipts					receipts					**240,000**
2.2	Procure 25 RWHS storage tanks									receipts					receipts					**120,000**
3	Procure 9 RWHS for agro-park in 7									receipts					receipts					**36000**
3	Procure 6 greenhouses for agro-park in 7									receipts					receipts					**42000**
3	Procure lining for five aquaculture ponds									receipts					receipts					**255000**
3	Procure 15 RWHS for agro-park in 2									receipts					receipts					**50,000**
3	Procure 10 greenhouses for agro-park 2									receipts					receipts					**75,000**
3	Equipment for agro-processing facility at 7 and at 2									receipts					receipts					**45000**
PMU	UWI Climatologist expertise for two months									receipts					receipts					**18454**
3	Economist on CCA									Report					Report					**20000**
PMU	Knowledge Management &Communication specialist									receipts					receipts					**46000**
PMU	Agro-park development Manager									receipts					receipts					**97,500**
2	Vulnerability analysis specialist									receipts					receipts					**90,000.**
PMU	Purchase two vehicles for Component 1									Two vehicles					Two vehicles					**40,000**

APPENDIX X

RESULTS OF CLIMATE SCENARIO ON FUTURE RAINFALL AND TEMPERATURE (2040-2100)

Climate variable		Model	Projected change (compared to 1981-2015)
Air temperature wet season	2040-2069	HadCM3	1.75°C
Air temperature wet season	2040-2069	ECHAM 5	1.25°C to 1.75°C
Air temperature dry season	2040-2069	HadCM3	2.5°C
Air temperature dry season	2040-2069	ECHAM 5	1.25°C
Air temperature wet season	2081-2100	HadCM3	2.75°C to 3.0°C
Air temperature wet season	2081-2100	ECHAM 5	3.0°C to 3.25°C °
Air temperature dry season	2081-2100	HadCM3	2.75°C to 3 .0°C
Air temperature dry season	2081-2100	ECHAM 5	3.0°C to 3.25°C
Rainfall- wet season	2040-2069	HadCM3	Decreases in seasonal (June-December) rainfall in the future (2040-2069) along the western coast, ranging from – 25 mm/season to minus 20mm/season near Soufriere. For the rest of the island decreases in seasonal rainfall range from minus 60mm/season along the east coast to minus 35mm/season in the interior
Rainfall –wet season	2040-2069	ECHAM 5	General decrease in seasonal(June-December) rainfall in the future (2040-2069), for most of the island, of the order of minus 75mm.
Rainfall-dry season	2040-2069	HadCM3	Greater decreases in seasonal rainfall for most of the island but especially on the east coast (January to May) rainfall in the future (2040-2069), especially along the eastern coast and of the order of minus 75mm/season. For the rest of the island covering most of the west coast and the central regions, decreases in seasonal rainfall range from minus 100mm/season to minus 125 mm/season in the interior.
Rainfall- dry season	2040-2069	ECHAM 5	Generalized decline in seasonal (June to December) rainfall, with the decrease being of the order of minus 75mm/season over most of the island
Rainfall-wet season	2081-2100	HadCM3	Significant decrease in seasonal (June to December) rainfall, especially along the western and central parts of the country, ranging from minus 350mm/season to minus 400mm/season.
Rainfall-wet season	2081-2100	ECHAM 5	General increase in seasonal (June to December) rainfall, in the future (2081-2100) for most of the island, of the order of + 65 mm to + 75 mm for most of the island.
Rainfall –dry season	2081-2100	HadCM3	Lesser decreases in seasonal (January to May) rainfall, averaging approximately 75 mm/season over most of Saint Lucia.
Rainfall-dry	2081-2100	ECHAM 5	Generalized decline in seasonal rainfall, the decrease being of the order of minus

			75mm/season over most of the island.

Source: Draft National Adaptation Plan (2018)