FISH-ADAPT: Transforming Climate Resilience and Sustainability in Saint Lucia's Fisheries Communities

Annex 2: Feasibility Study

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Executive Summary

Located in the Lesser Antilles, Saint Lucia is a Small Island Developing State (SIDS) at 13°59'N and 60°59'W. As the second-largest Windward Island after Dominica, it boasts 620 square kilometers of fertile land (roughly 42 km long and 22 km wide). The fisheries sector in Saint Lucia is primarily a blend of artisanal technology supporting a fishery comprising of a range of near shore, small pelagic, large pelagic fish stocks, as well as sea urchin, sea moss, shrimp and lobster species. All commercial fishing is done using small boats, traditional fishing methods, and simple equipment or technology. The fisheries sector makes major contributions to food security, poverty alleviation, employment, culture, recreation, tourism, and the general quality of life in rural and coastal communities.

There has been a significant increase in the number of seamoss farmers entering the market and seamoss production over the past four years. This is largely due to the low cost of production, increased knowledge of the nutritional benefits, the growing access to foreign markets and the high quality of seamoss being produced in St. Lucia. International fisheries statistics indicate that aquaculture has been singled out as a sector to contribute significantly to national food security, rural employment and income generation. The desired goal is for sustainable aquaculture production in Saint Lucia to set the standards for environmental health and climate resilience in agriculture in the Caribbean.

Climate change and sector impacts

Climate change is significantly impacting fishery habitats and disrupting fishing operations in Saint Lucia and is projected to threaten the long-term sustainability of fish stocks and the local livelihoods of fisherfolk. The climate change stressors on the marine environment of greatest significance to St Lucia's fisheries are sea level rise (SLR), ocean acidification (OA), increasing sea surface temperature (SST), and increased frequency of extreme weather events (e.g. storms and hurricanes).

Climate driver or hazard	Sector specific impact
Surface air Temperature By 2050 all scenarios predict at least a 0.6℃ increase in average mean surface temperature with temperatures increasing by 1.51° to 3.0° C by 2100 in SSP2-4.5 and SSP5-8.5, respectively in St Lucia. **Sea surface temperature** In the medium term (years 2041-2060) sea surface temperatures near St Lucia are projected to increase by 0.9 (1.2°C) with respect to the period (1995-2014) with the largest 1C (1.3°C) warming in the autumn months and minimum	**Fishing activities-** Fish and shellfish populations typically found in temperate regions are moving northward towards the poles in search of environmental conditions more suited to their survival. These preferred conditions are often defined by a specific temperature range, which they are adapted to through a concept known as "thermal niche conservatism." **Fisheries:** Rising ocean temperatures are anticipated to have a significant impact on commercially important fish populations. This is because warmer waters will alter the preferred habitats (thermal habitat alterations) of these species. Consequently, we expect changes in the species diversity. Some fish populations may migrate northward in search of suitable temperatures, while others may disappear entirely from historically productive fishing grounds. These changes will likely lead to increased variability in fishery yields. **Aquaculture Challenges:** Droughts and rising temperatures pose a threat to the crops used to produce essential components of fish feed. This potential disruption to the supply chain could lead to increased costs associated with raising fish through aquaculture.

Climate driver or hazard	Sector specific impact
warming 0.9 (1C) in the boreal spring season in the SSP2-4.5 (SSP5-8.5) scenario	As droughts become more frequent and temperatures continue to rise, competition for limited freshwater resources is expected to intensify between fish farms and agricultural practices that rely on irrigation. Aquaculture and Fish Growth: Elevated water temperatures may negatively impact the growth and development rates of fish raised in aquaculture facilities. Warmer water temperatures can also create favorable conditions for the establishment and spread of novel diseases and parasites within aquaculture facilities. This poses a significant risk to fish health and overall aquaculture production.
Precipitation and precipitation-related extreme events Projections of total, 1-day, and 5-day accumulated precipitation trend negatively in all SSPs indicating overall dryer conditions, though the model agreement for these variables is low Frequency of tropical storms may not increase, but they will become more intense. This trend is particularly evident in the North Atlantic, where observations over the past three decades indicate a rise in hurricane intensity. Rising sea surface temperatures, a key factor in storm development, are projected to continue. Climate models suggest that this warming trend may lead to an increase in overall hurricane activity, primarily through more powerful storms rather than a significant rise in their number.	**Fishing vessels and practices-** The relatively small size of Saint Lucian open-deck vessels increases the impact that environmental conditions, such as large swells or storms, will have upon the sector's operations and profitability. Compounding this, as coastal benthic and reef-associated fisheries decline (reef fishes, molluscs, spiny lobsters and crabs), fishing effort from FRP boats is likely to increasingly shift from near shore towards the FADs further offshore, raising safety concerns. Damage and loss of vessels and fishing gear **Fish landing sites and coastal infrastructure-** Heightened acute risk through increased severity of hurricanes, and longer-term incremental risks posed by sea-level rise and tidal flooding due to increase in annual rainfall. **Seamoss** Sea level rise, storms and hurricanes and increased temperatures can result in negative impacts on the seamoss resulting in breakage of seamoss from their lines with rough seas, seasonal fouling of the crop by epiphytes, spoilage of drying crops in wet seasons. **Aquaculture and aquaponics:** Protracted periods of drought will cause more acute problems with freshwater availability, particularly for facilities that rely on surface sources of freshwater. As surface supplies dwindle, ponds decrease in volume, crowding the fish and concentrating potentially toxic metabolites.
Sea-level rise By 2050 median projected SLR (relative to a baseline of 1995-2014) for St Lucia under the SSP2-4.5 scenario is 0.21 meters (0.10, 0.34), for the SSP5-8.5 scenario 0.23 meters (0.13, 0.36) is projected.	**Fisheries:** Loss of coastal fish breeding and nursery habitats if mangroves are lost due to sea level rise. **Landing sites:** Shoreline fishing communities and fish landing sites at higher risk of flooding, compounded by higher precipitation and storm surge. **See section 2.2.2 for a detailed assessment.**

Barriers to climate resilience

Multiple interrelated barriers hinder a spontaneous response to the climate challenges facing the sector.

- **Financial**: High operating costs and limited endurance of traditional fishing vessels limit fishers' ability to save and invest in climate resilient practices. Fuel, equipment and labor combined with cancelled trips during periods of wet and windy weather makes fishing expensive and leads to overfishing in nearby coastal areas.
- **Financial**: Limited productivity due to small plot size and few economies of scale restrict farmers' ability to invest in climate resilient aquaculture.
- **Financial**: Limited financial literacy, poor record-keeping and risk aversion reduce ability and willingness to access and secure loans to invest in climate resilience, or insurance products to cover potential losses (often with limited data to highlight climate impacts – see informational barriers).
- **Market**: Limited investment capacity because fishers are unable to reliably supply the diversity of fish products demanded by the market, leading to competition from imported fish that is cheaper, more diversified and consistently supplied.
- **Technical**: Limited access to tools, equipment, and training to monitor, analyze and respond to climate information.
- **Information**: Limited knowledge of climate change effects on fish habitats and appropriate response measures.
- **Information**: Limited access to fish stocks data and management systems
- **Institutional**: Limited Department of Fisheries staff numbers and capacity hinder active monitoring, engagement, and enforcement of policies.
- **Institutional**: Limited coordination between Government departments responsible for fisheries, waste, agriculture, environment, trade and infrastructure.

The proposed project supports implementation of Saint Lucia's Sectoral Adaptation Strategy and Action Plan (SASAP). It builds resilience in Saint Lucia's fisheries sector against the worsening impacts of climate change and enhances the livelihoods of those reliant on marine ecosystems by aligning incentives between private sector actors, government, and coastal communities for long-term sustainability.

The project has four Components, leading to three outcomes. The breakdown per component is as follows:

Outcome 1: Fish value chains transformed & reoriented for safety in a changing climate
Component 1 - Transform and reorient fishing systems for safety in a changing climate
Output 1.1 - Fishers and other actors are able to access and act upon weather and climate data
Output 1.2 - Fishing vessels improved to respond to shifting fishing grounds, and landing sites more resilient to climate related weather impacts
Output 1.3 - Coastal and inland aquaculture enhanced and made resilient against extreme weather
Outcome 2: Climate resilient coastal fish grounds & aquaculture systems
Component 2 - Implement Nature-based Solutions and sustainable fishing practices to improve ecosystem health and fish stock sustainability in response to climatic changes
Output 2.1 - Fisher communities adopt improved practices to manage and sustain fish stocks and habitat

Outcome 3: Increased financial resilience and diversified incomes for fishing sector stakeholders
Component 3 - Increase financial resilience and diversify incomes for fishing sector stakeholders
Output 3.1 Improved access to financial mechanisms for sustainable and climate resilient fish production and income diversification
Output 3.2 Artisanal fisheries and value chains and markets strengthened to sustainably diversify and stabilize incomes
Outcome 4: Strengthened institutional structures for participatory climate adaptation
Component 4 – Strengthen institutional structures for participatory climate adaptation
Output 4.1 Effective policy implementation and enhanced technical and institutional capacity at the community and government levels to support resilient fishing, aquaculture and fish value chain practices

The project activities will result in two primary co-benefits:

- **Co-benefit 1: Social and financial inclusion. .** The project will enhance the social and financial inclusion for women and men. The project will remove barriers to women's safe and active participation in fishing sector activities, and remove barriers that limit their access to credit and investment. At the same time, the project will overcome literacy and numeracy barriers that limit men's role in the financial management of fishing activities and will support the re-skilling of older fishermen**.**
- **Co-benefit 2: Reducing Fish Waste, Fertilizer, and Soil Runoff** The project will contribute to reducing the improper disposal of fish waste and reducing fertilizer and soil runoff into waterways. At present at least 20% of total landed weight is discarded as waste, with much of this dumped on and off-shore. Activities related to circular economy promotion through enhanced waste utilization will curb this dumping.

The recommendations from the gender analysis and action plan have been integrated into the project design to ensure that interventions are gender responsive and transformative. Activities and sub-activities include measures to reduce and remove barriers to women's participation in fishing activities; enabling environment measures that improve literacy and training opportunities for men (and especially older men who are less able to go out to sea); safety and hygiene improvements at fish landing and processing sites; gender sensitivity training, and other measures.

1. Country context

1.1. Saint Lucia country profile

1.1.1. Geographic overview

Located in the Lesser Antilles, Saint Lucia is a Small Island Developing State (SIDS) at 13°59'N and 60°59'W. As the second-largest Windward Island after Dominica, it boasts 620 square kilometers of fertile land (roughly 42 km long and 22 km wide).

Despite containing volcanic soils, only 28% (17,360 hectares) of the land is suitable for farming due to its hilly terrain. In 2012, around 10,000 hectares were cultivated, with 70% dedicated to permanent crops like bananas and cocoa, and 30% to temporary crops like vegetables. Meadows and pastures covered an additional 600 hectares, bringing the total agricultural area to 10,600 hectares (FAO, 2015).

Saint Lucia boasts rich diversity, with approximately 35% of its land covered in pristine natural and rainforest ecosystems (MPDEH, 2003). This trend extends to the island's marine ecosystem, as vibrant coral reefs fringe both the west and east coasts. Notably, the central west coast harbors the most flourishing and diverse reef systems. However, these vital ecosystems face a significant threat: land-based pollutants and sedimentation, which jeopardize the island's near-shore fisheries (MPDEH, 2003).

In administrative terms, Saint Lucia is a unitary state, meaning it has a single central government that holds all legislative and executive power. At national level the central government, headed by the Prime Minister and Cabinet, is responsible for all major policy decisions and implementation.

The country is divided into 49 departments and 17 ministries (Government of Saint Lucia, n.d.). At local level the island is divided into 10 districts, with Castries as the capital, each with an elected district council responsible for local services and development. However, their powers are limited and they are subject to the oversight of the central government. In alphabetical order, the districts are: Anse-la-Raye, Canaries, Castries, Choiseul, Dauphin, Dennery, Gros-Islet, Laborie, Micoud, Soufriere and Vieux-Fort.

Figure 1 - Saint Lucia administrative map

While there are different levels of administration, there are no municipalities or metropolitan areas in Saint Lucia in the traditional sense. The district councils serve as the primary local government units, although there are some smaller village councils with even more limited powers (Government of Saint Lucia, n.d.).

1.1.2. Demographic profile

The past 30-40 years have witnessed a significant demographic shift in Saint Lucia, mirroring broader trends across developing countries. This fertility transition, characterized by a decline from high to low birth rates, is shaping the island's population dynamics and future trajectory (Ministry of Economic Development, Transport and Civil Aviation. 2019). The population now remains at a stable rate with a large working population. The table below illustrates Saint Lucia's demographic statistics:

Table 1 Saint Lucia demographic statistics.

Source: World Bank, 2022.

Indicator	Most recent value
Population, total (2022)	179,857
Population growth, annual % (2022)	0.1
Life expectancy at birth, total years (2021)	71
Human Capital Index (HCI) (scale 0-1) 2020	0.6
Urban population (% of total population) 2022	19
Urban population growth (annual %) 2022	0.7
0-14 years % of population	25.8
15-64 years % of population	64.6
65+ years % of population	9.6
Literacy rate % of population	94.2

Driven by a surge in rural-urban migration, Saint Lucia grapples with rapid urbanization. Over half the population (55%) now calls the Castries-Gros Islet corridor home. This influx, however, poses challenges. Unplanned settlements house denser populations facing greater poverty and vulnerability to both natural and man-made disasters in urban and suburban areas (OCHA, 2020).

1.1.3. Economic profile

Saint Lucia faces multidimensional poverty challenges, although to a lesser extent than some regional neighbors. Approximately 3,000 people, or 1.9% of the population, were identified as multidimensionally poor in 2021. An additional 3,000 individuals (1.6%) were classified as vulnerable to multidimensional poverty. While the percentage of multidimensionally poor is low, the intensity of their deprivations, measured by the average deprivation score, is relatively high at 37.5%. The following table reveals the percentage of Saint Lucians experiencing severe multidimensional poverty, along with breakdowns of deprivation contributions by dimension. For context, comparable figures for Barbados and Trinidad and Tobago are included (UNDP, 2023).

Table 2 Saint Lucia comparative statistics.

Source: UNDP, 2023.

	Survey year	MPI value	Head-count (%)	Intensity of deprivations (%)	Population share (%)			Contribution of deprivation in dimension to overall multidimensional poverty (%)		
					Vulnera-ble to multidim ensional poverty	In severe multidim ensional poverty	Below income poverty line	Health	Education	Standard of living
Saint Lucia	2012	0.007	1.9	37.5	1.6	0.0	5.1	69.5	7.5	23.0
Barbados	2012	0.009	2.5	34.2	0.5	0.0	..	96.0	0.7	3.3
Trinidad and Tobago	2011	0.002	0.6	38.0	3.7	0.1	..	45.5	34.0	20.5
Latin America and the Caribbean	-	0.024	5.6	43.1	6.5	1.5	4.9	33.5	27.6	38.9

Table 3 - Saint Lucia economic indicators.

Source: World Bank, 2022.

Indicator	Most recent value
Human development index (HDI) 2021	0.72
GDP (current US$)	2.34 (2022 billion)
GDP per capita (current US$)	GDP per capita (current US$)
GDP growth (annual %)	15.9 (2022)
Unemployment, total (% of total labor force) (modeled ILO estimate)	17.4 (2022)
Foreign direct investment, net inflows (% of GDP)	2.8 (2022)
Poverty headcount ratio at $2.15 a day (2017 PPP) (% of population)	5.1 (2016)
Employment in agriculture, female (% of female employment) (modeled ILO estimate) (2021)	5
Employment in agriculture, male (% of male employment) (modeled ILO estimate) (2021)	15

Saint Lucia employment

Saint Lucia faces significant challenges in achieving sustainable social and economic development due to high structural unemployment (20.2% in 2017) and widespread underemployment, particularly among youth (38.5% in 2017). These pre-existing vulnerabilities have been further amplified by the COVID-19 pandemic, creating a complex and concerning scenario. The limited availability of job opportunities, particularly for skilled individuals, has resulted in a phenomenon known as "brain drain," where talented professionals emigrate, leading to a gradual erosion of the nation's human capital. This, in turn, exacerbates social exclusion, increases vulnerability, and fuels the growth of an at-risk youth population. Furthermore, these factors have been linked to a rise in violent crime. The continued prevalence of these interconnected issues poses a significant threat to the social fabric and long-term development trajectory of Saint Lucia, necessitating the implementation of comprehensive and effective solutions (OCHA, 2020).

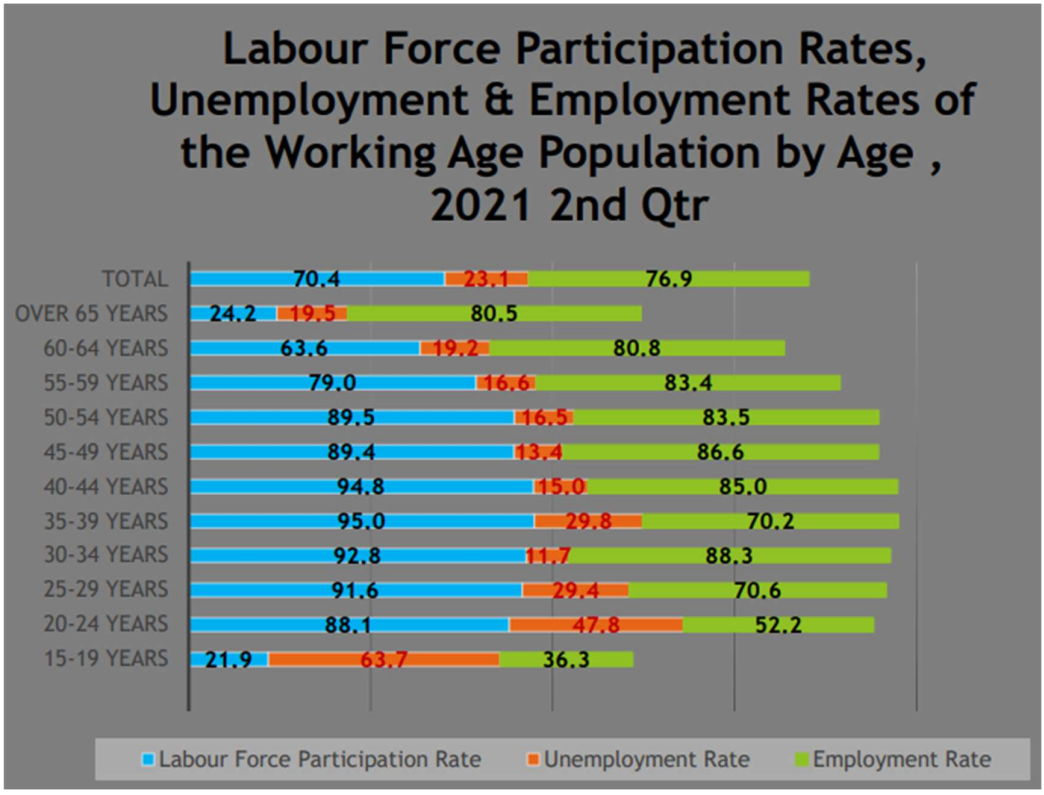


Figure 2 Labour Force Rates by Age Groups (St Lucia Central Statistical office, 2021)

Saint Lucia's economic sectors

The figure below shows the percentage of employment per sector. Both the Agricultural, forestry and fishing sector as well as the tourism sector are key players notably with a large percentage of women working in accommodation and food services.

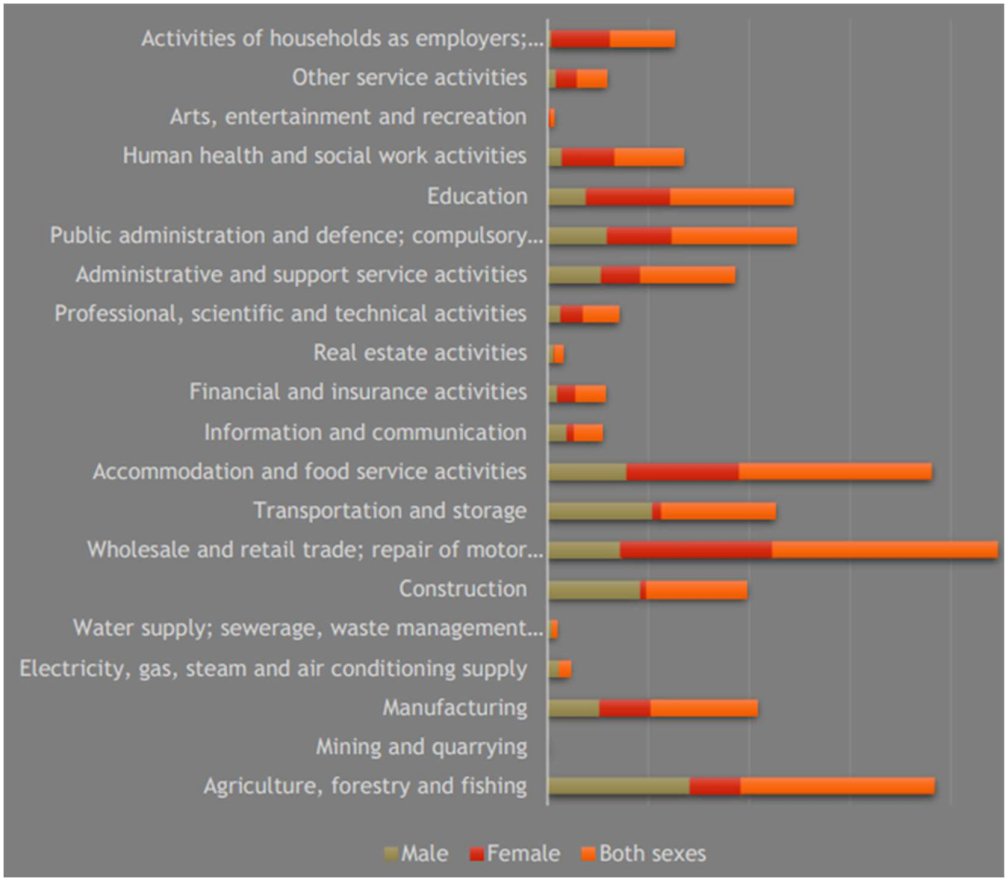


Figure 3 Employment by Industry 2021 (St Lucia Central Statistical office, 2021)

Tourism sector

In 2019 Saint Lucia had the highest account of tourists amounting to 1,220,000 people (World Bank, 2024). This influx is driven by its natural beauty and rich biodiversity such as its coral reefs and healthy aquatic ecosystems. Fisheries also provide the primary livelihood through tourism. Thousands of fishers on the island, as well as many more along the fishworker value chain, including restaurants, hotels make use of the fishing sector. Previously, in the past 30 years, fishery products represented about one third of animal protein supply, at present the share is around 12%. Nevertheless, it has to be considered that fish is one of the few food products available in the country that are produced locally (CARICOM, n.d.).

Over the past three decades, Saint Lucia's economy underwent substantial structural transformations. Negative impacts from frequent storms and hurricanes, coupled with the liberalization of trade markets, led to a decline in the agricultural sector's contribution to GDP, falling from 9.96% in 1990 to 2.07% in 2018. This shift has been accompanied by a surge in the tourism industry, which now serves as the primary driver of economic growth. The direct contribution of tourism to GDP reached 15.61% in 2018, reflecting an average annual increase of 2.71% (World bank, n.d.).

Furthermore, poverty levels witnessed a positive trend between 2006 and 2016, declining from 28.8% to 25%. This reduction was particularly pronounced in rural areas, where the poverty headcount ratio decreased from 41% to 32.9% (Department of Finance, 2011).

Tourism challenges

Saint Lucia's tourism sector dramatically fell to 432,500 people in 2020 (World Bank, 2024). An overdependence on for a substantial part of its gross domestic product (GDP) on key sectors that are especially exposed to extreme weather events, including tourism, agriculture and fishing. These sources of income have been severely reduced by the ongoing COVID-19 pandemic, with higher levels of debt to fund post-pandemic recovery and strict travel restrictions hindering international travel and tourism.

The COVID-19 pandemic exposed Saint Lucia's significant economic dependence on the tourism sector, which contributes 40.1% of GDP and 48.4% of jobs. Following the implementation of COVID-19 restrictions, tourism activity declined dramatically, leading to an estimated 8.5% contraction in GDP during 2020. This economic downturn resulted in rising unemployment, with projections suggesting a potential increase to 44% (OCHA, 2020).

The 2010 Hurricane Tomas unleashed a torrent of destruction on Saint Lucia, triggering widespread landslides and flooding. This resulted in a staggering US$336.2 million in total damages and losses, equivalent to over 43.4% of the nation's GDP in 2010. This figure represents a ninefold blow to the agricultural sector, a threefold hit to tourism, and a loss equivalent to 62% of all exports and services. The hurricane also claimed a 19% share of gross domestic investment and 47% of public external debt (Department of Finance, 2011).

1.1.4. Financial services

Finance estimates that the value of total landings has increased slowly over the last decade, reaching XCD 27.2 million (USD 10.1 million) in 2019, the quantity of total landings had also been falling at a compound annual rate of 1.4 percent between 2012 and 2019. Nevertheless, the still dominant traditional wild sea fishing sector in Saint Lucia continues to play a significant role in the country's economy, contributing to food security, employment, and foreign exchange earnings. The sector is an important source of livelihood for many communities, especially in rural coastal areas. However, it has witnessed stagnated economic growth since the advent of the Covid-19 pandemic, which limited fishers' ability to go to sea along with a steep rise in fuel prices due to supply constraints that have persisted. Fishers now experience the conundrum of higher energy costs and increased fishing effort while receiving lower prices for the fish supplied. When issues such as the cost of maintaining the fish by iced storage or refrigeration is factored into the mix, rising operational costs and losses due to spoilage add to the problem.

There are several other factors that have recently affected the viability of the fishing sector. Fish wastage due to unsold catches and generally smaller fish sizes regardless of the species have been intimated by fishers and boat captains. Additionally, the continuing influx of sargassum seaweed and pollution in the nearshore areas as well as in open waters continue to add to the burgeoning operational costs of fishers. The seaweed and debris tend to get stuck to their boat engines, which often results in engine failure and relatively high repair costs. The loss of fishing days due to severe weather events and sicknesses also limits income for the fishers and reduces the livelihood of their dependents (both family and work associates).

Further, not having refrigerated storage facilities with ice puts pressure on operations and finances. None of the fishers, save for the Choiseul Fish Cooperative, currently have adequate ice facilities and even where those facilities are in place (such as in Dennery) the fuel costs of operating the ice machines are prohibitive. For instance, the ice machine in Vieux Fort consumes EC$20,000 (EC $1.00 = US$0.37) for electricity and $3500 for water monthly plus

the required ammonia tank costs over $3000. The smaller machines in Micoud, Dennery, Praslin etc. would cost a bit less to operate, but the problem is the same. Encouragingly, Choiseul also has a fish purchasing facility for its members, which provides an interesting possible best practice for emulation. Both Dennery and Vieux Fort possess ice machines but none of them are currently operational.

The Government-owned and operated Saint Lucia Fish Marketing Corporation (SLFMC) provided ice, storage and purchasing services to fishers but had to close due to high and persistent operational losses in November 2019. A new public/private fish marketing entity, Lucian Blue Ocean Seafood (LBOS) entered the market in 2020, but it too has since closed, although in the process of reentering the market as a private investor/business operator in a public/private partnership (PPP) arrangement with the Government of Saint Lucia (GOSL). There are nevertheless two other such private entities still operating along with independent middlemen who purchase from fishers in limited quantities and at set prices to on-sell to hotels and supermarkets. They, however, operate at the premier end of the market and have limited relationships with most fishers.

Estimates of profitability for the sector, inclusive of mariculture and aquaculture, are placed at approximately 60% gross profit based on recorded ex vessel quantities and current market prices of fish but do not include the roughly estimated wastage of 8% nor spoilage, discounted sale prices, and unsold fish. Some interviewees revealed that they sometimes must either give away fish or sell it at a discounted price to avoid total loss and wastage. Fishers also intimated, during the interviews, that not all their costs are factored into the equation since, by their own admission, they do not always convey the true operating costs such as paying boat assistants, haulers, and crew, purchasing food and beverages prior to setting out to sea and paying fish cleaners, boat haulers, ground transportation and engine maintenance services. This, in essence, would lower the gross profitability estimate for the entire fish sector including both seamoss and aquaculture. It is therefore critical that a better capture of operating costs and revenue be done and, where necessary, bank interest charges and other administrative costs be recorded to arrive at a true net profit figure. This, of course, necessitates the cooperation of the actual fisher, which, from all the indications of interviewed stakeholders, is not always forthcoming. An enhanced role for the Fish Cooperatives is therefore envisaged but they must make a special effort to increase their membership by reaching out to many fishers who are not boat owners, are unregistered, and not members of any of the 9 major fish cooperatives.

Access to financial services in the fisheries sector

The main challenge for fisherfolk in gaining access to the financial sector is the inability of many of them to meet the requirements of lenders especially providing evidence of an ability to pay. The interviews with both commercial banks as well as the SLDB underscored that the ability to repay a loan was the singular determinant of eligibility. Even when collateralized, banks still expect that the borrower would be able to pay from their established inflows of income/revenue. However, as agreed by Randel Esnard of the DoF and even some of the financial institutions interviewed, current debt financing from financial agencies in Saint Lucia do not necessarily cater to the fishing sector. They are not sensitive to the peculiar liquidity or cash flow problems of the sector and consequently the traditional fixed-term amortization loan products fail to attract the interest of fisherfolk. There is therefore an opportunity for commercial banks, the SLDB, and credit unions to explore modern-day, more flexible loan products such as balloon payment loans or deferred payment loans rather than typical term loans. This would help to lessen the liquidity problems experienced by fishers but the documented evidence of an ability to repay from cashflow would still be required.

Even with credit unions, which are more closely associated with fisherfolk and the communities in which they live and operate, there must be a documented capacity to repay any loan that is advanced. This cannot be negotiated but certainly there is room for increasing efforts to help fishers in upgrading their financial record keeping skills as well as their capacity for business revenue monitoring and management. Similarly, targeted engagements with the financial sector to assist with improving their understanding of the needs and potential of the fishing sector would be critical.

While most commercial banks do not see it as their responsibility to provide this type of assistance to fisherfolk, the credit unions, on the other hand, seem more inclined to provide this service and given their closer connection to fish cooperatives and the fishing communities, which provide a significant share of their membership, should be the targeted lender of first resort for fisherfolk. Educating small business enterprises such as fishers and fish cooperatives, along with enlightenment of financial institutions about the needs and potential of fisherfolk, is therefore key to better financial intermediation. Notably, the 1st National (the first indigenous bank in Saint Lucia, which started as the "Penny Bank" by local businessmen in 1938) has stated its inclination to partner with fishers on any sponsored technical assistance project to improve their financial literacy and record keeping. The SLDB has also conveyed its readiness and willingness to assist by looking to hire a specialist (agriculturist) who can help with assisting the entire sector, including fisheries. Of course, as suggested by Esnard (Appendix 1), this person should ideally be well versed in agricultural finance, the design of loan products that alleviate liquidity stress, and blended finance for enabling inclusive business models.

There is also the issue of revenue and expenditure record keeping, which the interviews with both the fishing and financial sectors have underscored. Incidentally, LBOS has highlighted this as one of the critical services that they would provide to their partnering fishers and their respective cooperatives. This would be a strong and encouraging platform on which to essay the matrix of proposals designed to ameliorate the current lack of financial access and intermediation opportunities for the fishing sector in Saint Lucia (Andrew, 2023).

1.2. Overview of the fisheries sector

The fisheries sector in Saint Lucia recorded a compound annual growth rate of 0.46 percent in total wild capture landings between 2012 and 2018 and a compound annual growth of 16 percent in aquaculture production between 2000 and 2015, albeit from an extremely low baseline.

1.2.1. Fishing

The fisheries sector in Saint Lucia is primarily a blend of artisanal technology supporting a fishery comprising of a range of near shore, small pelagic, large pelagic fish stocks, as well as sea urchin, sea moss, shrimp and lobster species. All commercial fishing is done using small boats, traditional fishing methods, and simple equipment or technology. According to the 2013 National Census, there are 1,170 fishing households located throughout the country, along with an estimated 150 fish vendors and processors in Saint Lucia (GOSL, 2018). The fisheries sector makes major contributions to food security, poverty alleviation, employment, culture, recreation, tourism, and the general quality of life in rural and coastal communities (Andrews

et al. 2007, Conservation International 2008; Badjeck et al., 2010; FAO, 2005 and 2010; Rice and Garcia, 2011).

Saint Lucia has a relatively small continental shelf and an exclusive economic zone (EEZ) (Murray, 2009) that is compressed by its geographic proximity to the neighbouring islands of Barbados, Martinique and Saint Vincent. Over the past decade the fishing industry in Saint Lucia has evolved from one that was essentially artisanal to a more commercial fishery, harvesting a tropical multispecies stock. Total capture production in Saint Lucia was estimated at 1,433 tonnes in 2020 (including less than 15 tonnes from aquaculture). Over 60 percent of annual fish catches comprises offshore migratory pelagics such as dolphin fish, wahoo and tuna and tuna-like species caught by trolling but mainly with droplines around FADs. Flying fish forms an important but variable component of the catch and is also used as bait for FAD fishing. A multitude of shallow reef and coastal pelagic species are also key components of the catch. Conch, turtles and lobster are also legally targeted.

Landing sites

There are 15 fishing landing sites (Figure 1) along the coast of St. Lucia. These are: Gros Islet, Castries, Anse la Raye, Canaries, Soufriere, Choiseul, Laborie, Vieux Fort, Savannen, Micoud, Praslin and Dennery, not shown in the map: Bannenes, Cul de Sac, Roseau and Marigot (GoSL 2013).

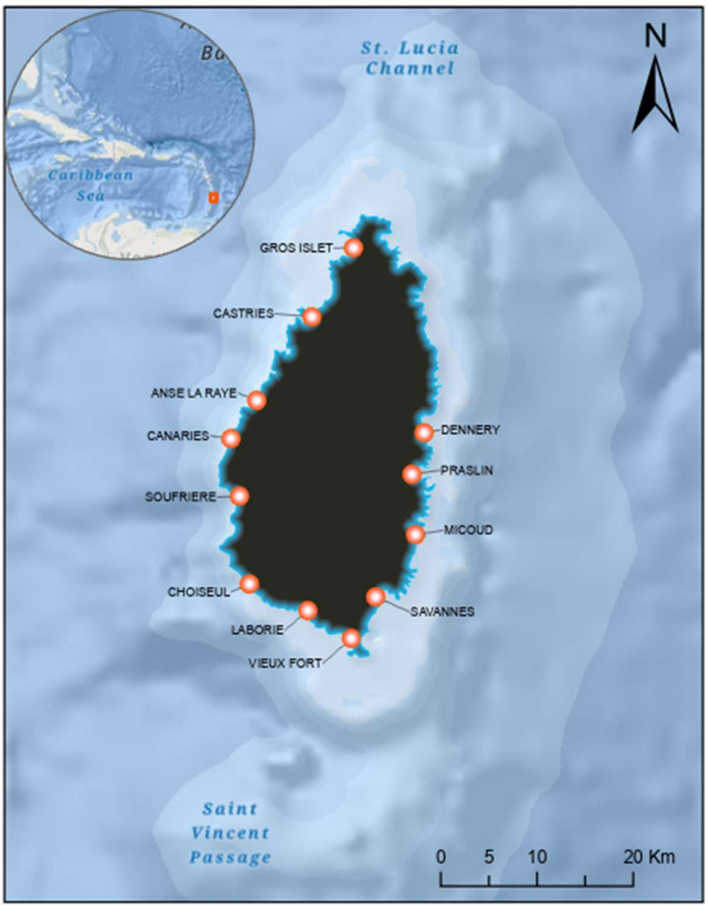


Figure 4 Fish landing sites

Many Saint Lucian fishers still engage in traditional fishing methods like trolling, netting and pots, using manually operated equipment such as trolling gear and long lines, and they target multiple fisheries (GoSL 2013). The fleet structure in St. Lucia is comprised primarily of four types of (5-9 m) vessel. In 2022, there were a total of 593 fishing vessels, for which 91% were pirogue, whilst wooden canoes accounted for 2.7%, shaloop 4.2% and Yaule 1% (GoSL, 2022). Tuna, dolphin fish, and wahoo are the main catches by weight in small-scale fisheries. Sharks make up a minor portion. Flying fish and wahoo landings are significant. Blue and white marlins are occasionally caught but in much lower numbers compared to other billfishes. Conch and lobster are crucial targets, with separate data available since the 1990s. Reef-associated species like snapper, lobster, conch, and recently lionfish, contribute about 5.8% of total landings (Riet Sapriza, 2024).

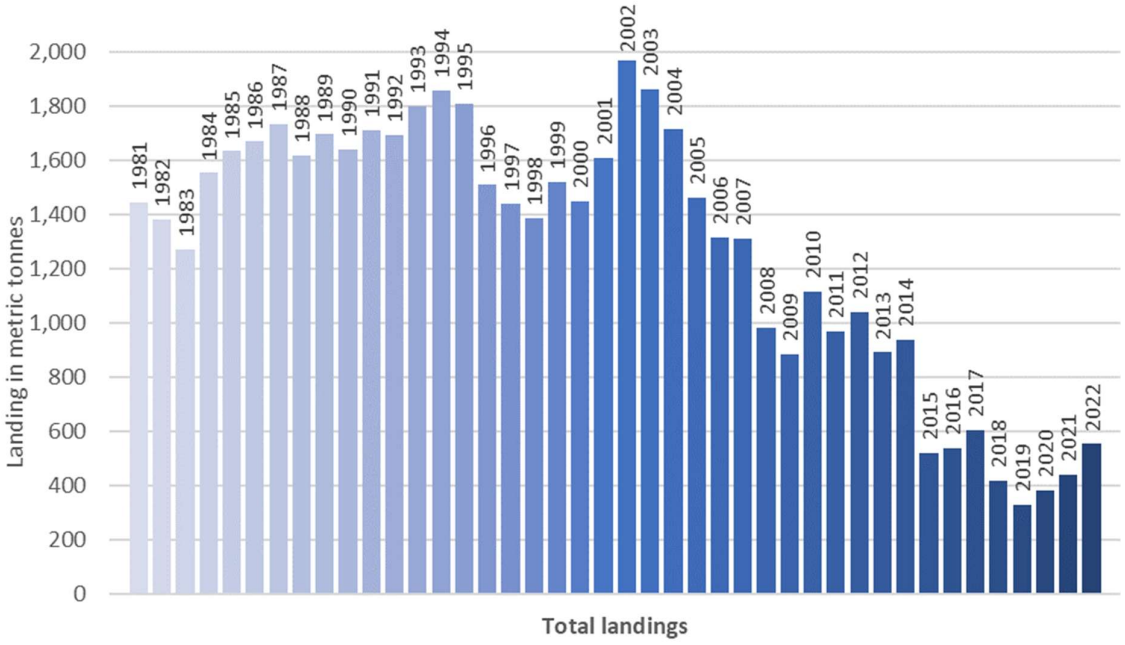


Figure 5 Estimated total landing (metric tonnes) of all target species per year targeted by small scale fisheries in St. Lucia, Caribbean. Source: Department of Fisheries of St. Lucia (GoSL, 2022).

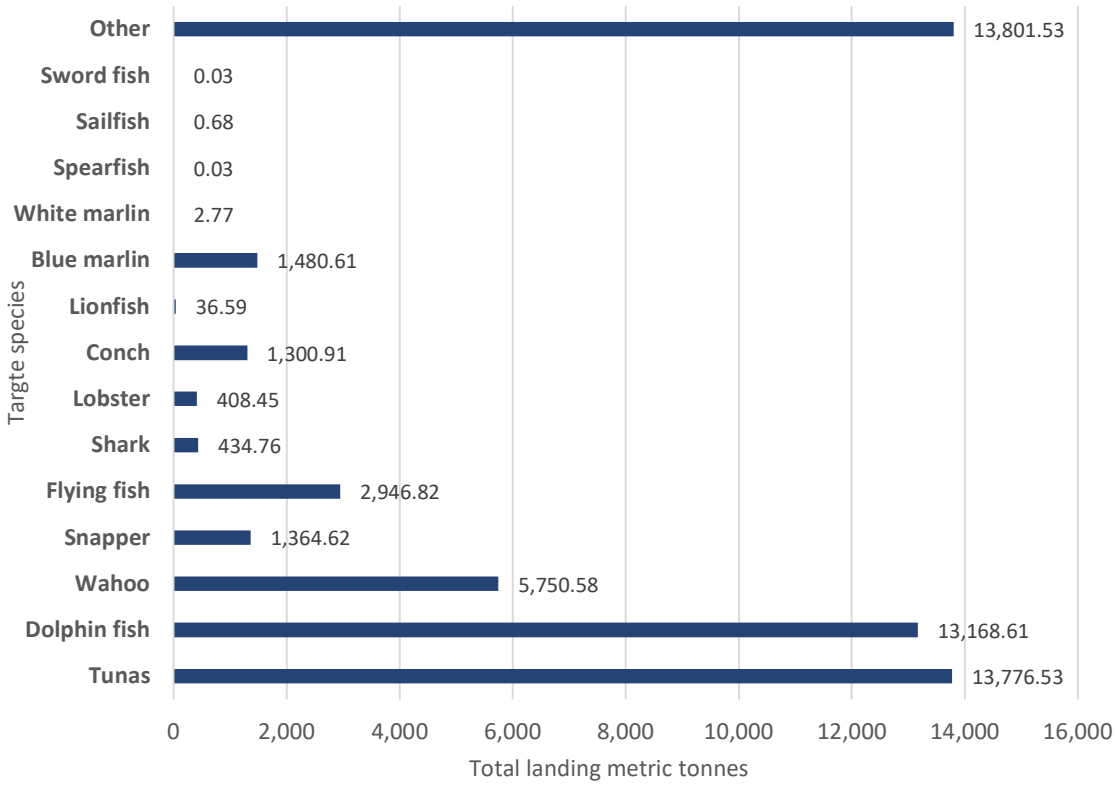
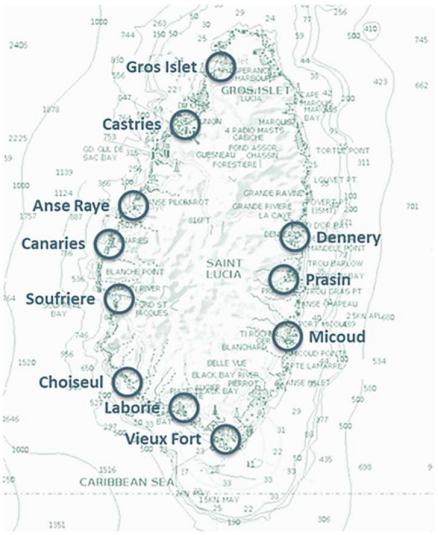


Figure 6 Sum of total landing, between 1981 to 2022, by target species of small-scale fisheries in St. Lucia. Source: Department of Fisheries of St. Lucia (GoSL, 2022).

Fishers contribute to the upkeep of primary and secondary landing site infrastructure (where it exists) via their fisher cooperatives. Saint Lucia has nine registered fisher cooperatives and one umbrella group, the Caribbean Network of Fisherfolk Organizations (CNFO). At present, cooperative membership comprises only about half the total fishing community.



Vessel Facilities

	Storage	Operation	Shelter
Gros Islet	ramp	wharf	harbor
Castries	ramp	pier	harbor
Anse Raye	beach	pier	exposed
Canaries	beach	pier	exposed
Soufriere	ramp	pier	exposed
Choiseul	ramp	wharf	port
Laborie	beach	pier	exposed
Viex Fort	ramp	wharf	port
Savannes	pier	pier	exposed
Micoud	beach	beach	exposed
Prasin	pier	pier	exposed
Dennery	wharf	wharf	port

Figure 7 – Location and General Characteristics of Fish Landing Sites

Most facilities harbor approximately 20 boats (10 to 30 boats). Soufriere is the only fish landing site with more than 30 boats that is not in a sheltered location (fishing port or harbor). The vast majority of fishing vessel types recorded are pirogues.

Size of fishing sector

The fishery sector in 2017 provided direct employment to 3,328 people in marine fishing, of which 182 were women, while 114 people (20% women) were directly employed in aquaculture. In 2020, the number of active fishers was 1,748 of whom 107 were female and 1,641 males; active being defined as those who had been licensed to fish at least 3 times in recent years. About 60% of those fishers relied on fishing as their full-time employment.

National fisheries stakeholders consider the peak season of pelagic species harvests to fall between November and June. While pelagic harvests persist throughout the year, as do harvests of conch, the relative targeting of lobster and snappers is much higher from June to December. Harvest seasonality for lobster links to the official closed season for this species from March to August, while pelagic harvest seasonality links to target species migrations, sargassum influences and average current strengths, with strong currents causing the surface FADs to submerge and lose productivity (Bealey, R. 2021).

The Saint Lucian fishing fleet has a range of vessel classes but is dominated by open fiberglass pirogue and traditional canoes. Vessel sizes range from 3m to 25 m. Because of the multi-species nature of the fishery, most fishing vessels are usually equipped with a combination of hand lines, trolling lines, nets and fish traps. Fishing trips are usually one-day trips ranging from 3 to 8 hours' duration. All fishers must be registered, and fishing vessels are required to be inspected for safety and navigational equipment, and based on a successful inspection, fishing licenses are issued for one year. In the past 10 years, the department has observed a small but steady increase in the number of registered fishers (for example in 2016 some 822 boats were recorded, compared to 700 in 2012). Data regarding shortfalls in fish stocks and fisher's catches experienced in recent years and projected for the near future are difficult to obtain. Because of the multi-species nature of the fishery, most fishing vessels are usually equipped with a combination of hand lines, trolling lines, droplines, nets and fish traps.

Annual sector revenue

According to 2016 data, fisheries account for 0.8% of the national Gross Domestic Product (GDP), and for about 25% of the agricultural GDP. These figures understate the social role of fisheries, which is very important in rural areas where fishing is the only employment available. According to the database of the Department of Fisheries, there were approximately 3,282 fishers registered in 2018 (4% women). 114 people (20% women) were directly employed in aquaculture and about 120 people working as fish vendors and processors. This is calculated via ranges of 15-25 persons per landing site who are either full or part time vendors. For fish processing shops, it is estimated that around 20 vendors operate at 13 markets – 260 total – many of whom are females supporting households of 4-6 persons.

Volume of fish caught

To monitor the industry's operations, Fisheries Department data collectors are stationed at all primary and some of the secondary landing sites. They are responsible for recording statistics such as weight and value of landings per site and by species. They use scales to measure fish weight and are trained to make estimates if scales are not available. Usually, data collectors record whether the weight is based on whole or gutted fish. Length or age data about the fish is not collected, due to low staff capacity.

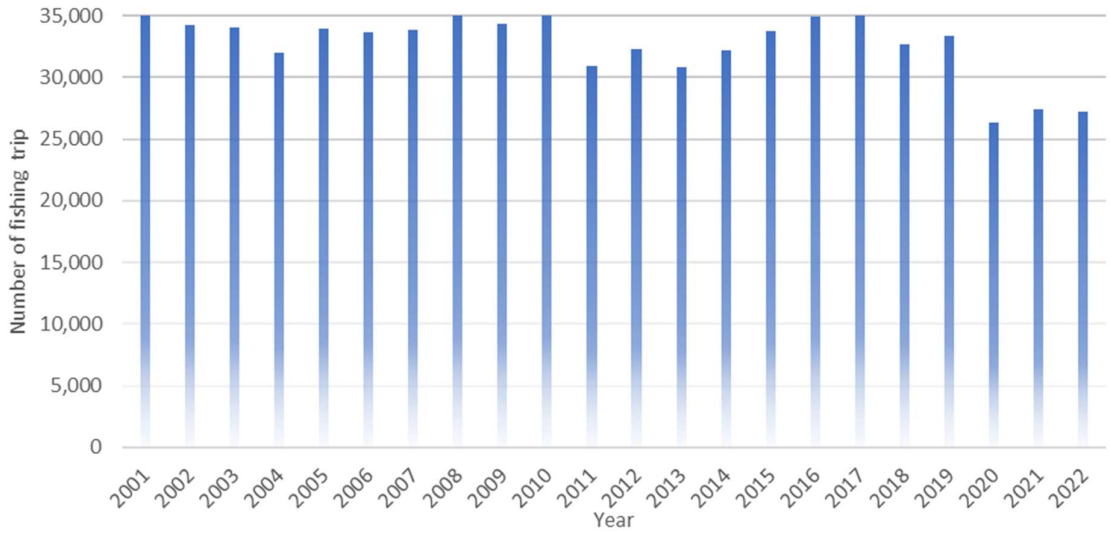


Figure 7 Estimated total number of fishing trips per year by small-scale fisheries in St. Lucia, Caribbean. Source: Department of Fisheries of St. Lucia (GoSL, 2022).

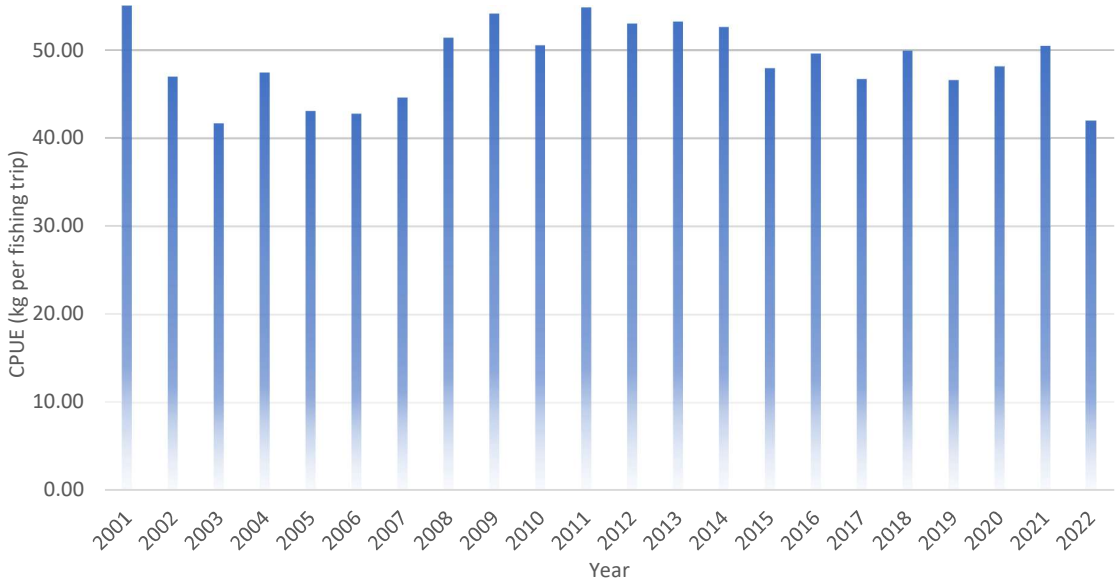


Figure 8 Estimated CPUE (catch per unit effort, catch per trip in kg) per year by small-scale fisheries in St. Lucia, Caribbean. Source: Department of Fisheries of St. Lucia (GoSL, 2022).

Biological information is available between years 1996 and 1999; however, assessment and quantification of total allowable catch (TAC) for the majority of target species are limited. Fish landing between 1981 to 2022, show a decline in the landing from the year 2005 to date (Figure 4). The total yearly landing between 1981 and 2007 has been over the threshold of 1,200 metric tonnes; however, since 2008, the yearly landing has been below 1.000 metric

tonnes. Furthermore, the yearly total landings between 2010 and 2022 has been under the threshold of 600 metric tonnes, 50% lower than that reported before 2007.

Fishers' Safety

A report from FAO "Safety as Sea – Baseline Survey Report" from 2021 with the Fish Safety Foundation. This report indicated findings on safety practices, attitudes and legislative understanding among a selected group of fishers in St. Lucia. The report found for accidents at sea that 11% indicated that they had experienced a personal injury on board, but no serious events like capsize or collision were recorded. Regarding main causes of accidents extreme weather was listed as a causation factor in accidents for 47% of respondent, as well as disablement (rudder or engine failure and gear/rope in propeller – 62% total) (E. Holiday, 2021).**Fishers' Income**

1.2.2. **A challenge for assessing the socioeconomic vulnerability of fishers and fish farmers is that they often cannot prove their income. The Department of Fisheries has begun pilot programs to encourage fishers to keep logbooks to create records of catches and income. Some data from the 2012 census gives indication on income and on the contribution of fisheries to GDP, for example highlighting that each vessel earned at the time on average EC$200 to EC$400 per fishing trip per vessel in the high season and EC$200 in the low season. A new census of agriculture and fisheries was launched in 2024. This census, when published, would be able to provide more of the baseline data. Despite the small contribution of fisheries to GDP (0.8% as mentioned previously), the sector is nonetheless an important source of employment and income for rural fishing communities island-wide. For example, 30 percent of people employed in the fisheries sector earn one quarter to half of their household incomes from fishing. There are eight main occupations in the fisheries sector: fishing vessel owner, fishing boat captain, sport fisher, fishing boat crew, vendors of fish, builders and repairers of boats and fishing equipment, outboard engine mechanics, and fishing equipment suppliers (World Bank, 2019).** **Seamoss**

The first small commercial plots were established in 1985 on the southeast coast of the island and in the following.

Initially seamoss farming began with Gracilaria species, however they were found to not contain the preferred carrageenan properties (Gracilaria produces agar) and a switch was made to Euchemia cottoni which is now known as Kappaphycus alvarezii. Also known commercially as simply cottonii, the species was introduced in 2013 from Venezuela as part of an initiative by the Department of Fisheries to diversify and improve seamoss farming (T. Nelson, 2017).

There has been a significant increase in the number of seamoss farmers entering the market and seamoss production over the past four years. This is largely due to the low cost of production, increased knowledge of the nutritional benefits, the growing access to foreign markets and the high quality of seamoss being produced in St. Lucia.

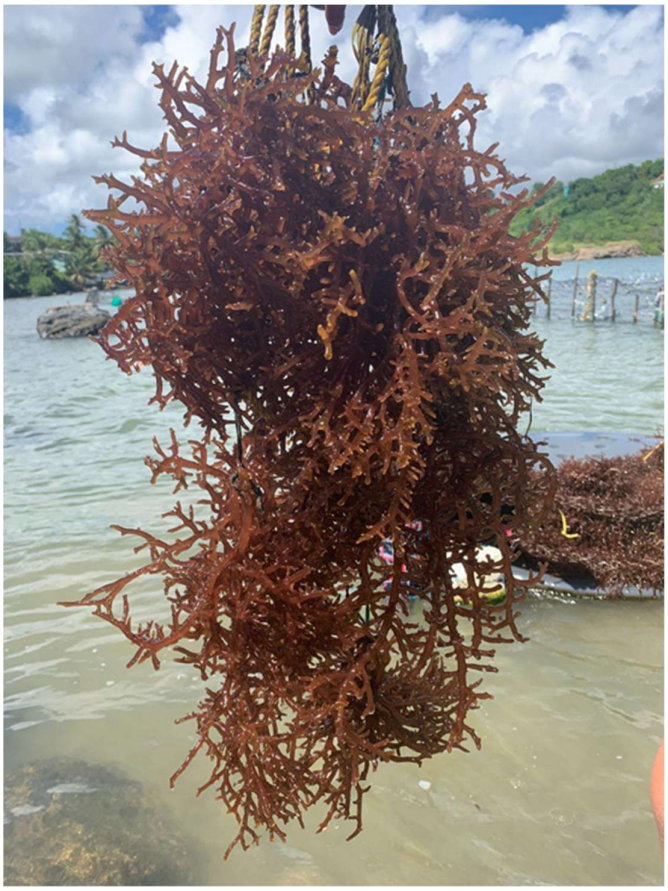


Figure 9 K. alvarezii

Landing sites

In Saint Lucia, seamoss is cultivated in four areas: Gros Islet, Eau Piquant/Savannes Bay, Praslin, and Laborie Bays. Praslin is the largest and most suitable area, thanks to protection from waves by reefs, islets, and seagrass beds. However, its shoreline with mangroves becomes too murky during the rainy season, so most farming happens near a protected islet within the bay. In Laborie, the suitable area lies on the east end due to good water flow, firm substrate, and protection from a nearby reef.

Figure 10 Savannes Bay

Praslin is the largest single area which is suitable for seamoss cultivation. The Praslin Bay faces the Atlantic Ocean and is associated with shallow reefs and small islet both of which afford protection for heavy wave action. The shallow seagrass beds in the middle of the bay also help reduce wave action in the inner part of the bay. The shoreline is bordered by mangroves which in the rainy season, run off causes much turbidly. As a result, much of the bay has been deemed unfit for Seamoss cultivation since during the rainy season, silt accumulates on the plants and lines. Alternatively, a suitable site adjacent to and in the lee of the small islet has been found that has facilitated the rapid increase in the number of seamoss farmers in the Praslin area.

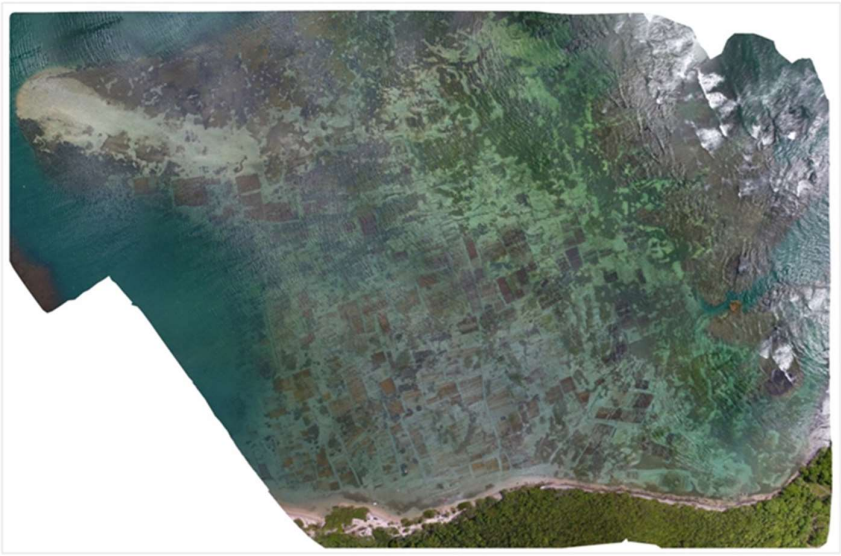


Figure 11 Praslin Photo credit

There are three main methods for cultivating seamoss. Bottom fixed is for shallow, hard-bottomed areas under 2 meters deep, wooden stakes anchor the seamoss directly to the seabed. Monoline floating: Ideal for deeper areas (over 2 meters) with diverse bottom types (except coral reefs), this method uses long lines or bamboo rafts to keep the seamoss afloat. Finally, floating rafts offer high planting density. These bamboo or PVC tube rafts are anchored with heavy weights and adapt to various depths and bottom types (T. Nelson, 2017).

Size of seamoss sector

There has been a significant increase in the number of seamoss farmers entering the market and seamoss production over the past four years. This is largely due to the low cost of production, increased knowledge of nutritional benefits of the algae, the growing access to foreign markets and the high quality of seamoss being produced in St. Lucia. Strides continue to be made to keep the sustainability of this St. Lucian gold by making it more resilient to weather conditions and safeguarding product quality by improving production practices.

Although there is a need to get incoming farmers registered, in 2023 there were 398 registered seamoss farmers, an increase since 2019 of 156 males and 57 females to 240 men and 150 women in 2022 (Russo, 2024).

Annual sector revenue

The high startup equipment and maintenance cost keeps the aquaculture sub-sector a lot more exclusive as opposed to fishing and sea moss.

Seamoss production increased from 102,542.52kg in 2019 to 201,299kg in 2022, with earnings surpassing 2,157,889 USD in 2022. Seamoss production increased from 102,542.52kg in 2019 to 201,299kg in 2022, with earnings surpassing 2,157,889 USD in 2022.

Most of the development efforts within the sector are centered on increasing value-added products since the profits from selling the raw products were not encouraging the growth of the sector. Implementing the farming of *K. alvarezii* would lead to higher-quality drinks, food and cosmetic products (pers. comm. Makeba Felix, Dept. of Fisheries).

Significant investments were made in processing facilities in areas such as Praslin to develop value-added products. Additionally, Export Saint Lucia, which is the national agency responsible for trade export and promotion in Saint Lucia, has contributed significantly to the expansion of the sector. This additional investment by the Government of Saint Lucia has led to farmers accessing markets in Dubai, the United Kingdom and the United States of America.

Export Saint Lucia also assisted in the creation of an export development plan, which was developed and executed in late 2018 to assist the industry in meeting international requirements. The plan incorporated export promotion in the United States and the United Kingdom and positioned the product as one of the world's best (Russo, 2024).

Table 4 Seamoss annual profile

Descriptive Features	2015	2016	2017	2018
Number of pond farmers		76	80	81 (75 males, 6 females)
Number of aquaponics farmers	1	4	6	16

Number of seamoss farmers		41	14	
Annual production - fish	13,300 kg	15,273 kg	9090 kg	
Annual production - shrimp	10,500 kg	11,897 kg	4,356 kg	
Annual production - seamoss	2159 lbs	5304 lbs		
Acreage in ponds	16.2 HA	17.9 HA	18.5 HA	
Hatchery production (PLs – post larvae)	89,000 fingerlings / 921,000 Pls	84,000 fingerlings /980,000 Pls	25,000 fingerlings /130,000 Pls	28,000 fingerlings /201,00 Pls
Av. Feed cost/pond culture/ Kg/lb	N/A	$ 0.92	$ 0. 92	$0.92/ $1.60
Training of staff (# trained / level), including the certification	3/Aquaponics Level 1	0	3/Aquaponics Level 1	

Challenges and needs

St Lucia's seamoss sector faces multiple challenges. Many farmers operate informally, making it difficult to track production, ensure quality control, and provide proper support and training. Encouraging and facilitating registration can improve data collection, resource allocation, and access to government initiatives

Overlapping marine reserves and priority fishing areas create uncertainty and potential conflicts for sea moss farmers. A comprehensive marine spatial plan is crucial to define designated zones for sea moss cultivation, fishing, and conservation, ensuring optimal use of resources and minimizing conflicts.

A lack of GPS coordination for shipping lanes can pose safety hazards for seamoss farmers. The risk increases as most sea moss farmers cannot swim (Russo, 2024). Implementing a system with clear GPS markings can help prevent accidents and improve navigation for both farmers and other users of the marine space.

The proximity of sea moss ropes and floats to the shore can cause inconvenience and potential safety concerns for beach users. Reports of near-drowning incidents highlight the need for solutions that ensure both the safety of beach users and the viability of sea moss farming activities. This might involve relocating ropes further offshore, utilising alternative materials with better visibility, or implementing awareness campaigns for beach users.

1.2.3. Aquaculture

The aquaculture sub sector in Saint Lucia spans over 20 years and was practiced in two main areas Union and Beausejour by 84 registered aquaculture farmers. Currently, aquaculture is practiced in about 10 areas with production area of just over 18.6 hectares across the island where aquaculture farmers grow mainly freshwater shrimp and tilapia.

In recent years, Saint Lucia has made great efforts to develop its freshwater (inland) small-scale aquaculture industry. There are currently two commercial aquaculture hatcheries on the

island: the main facility at the Union Agriculture station - which has the capacity to produce at least 360,000 tilapia fingerlings and 3.6 million prawn to supply to 80 domestic fish farmers at a total value USD 1,203,000 and USD 1,326,000 respectively and a second hatchery which serves primarily as a backup for the supply of the post larvae and fingering fish in the south of the island.

International fisheries statistics indicate that aquaculture has been singled out as a sector to contribute significantly to national food security, rural employment and income generation. The desired goal is for sustainable aquaculture production in Saint Lucia to set the standards for environmental health and climate resilience in agriculture in the Caribbean.

Aquaculture sector size

Inland aquaculture in St. Lucia spans over 20 years and is practiced in two main areas Union and Beausejour by 40 registered aquaculture farmers. Currently, aquaculture is practiced in about 10 areas with a production area of just over 18.6 hectares across the island where aquaculture farmers grow mainly freshwater shrimp and tilapia.

Figure 12 Aquaculture site, Tilapia pond

Annual sector revenue

From historical analysis, the number of tilapia fingerlings cultivated, peaked in 2015 (89,000 kg) while only 13,300 kg valued at USD 86,696.30. The lowest fish production was in 2021 with a value of USD 30,725. Shrimp post-larvae production declined from 1 million in 2015, to just under one hundred thousand in 2021. This significant reduction in the number of shrimp larvae cultivated shows a reduction in the shrimp production over that period by almost 10

times from producing 10,500kg in 2015 valued at USD 212,520 to production of 1818 kg valued at USD 36,723 (Russo, 2023).

Aquaculture has a very high startup cost as opposed to typical fishing and seamoss production mainly due to the high infrastructural costs of ponds and piping. From historical analysis, in the production of Fish (tilapia) we see that the quantity of fingerlings cultivated peaked in 2015 (89,000 kg) while only 13,300kg matured valued at USD 86,696.30. The lowest fish produced was in 2021 which also showed the lowest value of USD 30,725. Quantity of post larvae production have declined from close to 1 million in 2015 to just under one hundred thousand in 2021. This significant reduction in the quantity of shrimp larvae cultivated shows a reduction in the mature shrimp production over that period by almost 10 times from producing 10500kg in 2015 valued at US$212,520 to production of 1818 kg valued at US$36,723 (Russo, 2023).

Challenges

Given the extremely high cost of startup and equipment maintenance as well as the high vulnerability of the sector to climatic eventualities, the aquaculture sector needs more access to finance at reasonable interest rates to encourage more economically viable participation both for local and potential foreign markets. More support for training and finance should be made available to owners to become more resilient and help mitigate disaster. The following table illustrates the current challenges that were identified in St Lucia's aquaculture sector (Russo, 2024).

Table 5 Aquaculture challenges

Category	Challenge	Specific Issues
Infrastructure & Resources	Dispersed farms	Difficult & expensive support & development
	Increased flooding & erosion	Pond damage, fish mortality, reduced water availability
	Limited access of resources	- Land for production
		- Gravity-fed water
		- Electricity
		- Affordable & suitable feed
	High startup costs	Ponds, infrastructure, equipment
	High operational costs	Fuel, pumping
Production & Hatchery	High mortality in ponds	Unsustainable production
	High production costs	- Broodstock
		- Post-larvae production
		- Hatchery operations
	Declining fingerling production	Reduced supply chain potential
	No recovery cost for hatcheries	Unsustainable hatchery model
Farming & Industry	Fewer farmers & smaller farms	Reduced production capacity
	Lack of training & technical assistance	Knowledge gaps limit efficiency & best practices. There are very few trained and skilled farmers in farm management, production, postharvest handling, marketing, etc

Category	Challenge	Specific Issues
	Limited farmer associations & collaboration	Reduced knowledge sharing & support
	Inadequate data collection & analysis	Lack of informed decision-making
	Insufficient access to:	- Funding for development & disaster recovery
		- Credit & insurance for investment
		- National disaster management plan
		- Business planning guidance
Policy & regulation	Regulations & checks	Needed for proper site selection & environment protection
	Praedial larceny	Theft of crops

Similarly, stakeholders during the 2023 field visit noted the following challenges:

- Access to suitable and affordable feed
    - During the dry season, there is a shortage of water due to drought. There is a high reliance on the pumping of fresh water as there is limited access to gravity-supplied water on farms. Access to electricity for aerators and pumps, security lights, etc. can also be a challenge and fuel costs make it expensive to operate pumps.
- High mortality in ponds
- High cost of brood stock (for pond culture)
- High cost of production of post larvae / PL
- The number of fingerlings declining
- No recovery cost for hatcheries (fingerlings and PLs are provided free of charge to farmers)
- High cost of hatchery operations
- There are fewer farmers in production and smaller farm sizes
- Equipment and water quality testing kits needed

1.3. Overview of the financial services and insurance sectors

Financial Services Overview

Saint Lucia's financial and insurance sector is crucial for facilitating investments, promoting economic stability, and supporting the needs of individuals and businesses. The sector comprises a mix of domestic and international banks, credit unions, insurance companies, and other financial institutions. The financial and insurance sector in Saint Lucia is regulated by the government’s Financial Services Regulatory Authority (FSRA) to ensure stability, protect consumers, and prevent illicit activities. The Eastern Caribbean Central Bank (ECCB) is responsible for the regulation and supervision of commercial banks and other financial institutions that are deemed to conduct “banking business”; that is accept deposits and provide lending services to the public.

In respect of financial products offered by the entirety of financial providers in Saint Lucia, the preponderance of offered products are in the form of debt financing instruments, comprised mostly of loans, overdrafts and mortgages. Commercial banks and credit unions, along with some other non-bank financing institutions also offer deposit taking in the form of chequing, savings or term deposits. Overdraft facilities are offered to larger, more established enterprises and are secured by collateral assets or guarantees. All financial institutions interviewed underscored the **requirement of documented ability to repay from cashflow** as the seminal determinant of eligibility for a loan. Collateral requirements varied between institutions with the credit unions maintaining the most relaxed stipulations for their borrowing members.

Nevertheless, the financial sector in Saint Lucia is still admittedly limited, with a scarcity of financial intermediation agencies and activities. The dominant and traditional lenders are the commercial banks, namely: Bank of Saint Lucia (established by the GOSL in 1980 after the demise of Chase Bank and now majority-owned by Trinidadian investors)); 1st National Bank (the country's first private indigenous bank), CIBC First Caribbean International Bank (result of a merger of Barclays Bank and CIBC); Republic Bank EC Ltd. (Formed from merger of previous Republic Bank, Saint Lucia and Royal Bank of Trinidad & Tobago along with purchase of Scotiabank's Eastern Caribbean holdings) .

There are also several non-traditional, micro, and community financing entities, including 12 credit unions (see Figure 2 below). While these credit unions have varying capacities in terms of asset base and lending capacity, all of them provide essential lending to sustain their members' financial needs. In many instances, those members would not have the capability to access traditional bank financing due to limitations of collateral or income qualifications. The credit unions are, therefore, a vital component of the financial infrastructure of Saint Lucia and will be critical to achieving the objective of channelling much-needed financial resources toward local-level climate adaptation.

First Citizens St Lucia Limited and Financial Investment and Consultancy Services Ltd (FICS) are two seasoned, non-bank financial agencies currently operating on the island. While both entities provide some lending (investment lending, personal loans, and commercial loans), they are more involved in investment brokerage and savings/portfolio investment facilitation. Several newer, non-bank lending establishments, including the largest home furnishing retailer, Courts Unicomer, have entered the lending market and have begun to provide financing for a variety of individual borrowers' needs more recently. Their focus has, however, been on personal lending for consumer products. Included among these are Axcel Finance and CAPITA Financial Services Inc., which both provide small personal loans to borrowers with less onerous conditionalities but at significantly higher interest rates. There is a real concern, however, that these new entrants are focused more on quick gains from unproductive consumer loans to fund holiday travel and even carnival costumes. Nevertheless, through the Government of Saint Lucia, at least two microfinance providers specializing in business development loans also exist, namely the BelFund and the Micro Enterprise Development Fund. Their lending is aimed mostly at micro-business start-ups and early-stage enterprises but none of them are recorded as having lent to the fisheries sector in Saint Lucia.

A snapshot of available financial products in Saint Lucia and the major requirements for obtaining a loan or overdraft facility is given in Table 1 below.

Table 6: Lending Institutions in Saint Lucia and their Current Stipulations and Application Processes

Type of Financial Provider	Product /Service	Eligibility Criteria	Key Requirements & Processes for Accessing Product
Commercial Banks	1. Commercial and individual/personal loans including mortgages. 2. Savings & Chequing account deposits. 3. Overdraft facilities 4. Collections & Letters of Credit	1. Usually available to depositors or those willing to open deposit accounts. 2. Available to any resident (individual or business) via written application/filling-out of standard form. 3. Both individuals and businesses that meet the provider's set criteria. 4. Registered businesses involved in local or international trading.	Application in person along with written application form. Documented evidence of ability to repay loan from cashflow or income. Asset collateral or third-party guarantee. Personal identification documents. Evidence of confirmed residential address or business registration. Written salary deduction agreement for individual PAYE borrowers. Business registration, course of dealings with lender, and income statements. Supply contracts, monetary deposit (lien on account) or 3rd party guarantee.
SLDB	Loans to individuals and businesses in stipulated sectors areas such as education loans, house & land (mortgages) and business loans in agriculture, fishing, tourism, construction, manufacturing, other services etc.	Any resident individual or registered business. Loans are usually restricted to stipulated areas/endeavours and within maximum limits.	Written/in-person application with specified forms to be filled out in writing. Documented evidence of ability to repay from income or cashflow. Written salary deduction agreement. Asset collateral or third-party guarantee.
Credit Unions	1. Deposits for members only. 2. Individual and business loans/mortgages to members only	1. Members (where applicable restricted to workers/affiliates in the designated credit union's community or sector) 2. Members	1. Written/in-person application with specified forms to be filled out in writing. Assistance to fill out forms is provided by the credit union. 2. Documented evidence of ability to repay from income or cashflow. Optional asset collateral or third-party guarantee. Written salary deduction agreement.
Micro-lenders	Micro lending for consumer products and personal endeavours.	Open to anyone meeting repayment criteria. Usually not for commercial purposes.	Written application with form fill-out. Secure collateral. Documented evidence of ability

Type of Financial Provider	Product /Service	Eligibility Criteria	Key Requirements & Processes for Accessing Product
			to repay and/or written salary deduction agreement.

The three instructive takeaways from the above table are:

1) All applications require the filling out of forms hence a certain level of literacy.
2) Documented evidence of the ability to repay the loan is the primary criteria for determining the issuance of a loan to a prospective borrower in every instance.
3) None of the lenders currently do asset lending but security by way of property or cash collateral is required above a certain amount.

Lenders are therefore challenged with reaching potential fishers who do not possess the level of literacy to fill in the required forms or do not have an adequate documented record of income or cashflow to satisfy the requirements of lenders. According to the various interviews with the fishing sector, this often results in fishers resorting to cash-based financing options from friends, family, and barter arrangements as well as from savings outside of the commercial banking sector. Some of them are members of community-based or sector-specific credit unions and therefore receive direct assistance in filling out forms or in documenting income and expenses. Many fishers nevertheless operate within the informal economy and have expressed, in the interviews, a general "distrust" of the formal financial sector, which may be due to their inability to meet the stipulated requirements as well as to the lack of understanding of and appreciation for their needs by the financial sector. Those phenomena may have induced an inherent financial bias against the fishing sector, especially in respect of small-scale fishers (SSF) [1].

Commercial Banks

Saint Lucia currently has four (4) domestically operating commercial banks, namely 1st National Bank, National Commercial Bank of Saint Lucia, CIBC First Caribbean International Bank, and Republic Bank EC Ltd. The first two are indigenous banks that have consolidated their presence by acquiring other domestic banks in the region, whereas the other two are regional banks that have also consolidated by acquiring both regional and international banks that operated in the region. They all offer a range of financial services, from personal savings and checking accounts to business loans, mortgages, letters of credit and collections, and foreign exchange services. These banks also provide various digital banking solutions in line with the global trend towards digital financial services. As at the end of 2022 commercial bank interest rates range from a regulated minimum of 2% on savings deposits to a voluntary maximum 6.5% on 6-month time deposits. Given the need for a spread on deposit and lending rates, the lending rates during the same period ranged from a minimum of 4.50% to a maximum of 15% depending on the nature, tenure and size of the loan. The effective interest rate, however, was recorded at a maximum of 25%[2].

Interestingly, in Saint Lucia's private sector, credit extended to both businesses and households rose by 2.9 per cent and 0.8 per cent, respectively notwithstanding the perceived

[1] See Tietze and Van Anrooy (2018)
[2] ECCB Monetary & Financial Statistics 2022. Retrieved at: Interest Rates on Deposits and Loans (eccb-centralbank.org)

tightness of credit available to the fishing sector. As per the conventions of banking statistics, credit advanced to the fishing sector is not recorded given the miniscule proportions of this lending. This phenomenon has been confirmed by the two commercial banks interviewed thus far.

Development Banks

The St. Lucia Development Bank's (SLDB) mission is to facilitate enterprise and sustainable socio-economic development by providing accessible and affordable financial, technical and advisory services. Indeed, during the interview with this institution, its Managing Director confirmed that the SLDB's mandate includes the development of enterprises, and that mandate specifically mentions the fishing sector. However, there has not been much uptake by the fishing sector of SLDB's lending portfolio.

The SLDB also provides development financing to small and micro enterprises and has recently ended its pilot Climate Adaptation Financing Facility (CAFF), which was a world bank-funded financing mechanism within the SLDB designed to, "…*offer climate change adaptation loans which are: (a) affordable, (b) equitable across socio-economic and gendered lines and (c) provide incentives for pre-emptive vulnerability reduction*" (SLDB, 2020). The CAFF was originally developed under the Pilot Programme for Climate Resilience, a Climate Investment Fund (CIF)-led initiative but ended up as a component of the World Bank's Disaster Vulnerability Reduction Project (DVRP). Not much was forthcoming from the SLDB about the success of this project, but CAFF offered concessional loans and other financial services to finance investments and activities that sought to build the resilience of assets and livelihoods to adverse weather events.

With the non-renewal of its funding replenishment, the CAFF ended in June 2023 after a five-year tenure. The SLDB claims that it was useful because of its low-cost financing (allowed lending at 4.5%), which was better than that obtained by SLDB from traditional lines of credit providers such as the Caribbean Development Bank (CDB), the European Investment Bank (EIB), and the National Insurance Corporation (NIC). SLDB is now in the process of seeking GCF accreditation-as one of the designated entities in Saint Lucia for the GCF. This would allow it to administer funds through the Caribbean Community Climate Change Centre (CCCCC) and CDB, which are regional accredited entities and SLDB could then be a direct access entity. This, other things being equal, should facilitate the SLDB's intended more direct interface with the fishing sector.

Credit Unions

With a penetration level of more than 20%, credit unions in the wider Caribbean region are considered to have the greatest penetration rate in the world. In Saint Lucia, the penetration rate is estimated at over 75 percent. An estimated 95,988 St. Lucians were members of a credit union in 2017, with market penetration at 75.81 percent[3]. These community, employment and sector-based cooperatives have seen a marked expansion of their membership, increases in their assets and upgrading of their operational systems and technology, although their absolute numbers have dropped slightly, over the past decade through consolidations and market exits. The Caribbean Confederation of Credit Unions (CCCU) indicates that as at the end of 2020, there were 48 credits unions operating in the ECCU (inclusive of one each in Anguilla & Montserrat) with a combined membership of 435,866, savings (deposits & shares) of US$ 1.45 billion, assets of US$1.8 billion (28 percent

[3] Borgen Magazine. *The Benefits of Credit Access in Saint Lucia*. April 2019. Retrieved at: The Benefits of Credit Access in St. Lucia - BORGEN (borgenmagazine.com)

of GDP) including outstanding loans of US$1.17 billion[4]. This is significant for the ECCU region, as credit unions hold assets amounting to more than 17 percent of commercial banks assets and outstanding loans equivalent to almost 25 percent.

Although they are deposit takers, the credit unions are supervised by the domestic SRUs and not by the ECCB. In Saint Lucia, they fall under the auspices of the Registrar of Cooperatives, which currently resides within the Ministry of Commerce. Of course, their cash is deposited with commercial banks but some of them such as the Civil Service Cooperative Credit Union in Saint Lucia approximate the size of some of the smaller indigenous banks in the region. However, many of them are simply too small to be viable hence the recent reduction in their numbers occasioned by mergers or closures. Given their cooperative nature, which connotes ownership by members, they tend to have closer, mutually reassuring relationships between owners/shareholders and management that could be useful for promoting responsible investment and sustainable, inclusive finance for the fisheries sector[5].

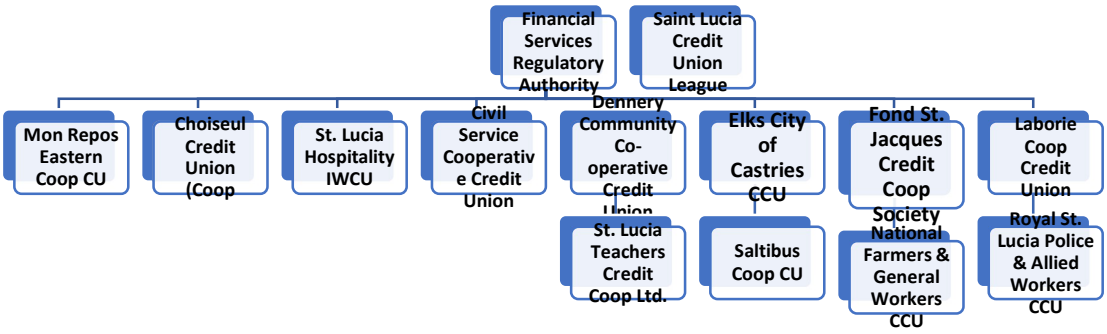
Table 7: Consolidated Statistics for Saint Lucia's Credit Unions

Nr of Credit Unions	Nr of Active Members	Total Savings	Outstanding Loans	Total Reserves	Total Assets	CUs with close ties to fishing communities
12	73,127	$187,206,346	$150,422,501	$13,737,670	$257,250,954	1. Choiseul CUC 2. Dennery CCCU 3. Fond St. Jacques CCS 4. Laborie CCU 5. Mon Repos ECC 6. Saltibus CCU

There are currently 12 credit unions in Saint Lucia, many of which are community based and operate within fishing localities. The current structure of credit unions in Saint Lucia is headed by a Credit Union League, which comprises all 12 of the existing credit unions. The details/names of the credit unions can be seen in the figure below:

Figure 13: Saint Lucia Credit Unions & Regulatory Structure

[4] Caribbean Credit Union Statistics – The Caribbean Confederation of Credit Unions (caribccu.coop)
[5] Op. Cit. Tietze, U. and Van Anrooy, R. 2018.



It is evident that the various credit unions are independent of each other although banded together under the National Credit Union League, which itself falls under the umbrella of the Caribbean Confederation of Credit Unions (CCCU). Other than the Civil Service Cooperative Credit Union, the St. Lucia Teachers Credit Cooperative, the Royal Saint Lucia Police and Allied Workers Credit Union, the Hospitality Industry Workers Credit Union, and the National Farmers & General Workers Credit Union, they are all community based. They are thus well placed to provide support and collaborative assistance to fish cooperatives and their members who are in some instances also members of the credit unions. Indeed, this already obtains in some of the fishing communities who have intimated a much more satisfactory business relationship with the credit unions, who seem to better understand the needs, challenges, and special requirements of fishers. The fishers have also revealed that the credit unions have facilitated their ability to keep records and provide financial statements etc.

While these credit unions have varying capacities in terms of asset base and lending capacity, all of them provide essential lending to sustain their members' financial needs. In many instances, those members would not have the capability to access traditional bank financing due to limitations of collateral or income qualifications. The credit unions are, therefore, a vital component of the financial infrastructure of Saint Lucia and will be critical to achieving the objective of channelling much-needed financial resources towards the climate adaptation and business development needs of local fisherfolk.

The various fish cooperatives are the primary institutional fishing sector interface with the credit unions, but some are more active than others. From site visits, requests for information and interviews, it is evident that the fish cooperatives in Choiseul, Dennery, Soufriere, and Laborie are the most active and well structured. They provide both technical and logistical support to their members and assist with training programs, administer the fuel rebate scheme on behalf of the GOSL, and represent the interests of their membership in various meetings, forums, and negotiations. It is thus no coincidence that the most active community-based credit unions are in those locations (The Fond St. Jacques CCS and the Saltibus CU are both in Soufriere and the others are in the three other locations except for Mon Repos ECCU, which is in Micoud).

Financial Sector Challenges

The main challenge for fisherfolk in gaining access to the financial sector is the inability of many of them to meet the requirements of lenders especially providing evidence of an ability

to pay. The interviews with both commercial banks as well as the SLDB underscored that the ability to repay a loan was the singular determinant of eligibility. Even when collateralized, banks still expect that the borrower would be able to pay from their established inflows of income/revenue. However, as agreed by Randel Esnard of the DoF and even some of the financial institutions interviewed, current debt financing from financial agencies in Saint Lucia do not necessarily cater to the fishing sector. They are not sensitive to the peculiar liquidity or cash flow problems of the sector and consequently the traditional fixed-term amortization loan products fail to attract the interest of fisherfolk. There is therefore an opportunity for commercial banks, the SLDB, and credit unions to explore modern-day, more flexible loan products such as balloon payment loans or deferred payment loans rather than typical term loans. This would help to lessen the liquidity problems experienced by fishers but the documented evidence of an ability to repay from cashflow would still be required.

Even with credit unions, which are more closely associated with fisherfolk and the communities in which they live and operate, there must be a documented capacity to repay any loan that is advanced[6]. This cannot be negotiated but certainly there is room for increasing efforts to help fishers in upgrading their financial record keeping skills as well as their capacity for business revenue monitoring and management. Similarly, targeted engagements with the financial sector to assist with improving their understanding of the needs and potential of the fishing sector would be critical[7].

While most commercial banks do not see it as their responsibility to provide this type of assistance to fisherfolk, the credit unions, on the other hand, seem more inclined to provide this service and given their closer connection to fish cooperatives and the fishing communities, which provide a significant share of their membership, should be the targeted lender of first resort for fisherfolk. Educating small business enterprises such as fishers and fish cooperatives, along with enlightenment of financial institutions about the needs and potential of fisherfolk, is therefore key to better financial intermediation. Notably, the 1st National (the first indigenous bank in Saint Lucia, which started as the “Penny Bank” by local businessmen in 1938) has stated its inclination to partner with fishers on any sponsored technical assistance project to improve their financial literacy and record keeping. The SLDB has also conveyed its readiness and willingness to assist by looking to hire a specialist (agriculturist) who can help with assisting the entire sector, including fisheries. Of course, as suggested by Esnard (Appendix 1), this person should ideally be well versed in agricultural finance, the design of loan products that alleviate liquidity stress, and blended finance for enabling inclusive business models.

There is also the issue of revenue and expenditure record keeping, which the interviews with both the fishing and financial sectors have underscored. Incidentally, LBOS has highlighted this as one of the critical services that they would provide to their partnering fishers and their respective cooperatives. This would be a strong and encouraging platform on which to essay the matrix of proposals designed to ameliorate the current lack of financial access and intermediation opportunities for the fishing sector in Saint Lucia.

Insurance sector overview

The insurance industry in Saint Lucia comprises both general and life insurance services. The former comprises companies and insurance brokers that offer policies covering a range of

[6] Interview with Jermaine Hunte, CEO of the Credit Union League of Saint Lucia (Appendix 1)
[7] See FAO guidelines:
https://www.fao.org/3/ca5128en/CA5128EN.pdf (credit)

risks, including general insurance, property (buildings and other immovable physical assets), motor (automotive vehicles, boats, engines etc.), health, shipping, and travel. Life insurance companies in Saint Lucia offer various products, including term life, whole life, and endowment policies. Additionally, some companies provide private pension plans and investment products. Third party insurance is mandatory[8] for all licensed motor vehicles that use the public roads of Saint Lucia. However, the same is not true for fishing vessels and this may be a useful way to ensure that all registered fishing vessels have at least third party, if not comprehensive, insurance.

A Government-subscribed parametric insurance facility known as the Caribbean Ocean and Aquaculture Sustainability Facility (COAST) initiative was developed in 2020 through a partnership of the U.S. State Department, which donated funds; the World Bank, which supported the product design and government readiness to implement COAST; CCRIF SPC, which developed and issued the actual insurance policies; the Caribbean Regional Fisheries Mechanism (CRFM), which supported the implementation of COAST; and the Caribbean governments. COAST was piloted in Saint Lucia and Grenada with the first phase of coverage commencing from July 1, 2019, until May 30, 2020. Information from the 2019 and 2020 Reports on COAST by the Chief Fisheries Officer (CFO) indicates an increasing trend in the number of registered fish sector workers covered by the COAST facility; registration rose from 637 in 2018 to 732 in 2019 and 1475 in 2020. Only 85 of the total of 1475 registered fish workers were women, with the majority (709) designated as crew, 270 boat captains, 234 non-fishers/unknown, and the remainder categorised as owner/captain/crew. The significant jump in registrations in 2020 was attributed to the requirement for registration of persons within the sector for the Department of Agriculture's Income Support Grant Program during the Covid-19 pandemic.

Under the pilot program, the national government and the fisherfolk of Saint Lucia were both direct beneficiaries of the COAST product. Indeed page 6 of the 2019 COAST brochure from CCRIF states thus:

"*While it is governments that purchase COAST policies, this parametric insurance product is unique – it incorporates a livelihood protection component (akin to microinsurance) and a tropical cyclone component (sovereign insurance).*

The COAST product provides coverage for losses caused by "bad weather" on fisherfolk and for direct damages caused by tropical cyclones (wind and storm surge) to fi shing vessels, fi shing equipment and fi shing infrastructure. In this case, "bad weather" is defined as high waves and occurrence of heavy rainfall throughout the policy year."

The intention was that the government would benefit by transferring the huge liability of disaster recovery to CCRIF SPC and reducing volatility in its national budget[9]. On the other hand, fisherfolk—boat owners, captains, crew members, fish vendors, and fish groomers—would gain from direct and quick pay-outs from the Ministry of Finance in the event of a catastrophe. This has, however not been as successful as anticipated but perhaps can be consolidated and expanded into a contributory insurance facility that provides both catastrophe insurance through its parametric segment and life insurance /pensions plans through the joint contributions of fisherfolk and their respective governments. (Tietze and Van

[8] Motor Vehicles Insurance (Third Party Risks) Act. Revised Laws of Saint Lucia (2020).
[9] Attempts to obtain the actual premiums paid by the GoSL from the DoF and CCRIF have been unsuccessful thus far.

Anrooy 2018) validated this idea in their fishing industry insurance proposals as did the feedback received from Randel Esnard of the DoF's Marketing Unit[10].

As the first-ever climate risk parametric insurance developed for the fisheries sector in the Caribbean, COAST was targeted at vulnerable fishing communities who needed enhanced access to insurance products developed specifically for their needs. It also promotes resilience in the fisheries sector by attempting to help mitigate the harmful impacts of climate change to fisheries and food security, while incentivizing policy reforms for climate-smart fisheries practices and coastal resilience.

Insurance Sector Challenges

Information collated from the interviews with the fishing sector and the financial sector point to many challenges that are uniformly exhibited across the former sector. Attempted interviews with other insurers have not materialized but anecdotal and documented information seem to confirm the key findings of a mismatch between the perceived risks inherent to the fishing sector and the ability, capacity, and willingness of the insurance sector to underwrite those risks.

Fishers admit that the costs of insurance, where available, are prohibitively high and confirm that the risks are high especially with the insurance of vessels/boats although the boat engines are sometime insured. The concerted response to those challenges therefore can be reduced to the following:

1. Employ agglomeration and other methods to mitigate risks.
2. Planned initiatives to promote a greater take-up by the fishing sector of insurance products (indemnity from catastrophes, vessels, health, life, retirement etc.) but reliable data is critical to the design of any new product. This requires a better structuring of the sector, perhaps by subsidizing management of the sector or through an extension service program like obtains in agriculture.
3. Aggregation of skills and responsibilities can also help such as creating a market space where fish vendors, purchasers and fishers could come together to ensure record keeping of sales that allows better access to financing.
4. New mechanisms that facilitate special access for fishers (e.g., through microfinance and targeted insurance products) so they can make prudent investment decisions on how best to adapt to the impacts of climate change.

A telephone interview with a senior representative of the insurance industry in Saint Lucia and an email response from an even more experienced expert[11] confirmed that there were many challenges with fulfilling the insurance needs of operators and artisans in the fishing, mariculture and aquaculture sector. The perceived risks inherent to the sector, even without the phenomenon of climate change, are very high and some, such as the open canoes and pirogues, are said to be uninsurable. They further intimated that the fishing industry struggles for insurance because exposure is high, aggregate is low and there is a limited availability of appropriate instruments and products. Where available, premiums are relatively high and have increased even more in recent months due to challenges with securing reinsurance. Further, the experts intimated that Saint Lucia and other small Caribbean countries are experiencing reduced reinsurance capacity/offerings in the markets, especially in respect of

[10] Esnard also believes that the COAST facility, as originally designed is, "…*merely a risk transfer scheme and not necessarily a sustainable way of 'sharing the responsibility' associated with an insurance product."*
[11] Op. Cit. Royron Adams & Leathon Khan (Appendix 1)

property insurance. (marine hull/equipment). However, there are no similar issues with life insurance and pension plans and the only limitation there would be the cost of premiums. Thus, if the fishers are organized in a formal way under the umbrella of an organization or association, then it would make it easier to arrange a "Group" insurance plan to cover the participating members. Public Liability is usually available as part of the insurance on fishing vessels. However, it becomes far more challenging if Public Liability coverage is being sought on its own, without any accompanying property insurance[12].

There also appears to be no real strategic approach by governments to urge insurance companies to develop appropriate products for the industry. Further, there is apparently a lack of expertise in the market to underwrite risks and this make the insurance industry even more risk-averse to the fishing sector[13].

Added to these challenges is a lack of critical mass as well as an inadequately organized fishing sector with most assets exposed and not underwritten[14]. There have been attempts by companies in the Caribbean to develop parametric products for credit unions and their members including farmers and fishers, but this did not get momentum due to poor understanding of potential users[15]. The then local carrier (Grace Kennedy Insurance of Jamaica), which was represented locally by EC Global Insurance, did not invest enough in the product. It is unclear whether this product succeeded elsewhere, as this could be a good practice to be studied and possibly emulated in Saint Lucia.

There is also a case in neighboring St. Vincent & the Grenadines where a marine insurance facility was underwritten, sometime in 2019, for the fishing and transportation (water taxis) sector (mostly vessels- non-trawlers {pirogues/canoes} made of wood/fiberglass up to 30 ft.). Most had outboard engines, but the high incidence of theft led to additional risks and exposure due to unsecured storage locations. The quoted insurance premiums for both all risks and total loss insurance for an open pirogue-styled fishing vessel/water taxi is captured in the tables below.

Table 8: Consolidated indicative Insurance Rates for Water Taxi/Fishing Pirogue (2019).

Source: Adams Insurance Brokerage, SVG

Coverage	Rate	Excess
All Risks	3% of the Value	4% of the Value (double for storm)
Total Loss	1.5% of the Value	2% of the Value (double for storm)
Liability	0.25% of the Limit	XCD5,000.00

This is merely an indication of the rates that various insurance providers in St. Vincent were willing to offer and it is suggested by the broker, who now operates in Saint Lucia, that, once

[12] Op. Cit. Leathon Khan

[14] Op. Cit. Royron Adams.
[15] Ibid..

adjusted for inflation and rising regional underwriting and global reinsurance rates, the indicative rates should be applicable to Saint Lucia.

The marine fleet programme was eventually put in place with underwriting support but strict conditions regarding the security of outboard engines. However, the local fisheries cooperatives failed to organize the program well enough to ensure safety standards and this floundered. This further underscores the lack of specialized skills and management in the various fishing cooperatives, which are flagged for major skills and operational upgrades.

Ensuring safety and security standards at landing sites are upgraded is a subject of this GCF Funding Proposal so this should hopefully assist the quest towards a more attractive product for insurers. The support of the Fish Cooperatives and the Department of Fisheries (DoF) would, however, be essential to the success of this venture.

Table 9: Examples of Total Premium on a Vessel valued at XCD70,000.00 for the two different types of coverage available.

Source: Adams Insurance Brokerage, SVG

Example 1	Example 2
Boat Value XCD70,000.00	Boat Value XCD70,000.00
Liability Limit – XCD1,500,000	Liability Limit – XCD1,500,000
Coverage – ALL Risks	Coverage – Total Loss
Hull & Machinery (70,000 * 3%) - XCD2,100.00	Hull & Machinery (70,000 * 1.5%) - XCD1,050.00
Liability Premium – (1,500,000 * 0.25%) – XCD3,750.00	Liability Premium – (1,500,000 * 0.25%) – XCD3,750.00
Total Premium – XCD 5,850.00	Total Premium – XCD 4,800.00

Fishers also indicated during interviews that there is indeed a distress policy in Saint Lucia for fishers. This is administered by the Department of Fisheries in collaboration with the Fish Cooperatives[16]. The funding of the distress fund is derived from the fuel rebate granted to fishers by the government. Whenever a claim for a rebate is processed, a small contribution is deducted for depositing into that distress fund. A percentage also goes into that fund every 3 months for all boat owners who are members. Government places a cap on the amount in the distress fund, so it is limited in scale and scope and not a replacement for comprehensive insurance of assets, life, and limb of fishers, many of whom admit to making no contributions to social security. Incidentally, LBOS did include a pension arrangement in their renewed proposal to the GoSL, whereby specific small amounts from the purchase of seafood from local fisherfolk would be retained for contributing to a private pension scheme.

[16] Efforts to garner the actual amounts claimed and paid out of the Distress Fund have been unsuccessful thus far. The DoF did admit that the information is available but has not been able to share this information. The alternative would be to obtain it directly from each of the 9 major fish cooperatives, but this would certainly result in unnecessary further delays.

1.4. Policy and regulatory landscape

National Development Plans and Strategies

The Saint Lucia's National Adaptation Plan (NAP) 2018–2028 (UNFCCC, 2018) outlines key adaptation measures across eight crucial sectors and areas, addressing both cross-sectoral and individual needs. It also includes a section on the limitations of adaptation, acknowledging the need for ongoing adjustments. Additionally, Sectoral Adaptation Strategies and Action Plans (SASAPs) will be developed and integrated into the plan over time. Priority sectors for immediate action include tourism, water resources, agriculture, fisheries, infrastructure and spatial planning, natural resource management (covering terrestrial, coastal, and marine environments), education, and health. The plan acknowledges that other key sectors may be identified through a continuous and iterative process.

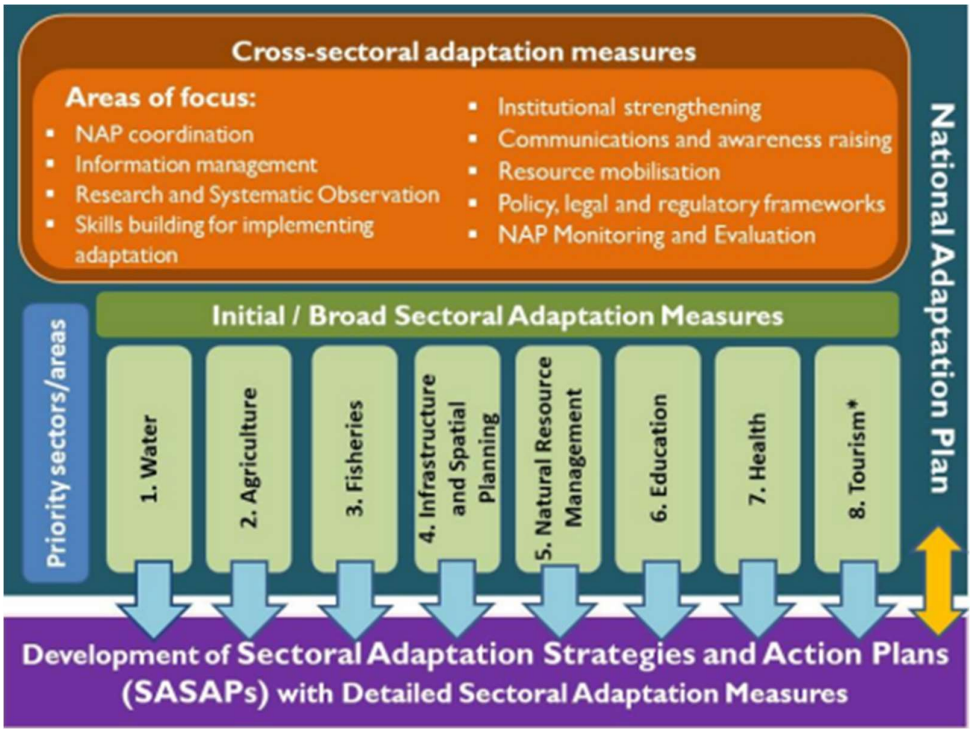


Figure 14 NAP strategy

One of the main objectives of the NAPs is "to facilitate the integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programmes and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate". NAPs align with national development and climate goals, leveraging existing policies, laws, institutions, and programs to mainstream climate adaptation into development, budgeting, and decision-making. Implementing the NAP and SASAPs assumes continued international support for development and climate projects, alongside additional adaptation funding secured from sources like the GCF, Adaptation Fund, and other partnerships.

Key national development, and climate policies, legislation and planning instruments for the NAP are as follows:

Policy

The Saint Lucia CCAP (2015)
National Water Policy (2004)
National Wastewater Policy and Strategic Plan (2017, awaiting adoption)
National Environmental Policy & National Environmental Management Strategy (NEP/NEMS) (2005, revised in 2014)
National Land Policy (2007) - Revised draft (2017, awaiting guidance)
National Environmental Education Policy Revised draft (2010)
Legislation
Beach Protection Act (1967 and Amendment of 1987)
Maritime Areas Act (1984)
Fisheries Regulations No.9 (1994)
Fisheries Act No.10 (1984)
Tourism Incentives Act (2005)
Tourism Industry Development Act (1982)
Planning Instruments
National Vision Plan (2008)
MTDS (2012-2016) Sectoral Action Plan
Strategic Programme for Climate Resilience (2011)
National Biodiversity Strategy and Action Plan (under review)
Framework for Integrated Environmental Management in Saint Lucia (2005)

Fishing sector outcomes:

1. Enhanced enabling environment for climate adaptation action in the fisheries sector
2. Enhanced nutrition, food availability, quality and security through adaptation in the fisheries sector
3. Strengthened partnerships for building sustainable and resilient fisheries in a changing climate
4. Strengthened preparedness to climate variability

Tourism sector outcomes:

1. Viable and productive tourism sector through direct interventions and collaborations and synergies with all other sectors

Institutions and governance structures of the fisheries sector

The Department of Fisheries within the Ministry of Agriculture Fisheries, Food Security and Rural Development is the primary regulator of the fishing sector in Saint Lucia. Fish cooperatives are, however, regulated by the Registrar of Cooperatives, which falls under the Ministry for Commerce etc. This Ministry, incidentally, also houses a Small Business Development Unit, which may be useful for any business development intervention that the fisheries sector would require. Like other Caribbean countries, Saint Lucia has been actively involved in regional efforts to manage and protect marine resources, including through participation in regional bodies like the Caribbean Regional Fisheries Mechanism (CRFM). The need for a collaborative 'whole of government' approach to providing policy, institutional

and technical support to the fisheries sector is underscored, as no single governmental agency would be able to plug the many operational, knowledge, technical and capacity gaps that militate against the sector's inability to source the required financial resources and insurance services needed for strengthening its climate resilience.

The Department of Fisheries operates within the framework of the **Fisheries Act No. 10 of 1984 in force 18 February 1985 (S.I.16/1985)**, which was revised in 1994 with Updated Fisheries Regulations and in 2000 with Fisheries (Snorkeling License) Regulations. The Act is divided into four (4) main sections, namely: Fisheries Management & Development; Marine Reserves & Conservation Methods; Enforcement; and a General Section that includes the regulations, exemptions and a savings clause. There is also a National Policy for the Fisheries Sector (NPFS) 2020, which names the DoF as the lead agency for implementing the policy. That policy document states that, "…The purpose of Saint Lucia's National Policy for the Fisheries Sector (NPFS) is to guide the planning and development of the fisheries sector for the period 2020 to 2030. The NPFS includes a vision, priorities and strategies to guide operational decision making in a manner that supports the sustainability of fisheries resources and contributes to the social and economic development of Saint Lucia.

The key priorities of the NPFS are:

- Priority 1: Ecosystem Health and Integrity
- Priority 2: Managing Climate and Disaster Risks
- Priority 3: Social and Cultural Development
- Priority 4: Stakeholder Capacity and Role in Decision Making
- Priority 5: Institutional Support
- Priority 6: Capture Fisheries
- Priority 7: Aquaculture
- Priority 8: Onshore Infrastructure and Ancillary Services
- Priority 9: Market Access and Expansion

The National Fisheries Policy Statement highlights the fisheries sector's crucial role in Saint Lucia's economy, offering jobs, food security, and business opportunities. Recognizing this, the government prioritizes effective management by providing policy guidance for commercial and recreational fishing, aquaculture, and post-harvest activities. The main focus of the Fisheries Management Strategy, which is reflected in the both the NPFS and Regulations, is as follows:

Table 10 National fisheries policy measures

Measures	Description
Conduct Stock Assessment	Evaluate fish population health and sustainability
Determine Fishing Effort	Analyse fishing pressure on specific stocks
Regulate Capture/Manage Exploitation	Set quotas, limits, and seasons for fisheries
Enforce Regulations	Ensure compliance with fisheries regulations
Establish Target & Limit Reference Points	Define sustainable harvesting levels
Revise Regulations	Update regulations based on research and data
Revise Legislation	Modify fisheries laws for long-term management

Measures	Description
Collaborate with Regional Organizations	Share data and management strategies with other countries
Collaborate with IWC	Manage whale populations through international cooperation
Promote Appropriate Fishing Technologies	Encourage environmentally friendly practices
Maintain Beach Access	Secure traditional fishing rights and communities
Maximum Legal Size	Regulate minimum harvest size of specific fish
Protect Critical Habitats	Conserve spawning grounds and nursery areas
Restrictions on Gear	Limit use of harmful or unsustainable fishing gear
Mesh Size Limits	Control catch size and selectivity
Closed Seasons	Protect spawning periods and vulnerable species
Closed Areas	Establish marine reserves for habitat protection
Moratorium	Ban fishing on specific species or in specific areas
International Regulations	Implement ICCAT and CITES regulations
Maintain Moratorium	Extend bans on endangered or depleted species
Sport Fishing Regulations	Control recreational fishing practices
Capture in Bays	Manage fishing activity within sensitive areas
Large Specimen Regulations	Implement IWC management of whales and large fish
Scuba Gear Use	License and regulate scuba diving for fishing
Export Regulations	Ensure responsible and legal fish trade (e.g. those governed by the Convention on International Trade in Endangered Species of Wild Fauna and Flora)

While the Department of Fisheries provides the supporting policy and regulatory framework, there is a critical need for business development support to facilitate the more efficient operation of fishers, whether individually or collectively through their respective cooperatives or the NFO. This would necessitate the involvement of other public agencies along with financial institutions and specialised business support entities that are better endowed with the resources and skills to assist the much-needed restructuring of fisheries operations, along the entire value chain, in Saint Lucia. The participating Fish Cooperatives at the one-day workshop on November 16th, 2023, in Saint Lucia resoundingly supported the idea of engaging in more efficient and profit0driven activities that would incentivize their members to become more productive, enterprising and disciplined. This would, of course, lead to steadier, greater income flows that would enable them to access insurance and financial services to build their climate and financial resilience. Upgrading the skills and knowledge of fishers and their cooperatives in this respect would require more specialised services such as that provided by the Ministry of Commerce (Business registration, mentoring and facilitation services); the Youth Economy Agency; and Export Saint Lucia.

Effective fisheries management requires close collaboration across government agencies acknowledging that fishers' needs are broader than just technical support. There remains a pivotal role for the Department of Fisheries in continuing to regulate the sector’s operations and providing technical support for sustainable fishing practices, implementation of the fishing

sector's Sectoral Adaptation & Strategic Action Plan (SASAP), promoting more rigorous data capture and reporting practices, and interfacing with regional and international bilateral and multilateral agencies on behalf of the local fisheries value chain (Andrew, 2023).

Financial Sector Policy, Legal & Institutional Issues

The Eastern Caribbean Central Bank (ECCB) is the primary regulator and supervisor of the Eastern Caribbean Currency Union's (ECCU) financial sector, of which Saint Lucia is the largest member in respect of economic and population size. The ECCU comprises eight (8) member countries, two of which are British Overseas Territories (BOT) and the other six, independent States. The ECCB is thus uniquely positioned to conduct monetary policy and to supervise the financial system to minimize systemic risks. Direct supervision is, however, limited to licensed financial institutions, which comprises only commercial banks and other deposit-taking institutions that are deemed to carry out "banking business" in accordance with the ECCB's Charter. The ECCB is currently coordinating the formulation and implementation of a green finance strategy in partnership with the World Bank and under the auspices of the NDC Partnership. Given its non-traditional mandate to actively promote the economic development of its member states, through means consistent with its other (traditional) central banking objectives, the ECCB would naturally be a key partner in forging a new dispensation that seeks to improve financial intermediation within the fisheries sector of Saint Lucia or any other ECCU country, for that matter.

The ECCU's financial system, as reflected at the national level in each member country, is made up of commercial banks, offshore banks (international financial services), credit unions, insurance companies, national development foundations, development finance institutions inclusive of national development banks, building and loan associations and finance companies. Saint Lucia mirrors this composition, but it is worth noting that there is a seamless movement of both capital and persons across the ECCU; thus, the entire ECCU financial sector is technically available to Saint Lucia as a source.

Most non-bank financial institutions within the ECCU, as obtains in Saint Lucia, are offshore entities with no direct involvement in financing activities within the region or any of its constituent countries. Nevertheless, they are variously regulated by the Eastern Caribbean Securities Regulatory Commission (ECSRC), which is responsible for overseeing the Eastern Caribbean Securities Exchange (ECSE) and other capital market participants; the Ministries of Finance (overall policy control and licensing); and the Single Regulatory Units (SRU) in each member state. In Saint Lucia, NBFIs, including insurance companies, are regulated by the Financial Services Regulatory Authority (FSRA).

The current ECCU Financial Regulatory Framework, of which Saint Lucia constitutes a precise replication, is illustrated in the figure below.

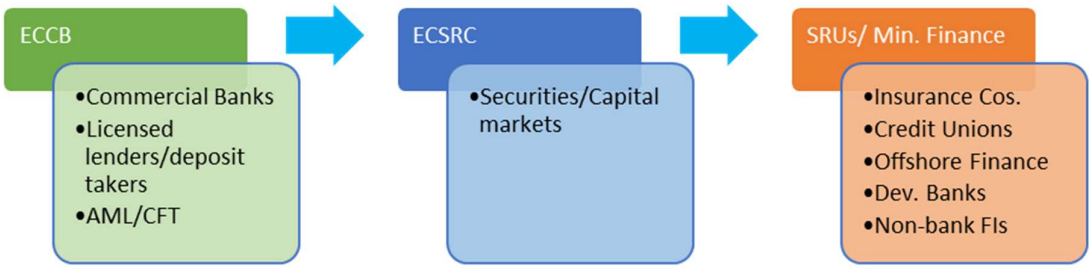


Figure 15 ECCU Financial Regulatory Framework

A 2007 study on the management of large pelagic fisheries in CARICOM countries investigated planned or anticipated developments in fisheries for large pelagics. The study noted that exploitation of large pelagic stocks in a country's EEZ can be pursued in several ways that have different strengths and weaknesses:

- Directly through development of domestic fleets;
- Directly through joint ventures with fishing enterprises from other countries;
- Indirectly through licensing foreign vessels to fish in the EEZ.

In a survey of the intentions of CARICOM countries to pursue these approaches separately or in combination, Saint Lucia reported in 2004 that in respect of its development opportunities and constraints:

Opportunities: Large pelagics are virtually the only avenue remaining open for fisheries expansion. There is need to go further offshore, use FADs in low season and increase number of vessels making multiday trips.

Constraints: Access to finance for vessels. Fishers not literate, or not able to learn in standard English. Training and other informational materials need translation into Creole.

Saint Lucian fishers are required to be registered through the Fisheries Department before they can formally operate and trade, but there are no restrictions on the numbers of fishers or vessels that can enter the large FAD pelagic fishery. Thus, the pelagic fishery is ultimately open-access. Co-management is promoted through local fishery cooperatives, but its effectiveness is not consistent and is variable between locations, while not all fishers are members of cooperatives. Consequently, many fishers stated that their voices are not heard during decision making processes.

National climate change strategies and plans

The National Adaptation Plan (NAP) of Saint Lucia was developed for the period 2018 to 2028 and is complemented by sectoral adaptation strategies and action plans (SASAPs). The NAP and formulated SASAPs contemplate the implementation of priority activities to start in the short-term (2018-2021), medium-term (2021-2024) and long-term (2024-2028), according to their urgency, with short-term being the most urgent.

Saint Lucia's Fisheries SASAP

The fisheries sector is one of the priority sectors identified in the NAP and a SASAP was created for the sector. There are four outcomes with strategic objectives associated with the fisheries sector:

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

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

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

- Strategic objective 1. improve productivity through climate resilient fisheries management systems
- Strategic objective 2. promote climate resilient aquaculture production in response to a changing climate
- Strategic objective 3. To promote alternative livelihoods creation and development and to strengthen climate resilience in fishery –dependent businesses

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

- Strategic objective 1. improve access to financial and business support for leveraging private sector investment into the fisheries sector

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

- Strategic objective 1. strengthen climate monitoring and communication for emergency planning and informed decision making
- Strategic objective 2. scale up climate resilient fisheries infrastructure to reduce climate risks

Saint Lucia's fisheries policy actively promotes development towards the optimum utilisation of seafood supply, to ensure high relative employment within the national fishing industry. The Government's main efforts focus on the following:

- development of the fishing industry in terms of modernization of fisheries infrastructure, fishing vessels and the use of improved fishing gear and methods;
- promotion of self-sufficiency through increased marine and aquaculture production;
- advancement of the social and economic status of fishers and their families;
- improvement of the nutrition of the nation through the provision of increased volumes of production.

While all these policy objectives are coherent (in the sense that none are in contradiction of any other) and laudable, the reality is that they remain largely aspirational. Limited data collection and analysis presents a challenge to the monitoring of progress in their achievement. Direct but limited observation suggests that progress is limited.

The stated Mission of the Department of Fisheries is to provide effective and efficient services in promoting sustainable development of Saint Lucia's fisheries sector through participatory management and sustainable use of the fishery resources. The fisheries policy and regulatory

framework of Saint Lucia pursues commercial practices with harvest rules for some non-pelagic species, and it currently allows the national sector to fully harvest large pelagic resources within the country's EEZ without harvest limitation.

2. Climate change context

2.1 Summary of future climate risk on fisheries sector in St Lucia

Climate driver or hazard	Sector specific impact
Surface air Temperature By 2050 all scenarios predict at least a 0.6℃ increase in average mean surface temperature with temperatures increasing by 1.51° to 3.0° C by 2100 in SSP2-4.5 and SSP5-8.5, respectively in St Lucia. **Sea surface temperature** In the medium term (years 2041-2060) sea surface temperatures near St Lucia are projected to increase by 0.9 (1.2°C) with respect to the period (1995-2014) with the largest 1C (1.3°C) warming in the autumn months and minimum warming 0.9 (1C) in the boreal spring season in the SSP2-4.5 (SSP5-8.5) scenario	**Fishing activities-** Fish and shellfish populations typically found in temperate regions are moving northward towards the poles in search of environmental conditions more suited to their survival. These preferred conditions are often defined by a specific temperature range, which they are adapted to through a concept known as "thermal niche conservatism." **Fisheries:** Rising ocean temperatures are anticipated to have a significant impact on commercially important fish populations. This is because warmer waters will alter the preferred habitats (thermal habitat alterations) of these species. Consequently, we expect changes in the species diversity. Some fish populations may migrate northward in search of suitable temperatures, while others may disappear entirely from historically productive fishing grounds. These changes will likely lead to increased variability in fishery yields. **Aquaculture Challenges:** Droughts and rising temperatures pose a threat to the crops used to produce essential components of fish feed. This potential disruption to the supply chain could lead to increased costs associated with raising fish through aquaculture. As droughts become more frequent and temperatures continue to rise, competition for limited freshwater resources is expected to intensify between fish farms and agricultural practices that rely on irrigation. Aquaculture and Fish Growth: Elevated water temperatures may negatively impact the growth and development rates of fish raised in aquaculture facilities. Warmer water temperatures can also create favorable conditions for the establishment and spread of novel diseases and parasites within aquaculture facilities. This poses a significant risk to fish health and overall aquaculture production.

Climate driver or hazard	Sector specific impact
Precipitation and precipitation-related extreme events Projections of total, 1-day, and 5-day accumulated precipitation trend negatively in all SSPs indicating overall dryer conditions, though the model agreement for these variables is low Frequency of tropical storms may not increase, but they will become more intense. This trend is particularly evident in the North Atlantic, where observations over the past three decades indicate a rise in hurricane intensity. Rising sea surface temperatures, a key factor in storm development, are projected to continue. Climate models suggest that this warming trend may lead to an increase in overall hurricane activity, primarily through more powerful storms rather than a significant rise in their number.	**Fishing vessels and practices-** The relatively small size of Saint Lucian open-deck vessels increases the impact that environmental conditions, such as large swells or storms, will have upon the sector's operations and profitability. Compounding this, as coastal benthic and reef-associated fisheries decline (reef fishes, molluscs, spiny lobsters and crabs), fishing effort from FRP boats is likely to increasingly shift from near shore towards the FADs further offshore, raising safety concerns. Damage and loss of vessels and fishing gear **Fish landing sites and coastal infrastructure-** Heightened acute risk through increased severity of hurricanes, and longer-term incremental risks posed by sea-level rise and tidal flooding due to increase in annual rainfall. **Seamoss** Sea level rise, storms and hurricanes and increased temperatures can result in negative impacts on the seamoss resulting in breakage of seamoss from their lines with rough seas, seasonal fouling of the crop by epiphytes, spoilage of drying crops in wet seasons. **Aquaculture and aquaponics:** Protracted periods of drought will cause more acute problems with freshwater availability, particularly for facilities that rely on surface sources of freshwater. As surface supplies dwindle, ponds decrease in volume, crowding the fish and concentrating potentially toxic metabolites.
Sea-level rise By 2050 median projected SLR (relative to a baseline of 1995-2014) for St Lucia under the SSP2-4.5 scenario is 0.21 meters (0.10, 0.34), for the SSP5-8.5 scenario 0.23 meters (0.13, 0.36) is projected.	**Fisheries:** Loss of coastal fish breeding and nursery habitats if mangroves are lost due to sea level rise. **Landing sites:** Shoreline fishing communities and fish landing sites at higher risk of flooding, compounded by higher precipitation and storm surge. **See section 2.2.2 for a detailed assessment.**

2.2 Climate profile

St Lucia has a tropical maritime climate, which is characterized by a wet season from June to November and a dry season from December to May. Figure 1 shows the area-weighted climatological temperature and precipitation for St Lucia based on data from the Climatic Research Unit. The peak rainfall is 292 mm in October and the minimum rainfall occurs during February (80mm) and March (72mm). Wet season precipitation comes mainly from tropical waves, depressions, storms, and hurricanes, which occur frequently over this region owing to its geographical location within the Atlantic hurricane belt. The hurricane season typically lasts from June until November.

The average maximum temperature varies between an average of 28.7C in February to 31 C in September. The average minimum temperature varies between an average of 22.5C in February to 25.1C in July. The prevailing northeasterly trade winds are strongest during the dry season and are weakest in the wet season when temperatures peak in September and October. The prevailing northeasterly trade winds are strongest during the dry season and are weakest in the wet season when temperatures peak in September and October. Relative humidity is high, between 73% and 78% throughout the year. Year-to-year variations in St Lucias's climate are weakly related to El Niño–Southern Oscillation (ENSO) and the North Atlantic Oscillation (NAO) and on longer decadal timescales by the Atlantic Multidecadal Oscillation (AMO). El Niño generally brings warmer and drier conditions, whilst La Niña tends to bring cooler temperatures and above-normal rainfall. During a positive phase of the NAO, temperature and rainfall in the region are generally lower than normal, though correlations are weak.

2.2.1 Historical climate trends

Surface air temperatures

The annual mean surface air temperature for St Lucia has increased from 26.0 C for the period 1951-1980 to 26.44 C for the period 1991-2000 with much of the 0.3 C warming occurring over the last 50 years. Figure 2 shows the interannual variability of annual mean surface air temperatures over the period 1950 to 2020 with the linear least squares trendlines for different periods superposed. The increase in temperature trends from 0.09℃/decade for the entire record to the 0.17℃/decade trend of the last 50 years is clear. The annual mean maximum temperatures and annual mean minimum temperatures have increased by 0.43 C and 0.38 C respectively with similar shifts in the trends over the past 50 years.

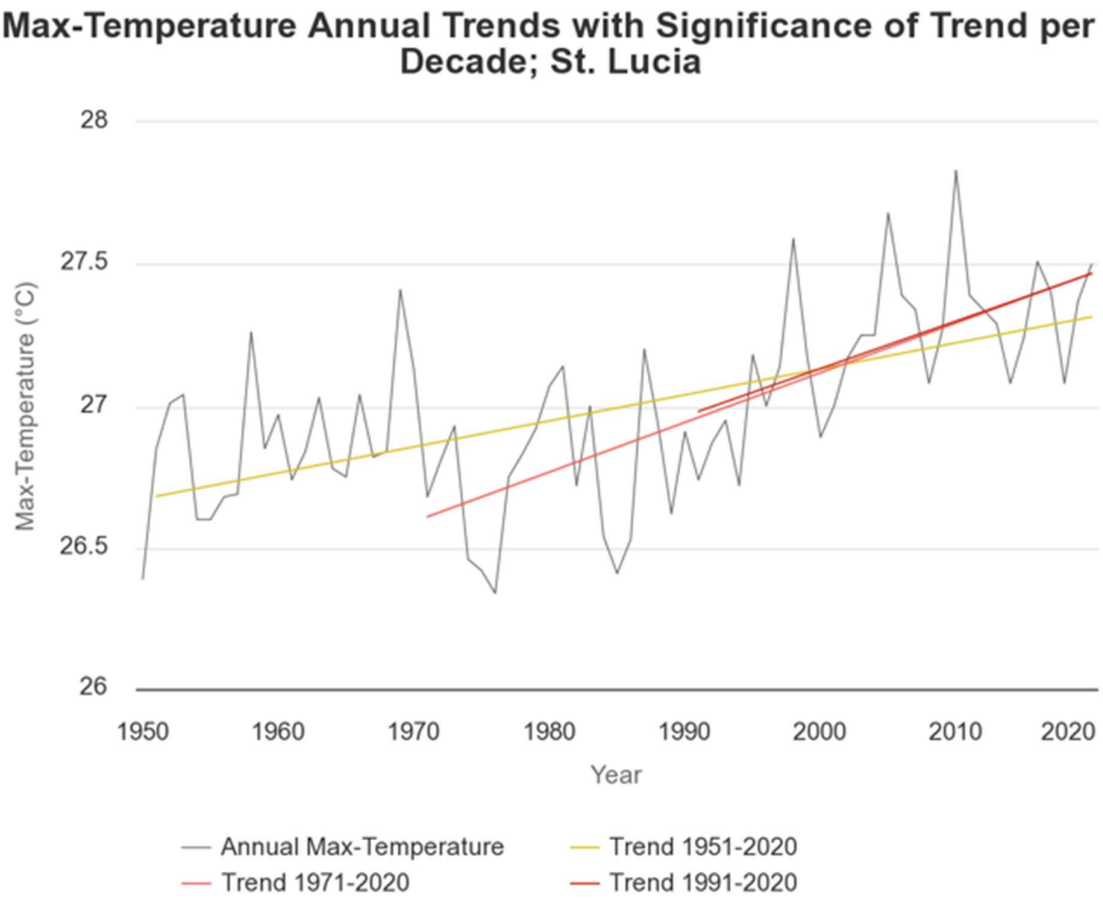


Figure 16 Annual temperature trends

Over the same period of record, there has been an increase in the frequency and amplitude of extreme warm events and a decrease in the frequency of extreme cooling events. Figures 4 and 5 show changes in the intensity of maximum daily maximum temperatures and minimum daily minimum temperatures over the past 70 years. The bubble plots highlight significant events by indicating the deviation of the event (unit standard deviations) from the climatological value for the period 1991-2020. The figure below the change in intensity of minimum daily minimum temperatures as a function of standard deviation, month, and year.

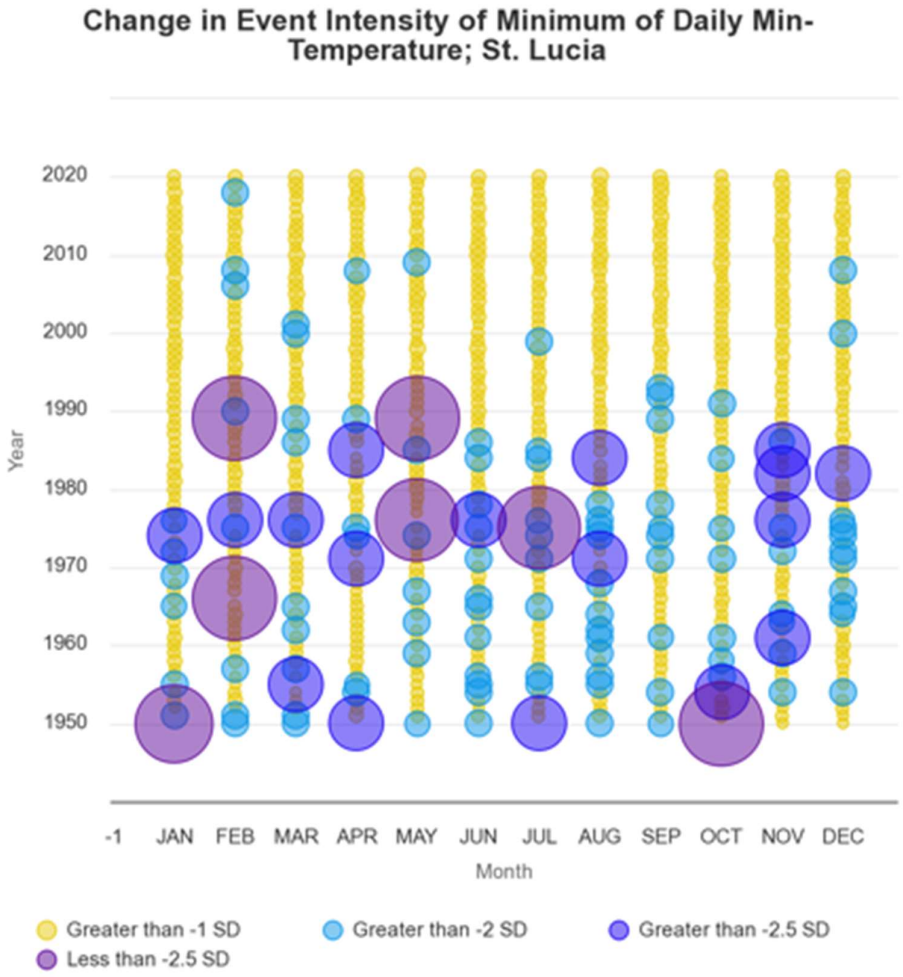


Figure 17 - Change in event intensity - temperature

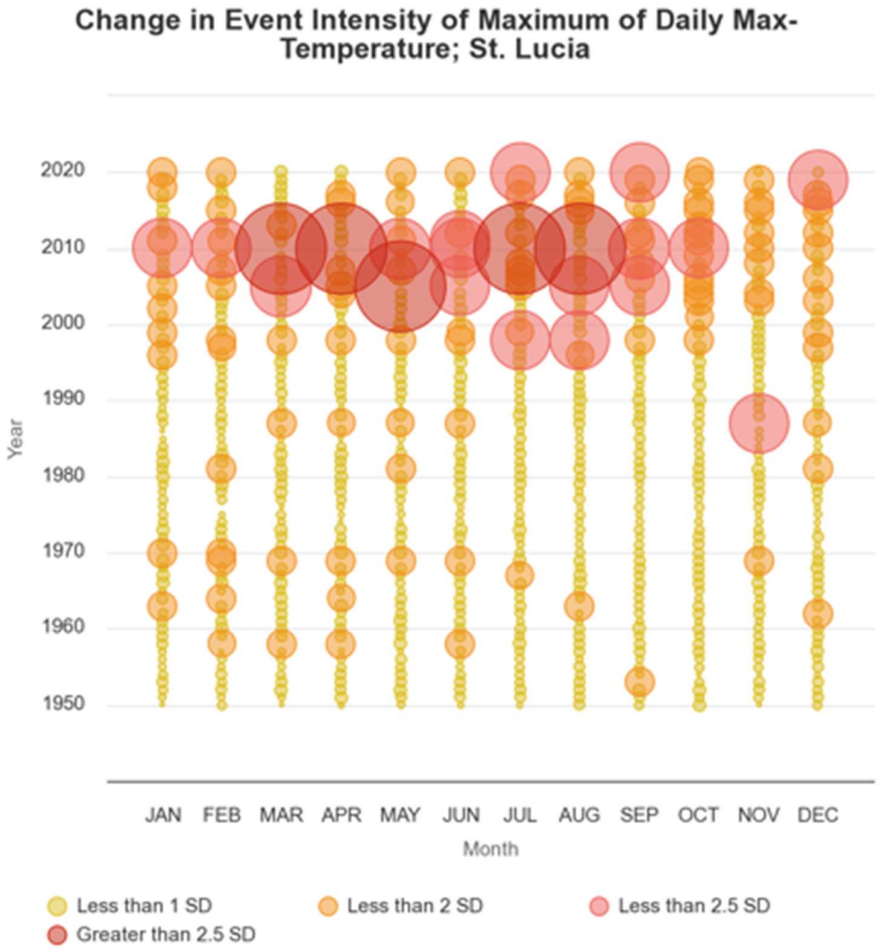


Figure 18 - Change in event intensity - max temperature

The frequency of cool events cooler than -1 standard deviations but warmer than -2 standard deviations indicates that the reduction in the frequency of cool events has been most affected in the peak warm season. For the coldest events (under -2.5 standard deviations) there have been no such occurrences since 1989. Figure 5 shows that the intensity of warm events (those greater than 2 standard deviations from the average tmax for that month) have increased significantly since 2000. The frequency of warm events exceeding 1 standard deviation, but less than 2 standard deviations are increasing the most in October-December in the last 20 years. For events exceeding 2 standard deviations but less than 2.5 standard deviations, the number of events has increased in the summer months of June -September. The increase in observed changes in hot extremes is consistent with the IPCC AR6 findings (Tech Summary)

Sea surface temperature

The figure below shows the interannual variability of monthly mean sea surface temperatures over the period 1950 to 2020 with the linear least squares trendlines for different periods superposed. The trend increases over time from 0.0 C/decade (RMSE = 0.37) for the entire 70-year record to 0. C/decade (RMSE = 0.33) over the last 50 years to 0.29C (RMSE = 0.33)

for the period 1991-2020. Figure 12 shows the pattern of warming in the region from a high-resolution SST dataset for the period (2000-2019) with respect to the period (1980-1999).

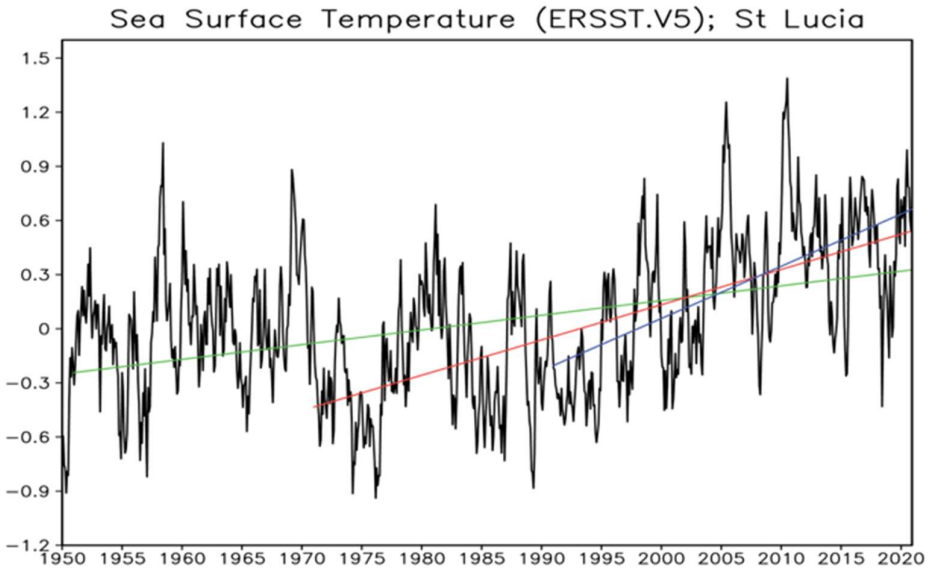


Figure 19 - Sea Surface Temperature Trends

The figure above shows the seasonal cycle of SSTs at St Lucia in the periods 1941-1960 (black), 1971-1990 (blue), and 2001-2020 (red). The warming for the most recent period of record with respect to the 1941-1960 period varies from 0.3 C in January to 0.6 C largest in September and October. It is also evident that the period 1971-1990 was generally cooler than the periods before and after. This decadal modulation of temperature is related to the Atlantic Multidecadal Oscillation, which recently shifted from a (1962-1998) cold phase to a warm phase that persists today.

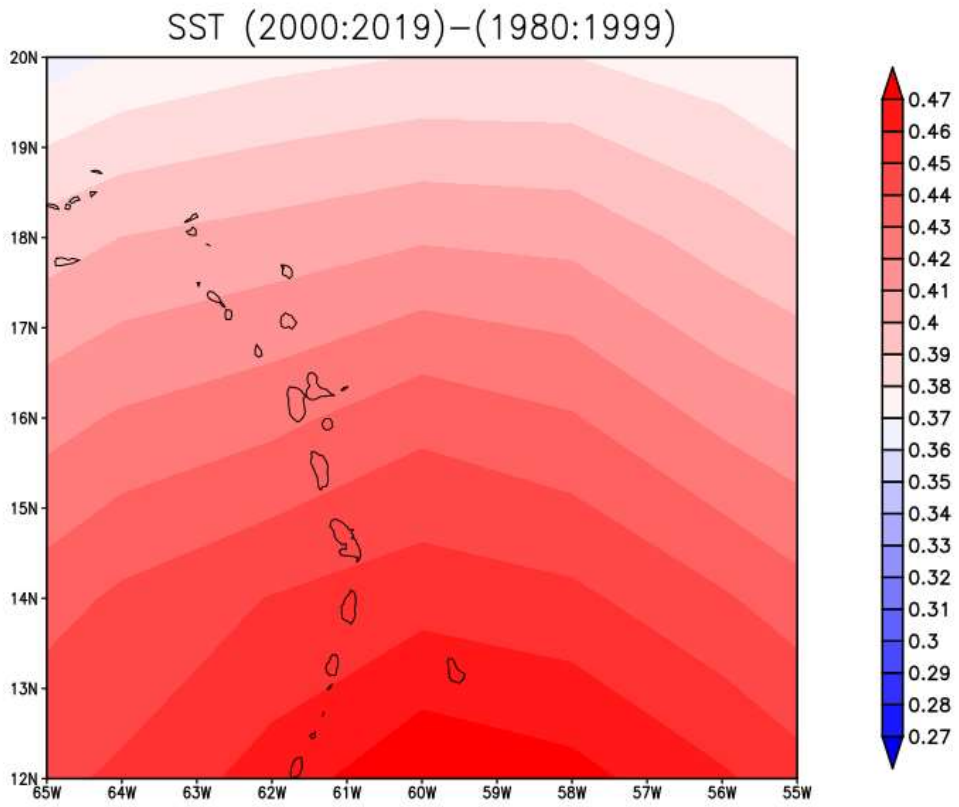


Figure 20 - Sea Surface Temperature

Rainfall

Figure 13 shows the annual total precipitation for St Lucia over the past 70 years. The trend over this period is slightly negative 0.21 mm/day per decade and not significant, however, the interannual and decadal variability is evident. A recent study suggests that the elevated precipitation totals since the early 2000s are due in large part to the influence of the PDO and AMO, which are currently in a favorable configuration to promote increased precipitation in the region (Zermeño-Díaz, 2022).

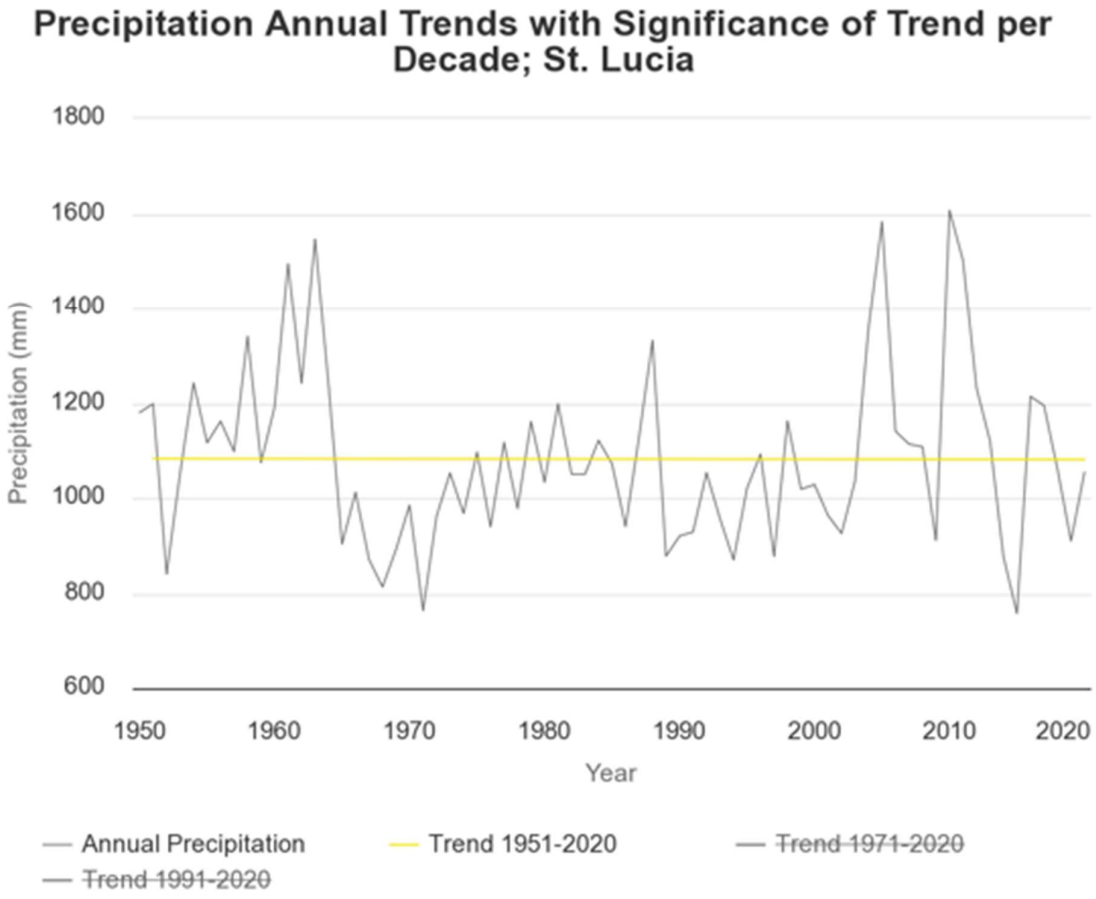


Figure 21 - Precipitation trends

While there is large uncertainty concerning the trend in total precipitation in St Lucia over the past several decades, there have been significant changes in the extreme events including droughts and intense rainfall events. The figure below shows the annual values of the maximum number of consecutive dry days and statistically significant trends over the past 70 years. The number of dry consecutive days is increasing at a rate of 1.18 days per decade for the period 1970-2020. Extreme wet events are also increasing in St Lucia.

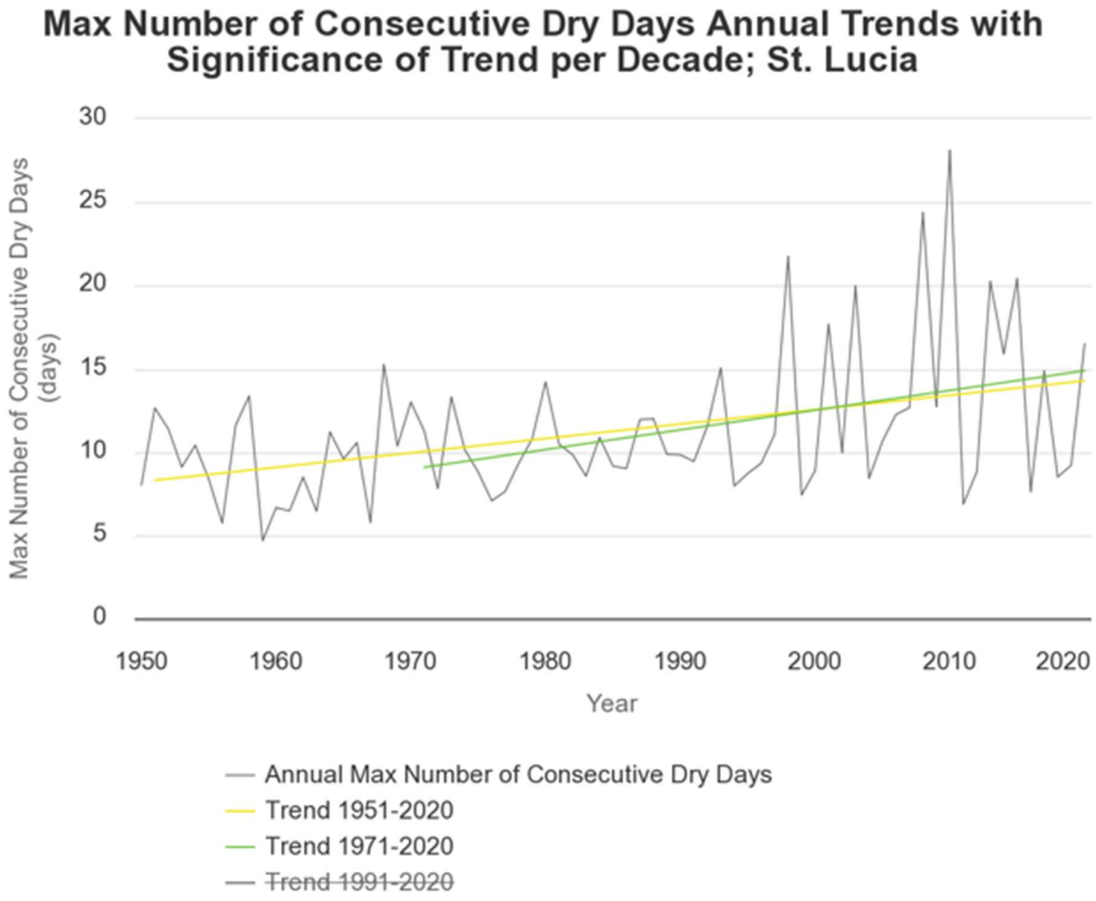


Figure 22 Consecutive dry days

The figures below show the largest 1-day and 5-day cumulative precipitation totals over the same period with significant trendlines overlaid. The average largest 1-day precipitation amounts have increased from a rate of 3.47mm per decade since 1971 to 7.85mm per decade since 1991. For the entire period of record, the increase in precipitation 5-day cumulative precipitation is 5.28 mm per decade and for the period 1991-2020, the trend increases to 19.18mm per decade.

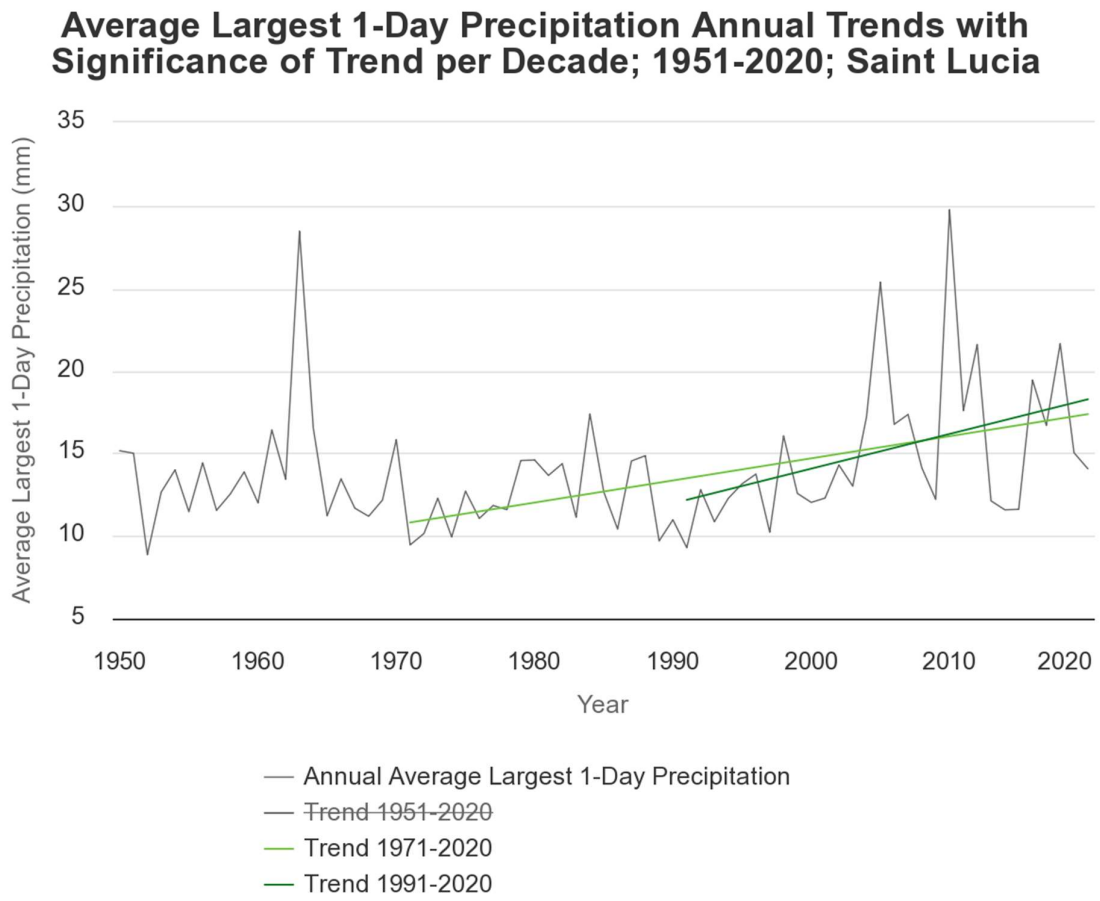


Figure 23 1-day precipitation trends

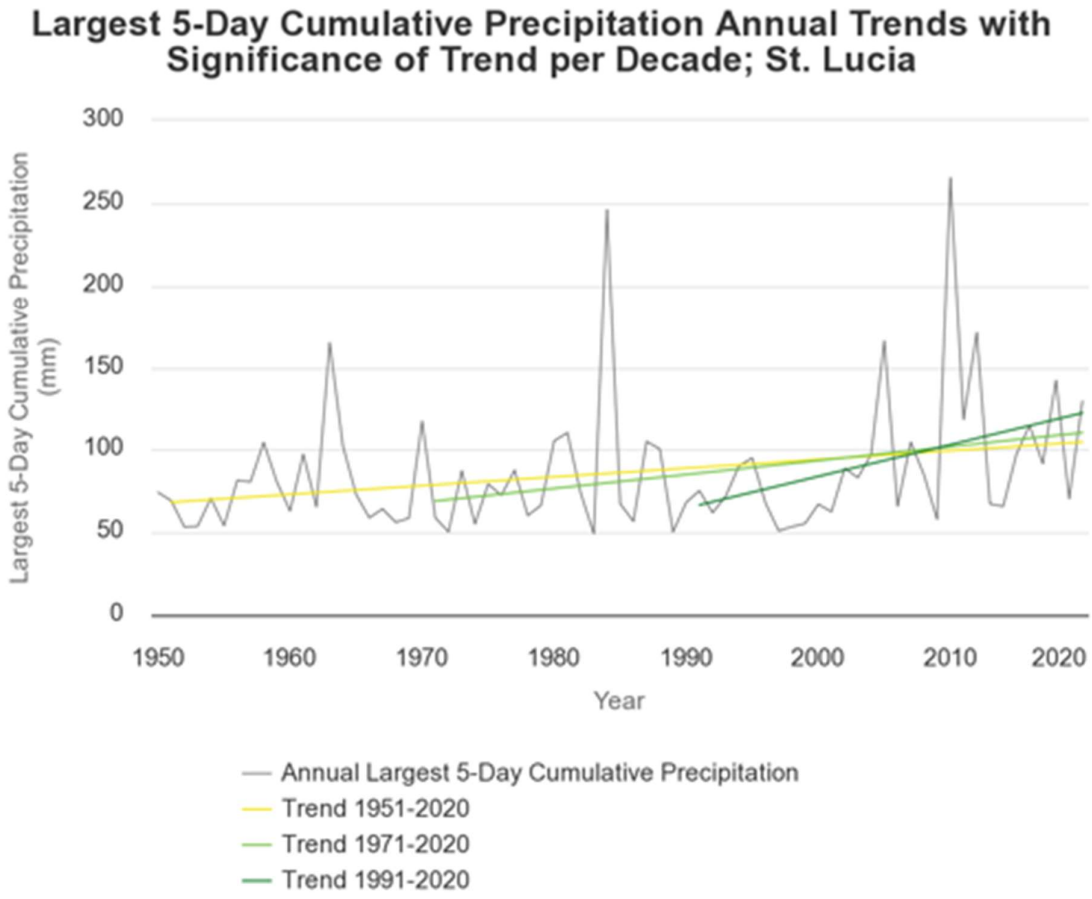


Figure 24 - 5-day cumulative precipitation trends

Sea level rise

Figure 18 shows the satellite-derived monthly area averaged sea level rise for the ocean region surrounding St Lucia over the period October 1992 to September 2022, with the linear least squares trendline overlaid. The increasing trendline indicates a 0.031m per decade increase in mean sea level over the past 30 years. Figure 19 shows the sea level projections for 5 SSP scenarios out to the year 2050 relative to a baseline of 1995-2014. Here the solid lines indicate the median model values and the shading indicates the 17th to 83rd percentiles. While the rate of change in local sea level tracks with the SSP, sea level will continue to increase over the next century regardless of the mitigation efforts. Table 2 lists the projected values of sea level rise relative to a baseline period of 1995-2014 for five shared socioeconomic pathways and the projected rates of sea level rise for medium-term and long-term future periods

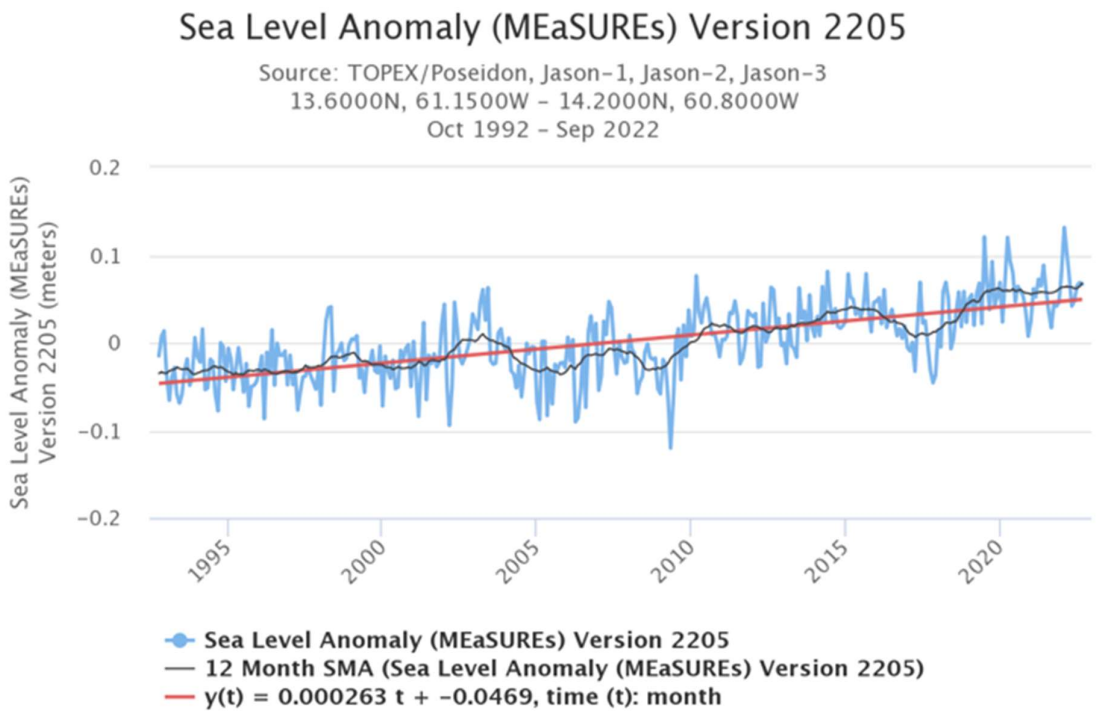


Figure 25 - Sea Level Anomaly

Extreme events

Due to its tropical location in the western Atlantic, St Lucia is subject to occasional severe tropical weather including tropical depressions, tropical storms, and hurricanes. Over the past 30 years, St Lucia has been impacted by several storms with varying degrees of impact. In 1994 the island was affected by tropical Storm Debby which caused severe flooding, landslides, damage to infrastructure including bridges, significant crop damage, and deaths. In 2010 hurricane Tomas developed from a tropical wave east of the Windward Islands on October 29. Quickly intensifying into a hurricane, a Category 1 hurricane, barreled over the southern part of Saint Lucia killing fourteen people. Tomas brought sustained winds of 70mph with stronger gusts and torrential rains that fell continuously for 21 (up to 593.1 mm) hours causing major flooding and landslides, particularly in the south. On December 24 and 25, 2013 a tropical trough system produced excessively heavy rains in Saint Lucia. The storm produced extreme rainfall (171 mm over 24 hours) which lasted from the morning (around 6:00 am) of December 24th into the early hours (around 4:45 am) of December 25th leading to rapid and intense flash flooding as well as numerous landslides. In September 2016 Tropical Storm Matthew's center was located to the southwest of St Lucia, producing heavy rainfall, rough seas, and strong gusty winds. Flooding was reported throughout all of St Lucia's municipalities. Another trough system struck St Lucia on November 6, 2022, after wet season rains had saturated the soil. The heavy rains caused widespread flooding and landslides in several communities in the north of St Lucia. These and other extreme climate events have provided an indication of some of the additional future costs of climate change for Saint Lucia. For example, the impact of Hurricane Tomas (2010) had a total cost of 43.4% of the island's

GDP[17]. It caused a total estimated USD 336 million in damages to housing, infrastructure and economic sectors, mainly agriculture and tourism, and claimed seven lives. On average economic costs of tropical cyclones across the Caribbean between 1950 and 2014 has been estimated at the equivalent of between 2 and 5% of GDP. While analyses focused on loss and damage to the fisheries sector are less common, damage and loss assessments from other countries can give some indication – for example Hurricane Maria in Dominica estimated damage to fishing boats, engines and gear at about USD 4 million[18].

An assessment of the economic and social impacts of climate change on the coastal and marine sector in the Caribbean also indicated that built coastal assets would be severely damaged under both the best-case and worst-case scenarios. Predicted damage would be around US$ $ 0.5 billion in a best-case scenario and over US$ 1 billion under a worst-case scenario. While not specific to St. Lucia it does give an indication of both impacts and costs of extreme events and the effect of climate change[19].

2.1.2 Future climate change projections

Surface air temperature

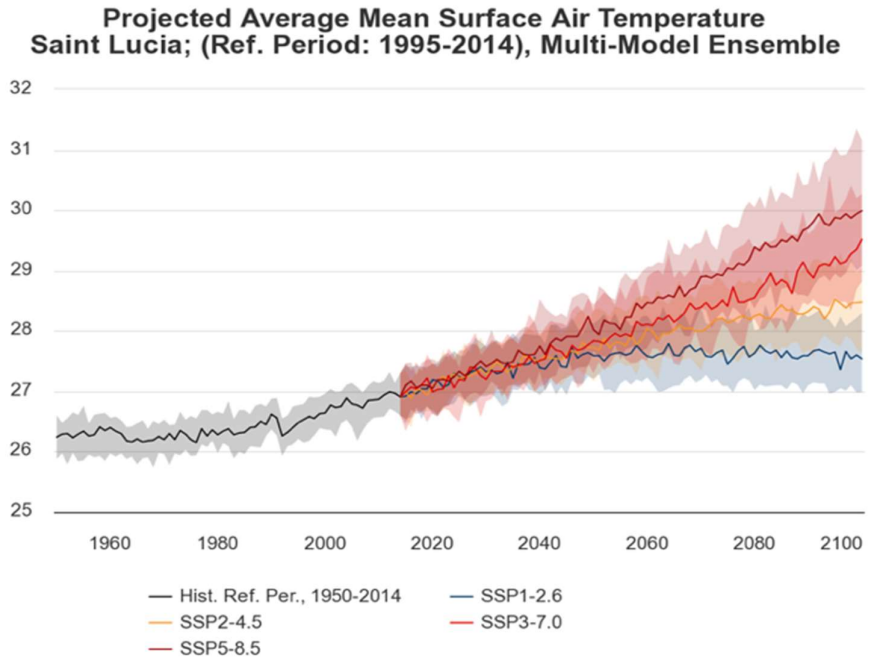


Figure 26 Projected mean surface air temperature

[17] Ministry of Sustainable Development, Energy, Science and Technology. (2015). The Saint Lucia climate change adaptation policy: Adapting one individual, one household, one community, one ENTERPRISE and one sector at a time. Retrieved from http://dms.caribbeanclimate.bz/MFiles/openfile.aspx?objtype=0&docid=6566

[18] CRFM. Climate Change Adaptation and Disaster Risk Management in Fisheries and Aquaculture in the CARICOM Region: Regional Strategy and Action Plan 2020-2030. https://www.crfm.int/~uwohxjxf/images/CRFM_Tech__Advisory_Doc_2020-02_Regional_Strategy__Action_Plan_02.07.2020.pdf

[19] Lorde, T. (2013). *An assessment of the economic and social impacts of climate change on the coastal and marine sector in the Caribbean* (Report No. LC/CAR/L.395). United Nations Economic Commission for Latin America and the Caribbean (UNECLAC) https://doi.org/10.13140/2.1.3900.1121

35 models of the most recent Coupled Model Intercomparison Project (CMIP6) under four separate SSPs using the period 1995-2014 as a baseline. The solid line represents the median simulation values of 35 member-models and the shading represents the 10th through 90th percentile range. Projected average mean surface air temperature increase in all scenarios over the next 25 years, then diverge depending on the SSP through the end of the century. **By 2050 all scenarios predict at least a 0.6 C increase in average mean surface temperature with temperatures increasing by 1.51 to 3.0 C by 2100 in SSP2-4.5 and SSP5-8.5, respectively.**

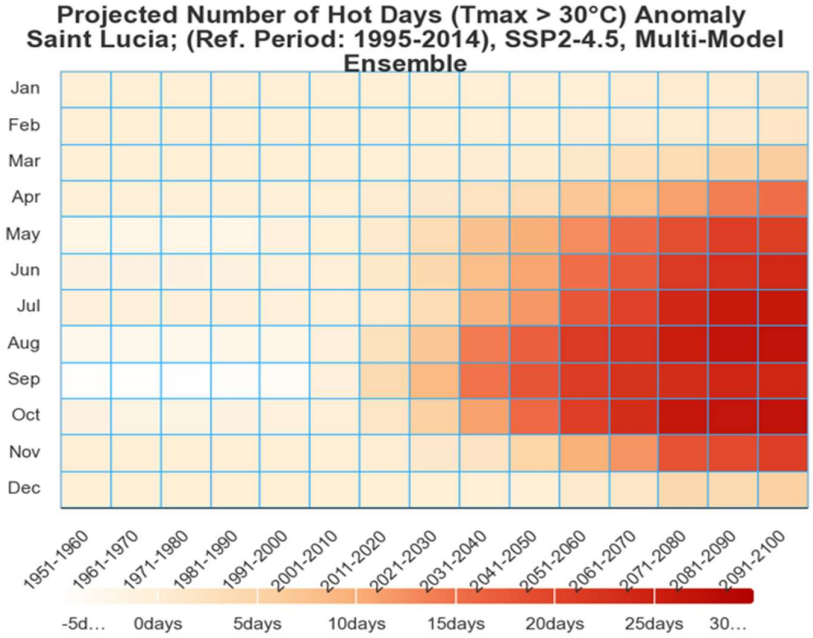


Figure 27 Projected number of hot days - Anomaly

The projected average Maximum and Minimum surface air temperatures increase similarly, with average maximum temperatures increasing by 0.68 to 1.14 C by 2050 in all scenarios. By the end of the century, SSP2-4.5 and SSP5-8.5 scenarios project increases of 1.53 C to 3.15 by 2100, respectively. Changes in the average mean/minimum/maximum surface air temperatures show the smallest increase in the spring and early summer months and the largest increase during the autumn season. The figure above shows the projected changes in the number of days where maximum daily temperatures exceed 30 C.

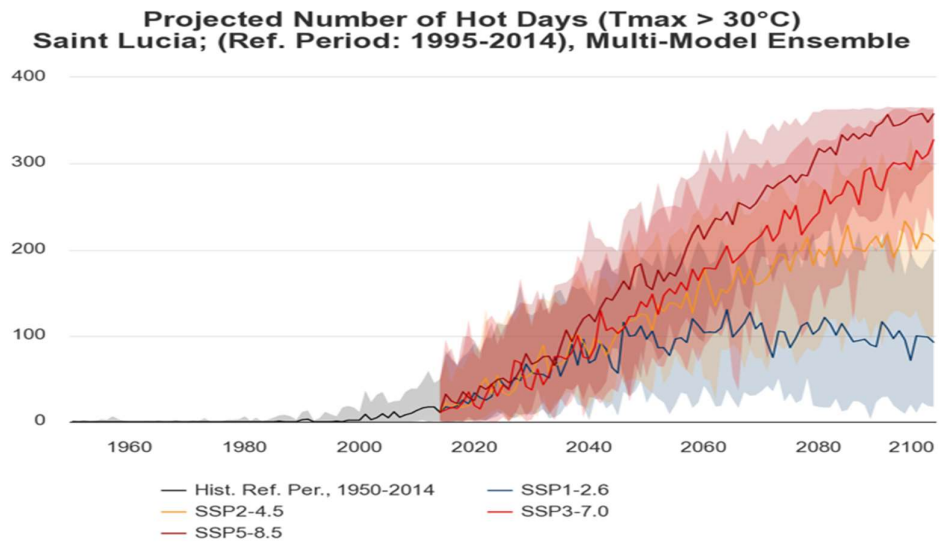


Figure 28 Projected number of hot days

All scenarios show an increase in hot days with an increase of 85 days and 147 days by 2050 in the SSP2-4.5 and SSP5-8.5, respectively. By the end of the century the number of days exceeding 30 C increases to 199 days and 347 days for the SSP2-4.5 and SSP5-8.5 scenarios, respectively. shows the monthly increase in the number of hot days over the next century for the moderate SSP2-4.5 scenario, with late summer months seeing the largest increases by mid-century, expanding to large increases in spring and summer months by the end of the century. The figure above shows the increase in the number of hot days at the end of the century for 4 SSPs as a function of the month of the year. The shading indicates the spread among the models, a measure of relative uncertainty in the projections. For all of the scenarios, the increase in the number of hot days is largest in the summer months, and the results for the SSP2-4.5, SSP3-7.0, and SSP5-8.5 scenarios indicate significant increases by the end of the century.

Sea surface temperature

In the medium term (years 2041-2060) sea surface temperatures near St Lucia are projected to increase by 0.9 (1.2 C) with respect to the period (1995-2014) with the largest 1C (1.3 C) warming in the autumn months and minimum warming 0.9 (1 C) in the boreal spring season in the SSP2-4.5 (SSP5-8.5) scenario. In the long term (years 2081-2100) sea surface temperatures near St Lucia are projected to increase by 1.5 (2.7 C) with respect to the period (1995-2014) with the largest 1.6 C (2.9°C) warming in the autumn months and minimum warming 1.4 (2.5 C) in the boreal spring season in the SSP2-4.5 (SSP5-8.5) scenario. The climate change signal here is computed, at St Lucia's coordinates, as the arithmetic difference between the 'sea-surface temperature' (SST) climatologies of the SSP scenario and the historical scenarios.

Rainfall

Projections of total, 1-day, and 5-day accumulated precipitation trend negatively in all SSPs indicating overall dryer conditions, though the model agreement for these variables is low

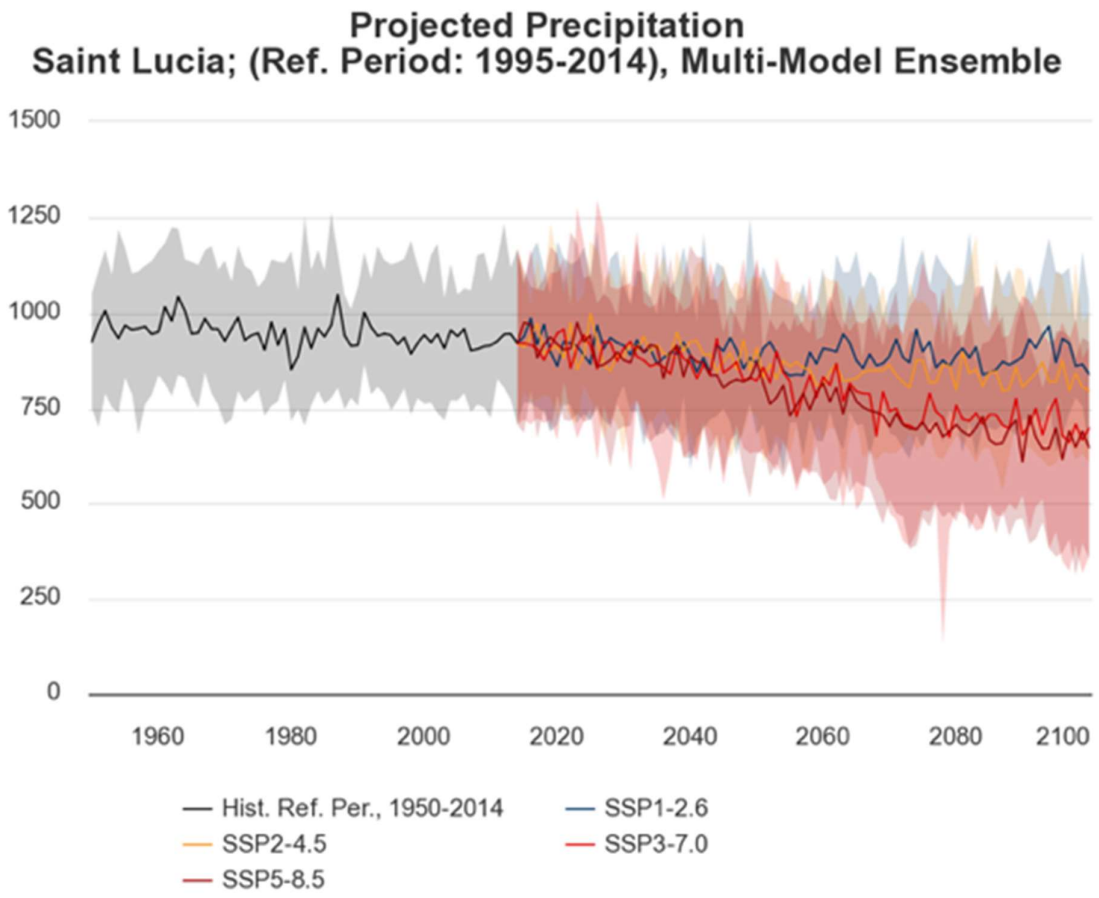


Figure 29 Projected precipitation

Sea-level rise

By 2050 median projected SLR (relative to a baseline of 1995-2014) for St Lucia under the SSP2-4.5 scenario is 0.21 meters (0.10, 0.34), for the SSP5-8.5 scenario 0.23 meters (0.13, 0.36) is projected. By 2100 median projected SLR anomaly for St Lucia under the SSP2-4.5 scenario is 0.59 meters (0.32, 0.92), and for the SSP5-8.5 scenario 0.78 meters (0.49, 1.14) is projected. For the period 2040-2060, the median rate of projected SLR increases to between 6.0 mm yr-1 (3.0 mm yr-1 – 9.0 mm yr-1) under scenario SSP2-4.5 to 7.0 mm yr-1 (3.0 mm yr-1 – 11.0 mm yr-1) under scenario SSP5-8.5. For the period 2080-2100 the rate of projected SLR under scenario SSP2-4.5 increases to 8.00mm yr-1 (4.00mm yr-1–13.0mm yr-1) and 12.0 mm yr-1 (7.0 mm yr-1–19.0 mm yr-1) under scenario SSP5-8.5.

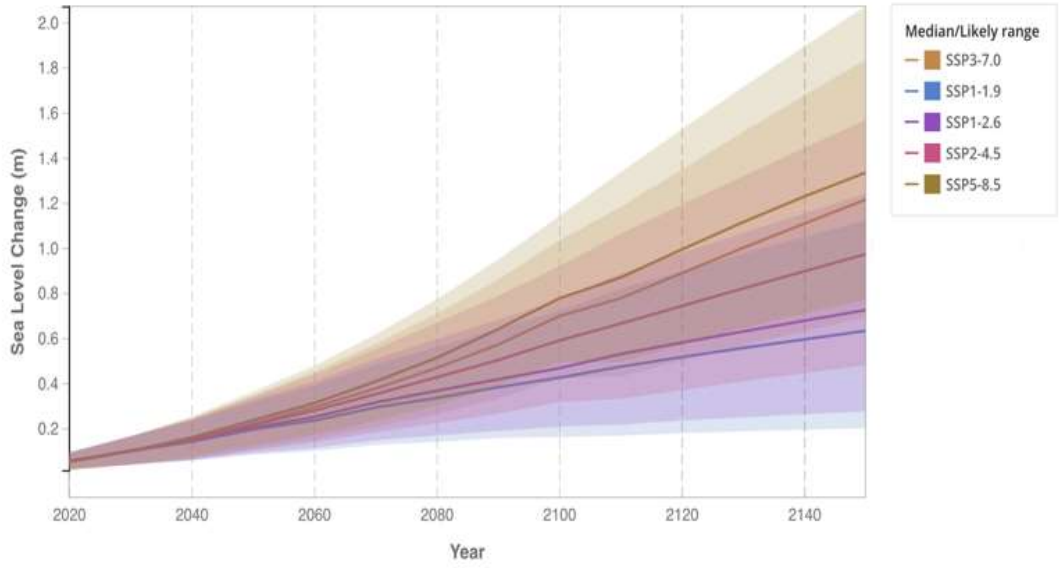


Figure 30 Sea Level Change

Frequency and/or intensity of extreme weather events

Recent research has indicated that there has been a significant increase in the number of major hurricanes over the period 1979-2017 (Kossin et al. 2020) with major tropical cyclone exceedances increasing at 6% per decade. There is also evidence that the intensification rates for these storms have increased over the same period (Kishtawal et al., 2012; Bhatia et al., 2018). In addition, Kossin (2018) showed that the translation speed, the speed with which tropical cyclones move across the planet, has decreased over the period 1949–2016. This slow-down has direct implications for the amount of local rainfall (increasing with slower storms) and the associated local wind damage (increasing with slower translation speed).

The IPCC has concluded that the average peak wind speed and the proportion of major hurricanes (category 4-5) is very likely to increase with global warming. It is also very likely that the average rain rates for these storms will increase with a warming future climate due to the increase in available water vapor (which fuels hurricanes) which increases at a rate of 7% for every one-degree warming of the surface air temperature. This increase in water vapor will also make the environment near St Lucia more favorable to severe convective storms due to an increase in the convective available potential energy (CAPE).

2.3. Fisheries specific hazards, vulnerability and impacts

Climate change is significantly impacting fishery habitats and disrupting fishing operations in Saint Lucia and is projected to threaten the long-term sustainability of fish stocks and the local livelihoods of fisherfolk. The climate change stressors on the marine environment of greatest significance to St Lucia's fisheries are sea level rise (SLR), ocean acidification (OA),

increasing sea surface temperature (SST), and increased frequency of extreme weather events (e.g. storms and hurricanes).

As with the threats to freshwater mentioned above the increasing intensity of convective storms and tropical cyclones, and associated floods of storms and rising sea levels present a threat to infrastructure and have direct implications for fisherfolk and their ability to access equipment and landing sites, which can influence their ability to fish. Increased frequency of storms and intensity of hurricanes will affect the safety of fishers at sea and potentially increase the number of accidents. Landslides caused by flood events have effectively shut down travel on the island by damaging roads and bridges. Decreasing translational speeds will increase storm damage to infrastructure including vessels and fishing gear and increase the time until fisherfolk are able to set out again. Sea level rise will also impact piers and landing sites, requiring the need for more or alternate harbors and moorings.

The fisheries sector is dependent on healthy and climate-resilient coastal and marine ecosystems. These include important habitats (corals, sea grass, mangroves) that have wider ecosystem benefits for the islands, such as tourism and protection from storm surges. Loss of habitat is occurring due to increasing SSTs, SLR, ocean acidification, and increasing extremes (Oxenford and Monnereau, 2017). St Lucia is bounded by fringing reefs along 40% of its coastline, particularly along its eastern coastline. Coral reefs in the Caribbean have suffered large declines in live coral cover in recent decades due to high SST-induced mass coral bleaching events (e.g. 1998, 2005, and 2010; Eakin et al., 2010). Such events are predicted to increase in frequency and may even occur annually in the Caribbean by the mid-twenty-first century (van Hooidonk et al., 2015). Coastal fisheries reproduction in reef fishes has shown a high sensitivity to SST, with reduced pairing, lower fecundity, and smaller eggs and larvae being produced with temperature increases of 1.5°C to 3 °C (Pratchett, Wilson and Munday, 2015).

Another result of increasing SSTs is the increasing incidence of coral diseases (Bruno and Selig, 2007). Another threat to coral reefs is the damage associated with large tropical cyclones which reduce the structural complexity of the reef and alter the reef communities (Hughes et al., 2007). In addition, the increase in the intensity of rainfall associated with tropical storm events will increase the sedimentation of near-shore coral reefs, hindering the recovery of corals from damage experienced from previous events. Ocean acidification will also affect the coral reefs by reducing carbonate production, resulting in erosion or reduction in the amount of reef structure. The reef and shallow shelf fish that rely on these habitats are under the greatest threat by climate change.

Recent studies have shown that marine heatwaves can lead to severe and persistent impacts on marine ecosystems – from mass mortality of benthic communities, including coral bleaching, changes in phytoplankton blooms, shifts in species composition and geographical distribution, and toxic algal blooms, to decline in fisheries catch and mariculture (Collins et al., 2019, Smale et al., 2019; Piatt et al., 2020).

Rising ocean temperatures and sea level rise can contribute to the loss of coastal ecosystems like mangroves and seagrasses, which serve as critical habitats for coastal pelagic species, often used as bait fish and other marine organisms. A decline in mangroves across the Caribbean has been linked with a decline in Caribbean fishery species. Mangroves that are currently protected by reef barriers will likely be lost as reefs erode and sea level continues to rise. Mangroves will become increasingly impacted by SLR, and in St Lucia where there is little opportunity to migrate landwards, these habitats will be lost. Since mangroves are obligatory nursery habitats for some species, and for others provide adult habitat or greatly enhanced reef productivity, their loss will result in the declining carrying capacity of coastal

environments to support reef-associated fish and shellfish populations (Oxenford and Monnereau, 2017).

As ocean acidification increases, calcifying organisms like queen conch, spiny lobster, and penaeid shrimps will find it increasingly difficult to build calcareous skeletons and shells, although the impact on the region's important shellfish species. Ocean acidification has also been shown to result in the impairment of a diverse suite of sensory and behavioral abilities in reef fishes, particularly the early life stages that affect the ability to escape predation, habitat selection, and timing of settlement to coral reef habitats (Devine et al., 2012)

As a result of increasing SSTs, there will be stronger ocean temperature stratification near the ocean surface. Stratification is enhanced in the ocean when the surface layer is heated and mixing by the winds or entrainment of cool waters from below is reduced. Associated with increased stratification in the ocean's surface layers are reduced amounts of dissolved oxygen and nutrients like nitrogen. Ocean deoxygenation, the loss of oxygen in the ocean, results from ocean warming, through a reduction in oxygen saturation, increased oxygen consumption, and increased ocean stratification and ventilation changes (Keeling et al., 2010). Deoxygenation and acidification often coincide because the biological consumption of oxygen produces CO_2. Deoxygenation can have a range of detrimental effects on marine organisms and reduce the extent of marine habitats (Vaquer-Sunyer and Duarte, 2008).

The availability of nutrients in the surface ocean often limits the amount of primary productivity in the layer, with implications for marine food webs and the biological carbon pump. The IPCC AR6 cites enhanced stratification for the tropical oceans, with decreasing oxygen levels, decreased levels of nitrogen (nitrate), and reduced net primary productivity in the coming century. The distribution, migration routes, and locations of foraging aggregations of the major pelagic species (dolphinfish, tunas, mackerels, sailfish, swordfish, and the marlins), the largest contributor to the fisheries sector, are known to be highly sensitive to surface currents, SST and to the location of oceanic features like frontal systems, thermoclines, and mixed layers. Rising sea surface temperatures and stratification, coupled with increased acidity and changes in net primary productivity will act to push the pelagic species further to the north to cooler better-oxygenated waters. Since previous assessments, the IPCC has shown that poleward range shifts have remained a ubiquitous response to climate change, moving species from warmer regions into higher-latitude ecosystems (Lenoir et al., 2020). The thermal tolerances of epipelagic populations drive biogeographic change, though factors like deoxygenation and acidification may be contributing factors.

This migration will lead to reduced catch-potential and increased costs associated with the fuel and equipment costs for fisherfolk to reach the fish. As fish in the region are transboundary in nature, shifts in their distribution are likely to impact current management arrangements including international agreements.

2.2.1 Fishing vessels and practices

St Lucia has a long tradition of boatbuilding. The rain forests offered unlimited supplies of wood, particularly the gomier tree, whose trunks were hollowed out to make dugout canoes (pirogue in French or Creole). Over time, the seaworthiness and range of these pirogues were enhanced by the gradual addition of frames and planked topsides. Boatbuilding continued to develop particularly though the early 20th century when whaling evolved into an artisanal fishery for small cetaceans. The boats and equipment used in this fishery were, and still are, similar in design to those used by the American whalers and the skills and techniques of boatbuilders continued to develop. Some wooden boatbuilding continues to this day, but the

vast majority of the Saint Lucia fleet is now composed of small (under 9 metre) FRP open boats, almost exclusively purchased second hand from neighbouring islands. Sadly, the wooden boatbuilding tradition and skills have not been transferred to the expanding FRP fleet. The quality of FRP boatbuilding and repairs seen in the two of the three landing sites visited was of poor quality and is likely to lead to delamination or catastrophic failure when slamming in larger seas. However, it is understood that a Martinique company may soon set up an FRP facility in Saint Lucia, good news for Saint Lucia fishers but a missed opportunity for a local entrepreneurial investor.

Because of the multi-species nature of the fishery, most fishing vessels are usually equipped with a combination of hand lines, trolling lines, droplines, nets and fish traps. Fishing trips are limited to one-day trips ranging from 3 to 10 hours' duration.

The relatively small size of Saint Lucian open-deck vessels increases the impact that environmental conditions, such as large swells or storms, will have upon the sector's operations and profitability. Compounding this, as coastal benthic and reef-associated fisheries decline (reef fishes, molluscs, spiny lobsters and crabs), fishing effort from FRP boats is likely to increasingly shift from near shore towards the FADs further offshore. The remaining wooden vessels, restricted by their inability to carry powerful OBMs and withstand the loading of high speeds in moderate seas will continue working on reefs and close inshore until those resources reach levels where harvesting is no longer viable. The existing wooden vessel fleet will likely then become redundant.

The FAD fisheries which are currently the major fishery in Saint Lucian waters can be expected to expand up to the point where the deployment of additional FADs will be restricted by the Maritime Authority which has raised concerns about their interactions with marine traffic and limitations will be placed on further deployment. It may be anticipated that boat sizes will not increase significantly because they will continue day operations, perhaps with some additional FADs being placed further offshore. FADs should not be deployed so far off the coast that they endanger lives of fishers in the small FRP open deck boats who will fish around them, beyond the range of VHF communications. Trials are currently being conducted with VMS and also with VHF repeaters to extend range.

Unless larger vessels are introduced, the FAD fishery will remain a day fishery with the possibility that OBMs will become even more powerful to reduce commuting times. FRP hull construction may need investigation to ensure adequate transom strength to cope with the weight and power of the OBMs. Likewise, FRP hulls will need strengthening to cope with the expected slamming loading associated with fast boats in steep seas. Purchasers of OBMs are limited to a maximum of 125 HP (a measure introduced to counter the increased speed of boats involved in the illicit drug trade) but may apply for a permit to purchase an OBM with power in excess of 125 HP. To circumvent the 125 HP limitation, owners who want more power can, if they prefer, simply instal multiple OBMs of less than 125 HP (as an example, see photo of the vessel taken in Vieux Fort with 4 OBMs on a single transom (Annex 3), possibly a smuggling boat).

Investing in larger vessels for the FAD fisheries might seems a potential fix to this situation, but the cost-effectiveness of using larger vessels on daytrips to fish around FADs is questionable. Therefore, larger vessels may be oriented towards pelagic longline fishing farther from shore, as is already the case in some other Caribbean States, notably Grenada. Three pelagic longline vessels were seen in Saint Lucia (Castries, Gros Islet and Vieux Fort) but none of these three are in operation. Two other vessels were seen in Vieux Fort which had been purchased with the intention of longlining, but both of these would need modification in order to do so. Reportedly, one of the vessels had never fished because of difficulties finding a crew.

The development of an offshore tuna longlining fishery will inevitably be accompanied by the import of larger multiday vessels with diesel inboards and it will be essential that these vessels are of adequate quality to safeguard the lives of fishers. The current regulations governing the

quality of the Saint Lucia fleet are perhaps adequate for open deck day boats, but certainly not for anything larger or more complex. This topic is addressed under the Regulations section.

2.2.2 Fish landing sites

The fish landing and sea moss coastal facilities in St Lucia are at risk due to extreme events and enhanced hazards due to climate change. Fish landing operations also have serious equipment and organizational shortcomings, which result in serious systemic inefficiencies.

The coastal infrastructure of these facilities is vulnerable to extreme events and will increase its vulnerability over time. More importantly, because the present and future vulnerability is not well understood, short-term investments in equipment and infrastructure by different parties may be exposed to climate risks that are not evaluated.

Under normal or frequent storms, high waves impact the shoreline and may cause erosion and some damage to coastal structures. However, these frequent events are typically associated with water levels only affected by astronomical tides. Waves break in shallow waters and typically do not propagate inland.

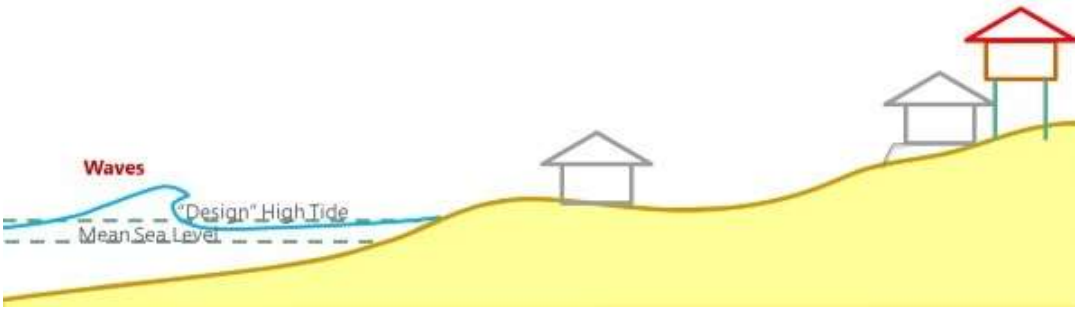


Figure 31 – Normal Storms (modified from Biondi and Guannel 2018)

In the Caribbean, storm surge represents a relevant additional water elevation, since astronomical tides are typically small. Depending on the location, storm surge can be 100% or more than 300% of the tidal range. Due to the increased water depth during the storm, waves break closer to the shoreline, so they are typically larger. In areas where the combined water elevations (tides and storm surge) are significant relative to coastal land elevations, coastal flooding occurs and wave impacts can be severe.

Figure 32 – Hurricane Impacts and Relevant Variables (modified from Biondi and Guannel 2018)

Physical adaptation to climate change is required for all coastal fishing infrastructure to reduce their vulnerability and manage risks. The report outlines physical climate adaptation pathways for the different types of facilities, where different types of solutions may be implemented. Site

specific recommendations for each facility are not detailed due to the lack of quantitative data, but an approach is outlined.

Climate physical risk of coastal infrastructure is driven by climate hazards and infrastructure exposure. Climate coastal risk is the probability of damage due to climate hazards, multiplied by the cost of such damage. This quantitative framework to calculate coastal risks requires the assessment of the probability of occurrence (or exceedance) of certain hazards and the evaluation of the damage that they may cause.

There are two types of physical climate risks: acute and chronic. Acute physical risks arise from changes in extreme event hazards, such as an increased severity of hurricanes. Chronic physical risks refer to longer-term, incremental shifts in climate patterns, such as tidal flooding due to the increase in mean sea level or annual average rainfall.

While climate hazards are uncertain by nature, quantitative evaluations for some hazards and their impacts on infrastructure can be determined.

Among climate change impacts, there are projected ranges of sea level changes, that allow for evaluation of sea level rise impacts. Most notably, sea level rise causes both chronic and acute physical climate risks.

Chronic physical climate risks due to sea level rise include high-tide flooding (also known as “sunny day flooding” or nuisance flooding), reduction in rainfall stormwater storage capacity in natural or designed retention ponds, saltwater intrusion of freshwater aquifers, etc.

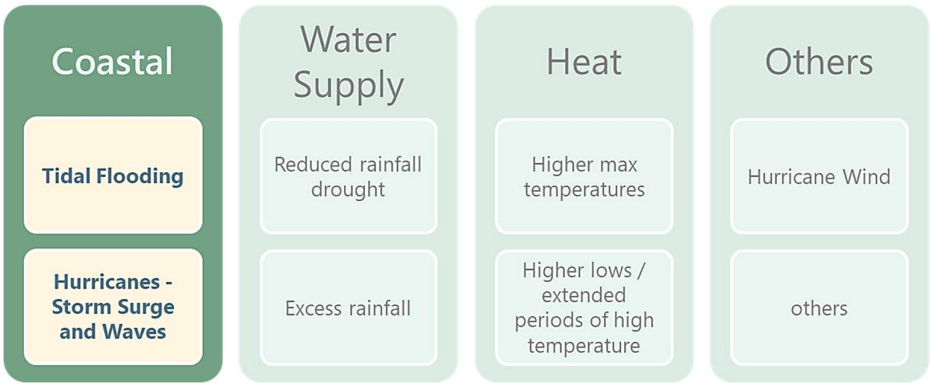
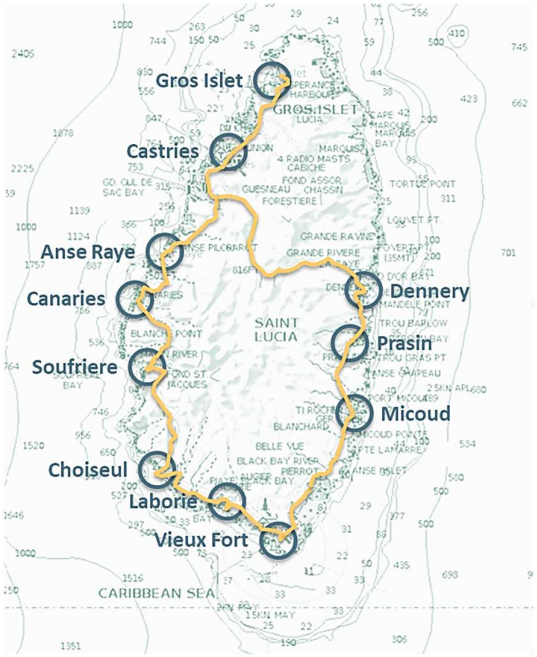


Figure 33 Climate Change Physical Impacts Context (Biondi 2021)

The most significant acute climate physical hazards in coastal areas are the increased impacts of extreme events, namely hurricanes. Coastal flooding due to storm surge and wave impacts of hurricanes can be calculated for increased sea level conditions. River flooding due to increased rainfall (intensity and duration) during extreme events can also be calculated where data is available. While many coastal facilities include both coastal and river flooding impacts, which typically compound during a hurricane, many of them are primarily exposed to coastal hurricane impacts.

A comprehensive site visit encompassing 12 sites was conducted between November 13 and 15, 2023. For each of the facilities, base plans and basic information summaries were prepared before the site inspections.



Site Visit

Facility	Date
Gros Islet	15 Nov 2023
Castries	13 Nov 2023
Anse Raye	14 Nov 2023
Canaries	14 Nov 2023
Soufriere	14 Nov 2023
Choiseul	14 Nov 2023
Laborie	14 Nov 2023
Viex Fort	14 Nov 2023
Savannes	14 Nov 2023
Micoud	14 Nov 2023
Prasin	15 Nov 2023
Dennery	15 Nov 2023

Figure 34 – Site visit itinerary

The vulnerability perception from the community is summarized below. The value in the box describes the vulnerability with 1 being “not at all vulnerable” to 5 being “very vulnerable”. The hazard definition is ambiguous, but the facility is perceived to be very vulnerable to extreme events and coastal climate change physical impacts

Gros Islet

The facility is located at the entrance of the Rodney Bay harbor, which provides limited protection from extreme events. The landing site is on the north shore of the entrance channel of the Rodney Bay Marina, very close to the mouth. The facility is within a dense urban area, without security fencing or dedicated parking. Storm surge and waves generated by hurricanes or tropical storms may represent hazards to the ramp and wharf facilities, which will increase due to climate change. While wave impact may be reduced by the inlet structures, the proximity to the entrance suggest that wave impacts may occur. Upland infrastructure is very close to the waterfront and may be flooded during extreme events due to storm surge or stormwater runoff.

Storm surge databases suggest that 0.80m may occur with a return period of 10 years and 1.55m with a return period of 100 years. It is expected that these conditions will cause damage during a design storm, which will be exacerbated with climate change.

No ramp and inland dry storage of fishing boats for emergency response is available. The ramp appears to be fully occupied with a portion of the vessels operating in the facility. It appears that there is insufficient capacity to implement for upland storage measures for hurricane preparation within the facility, so some fishing boats presumably need to seek shelter elsewhere in the bay. Facilities appear to be in generally fair to poor condition.

Table 11 Gros Islet vulnerability perception

Hazard	GIS	VRA (Avg)	VRA (2022)
Storm Surge	4	4.0	4
Flood	4	4.2	3
Trop Storm	4	3.5	4
Hurricanes	3	3.2	5
Sea Level Rise	0	n/a	n/a

Table 12 Gros Islet vulnerability Assessment

Hazard	Risk Assessment
Hurricane Storm Surge	5
Hurricane Waves	3
Tidal Flooding	4
River Flooding	0
Rainfall Flooding	5
Sargassum	0

Castries

The facility is located within Castries harbor, which provides excellent protection from waves during extreme events. Storm surge generated by hurricanes or tropical storms may represent hazards to the ramp and wharf facilities, which will increase due to climate change. Upland infrastructure may be flooded during extreme events due to storm surge or stormwater runoff, but visual observations suggest that building elevations are higher than in other locations.

Storm surge databases suggest that 0.80m may occur with a return period of 10 years and 1.55m with a return period of 100 years, but facilities elevation relative to the same datum is not available for comparison purposes. It is unclear if these conditions will cause damage during a design storm, but storm impacts will be exacerbated with climate change.

A ravine / river discharge adjacent to the facility can cause severe siltation and damage during an extreme rainfall event in the watershed. The facility is reportedly already suffering from navigation restrictions due to reduced water depth. After maintenance work is completed under normal operational conditions, climate change is expected to increase this maintenance.

Castries landing site consists of a fixed pier with boat ramp areas on either side. The pier is approximately 85 ft long and 15 ft wide. The pier is a concrete monolithic structure with timber fendering. The boat ramp areas span approximately 100 ft on either side of the fixed pier. Portions of the boat ramp feature intact asphalt while other portions have eroded to the gravel base material underneath. The coastal and port facilities of Castries are in need of urgent maintenance and repair. The fixed pier is severely eroded and uneven. There are insufficient cleats on the pier to secure the vessels. The boat ramps are also damaged and deteriorated.

Table 13- Castries vulnerability perception

Table 14- Castries climate hazard and vulnerability assessment

Hazard	GIS	VRA (Avg)	VRA (2022)
Storm Surge	4	4	4
Flood	5	5	5
Trop Storm	0	n/a	n/a
Hurricane	4	4	3
Sea Level Rise	4	4	5
Sargassum	0	n/a	n/a

Hazard	Risk Assessment
Hurricane Storm Surge	4
Hurricane Waves	1
Tidal Flooding	3
River Flooding	4
Rainfall Flooding	3
Sargassum	0

Anse la Raye

The facility is located on an open beach, which make it vulnerable to wave impacts and storm surge. Furthermore, its location between two rivers makes the whole community vulnerable to river flooding. These hazards will increase due to climate change.

Pier deck damage should be expected during a design storm so replacement decks should be available for storm recovery. Beach erosion is expected under extreme events and will have the potential to undermine the foundations of the fish landing facilities.

There is no ramp and no structure to store for emergency response in preparation for a hurricane. Boats kept on the beach will be vulnerable to extreme storm surge and wave impacts.

Upland fish landing infrastructure may be flooded during extreme events due to storm surge, river flooding, or stormwater runoff, but visual observations suggest that building elevations are higher than in other locations (road and homes on the other side of the road).

Storm surge databases suggest that 0.72m may occur with a return period of 10 years and 1.60m with a return period of 100 years, but facilities elevation relative to the same datum is not available for comparison purposes. It is unclear if these conditions will cause damage during a design storm, which will be exacerbated with climate change.

Table 15- Anse la Raye climate risk perception

Hazard	VRA
Storm Surge	5
Flood	5
Tropical Storm	0
Hurricane	0
FID	2
Sargassum	0

Table 16 Anse la Raye climate risk and vulnerability assessment

Hazard	Risk Assessment

Hurricane Storm Surge	5
Hurricane Waves	5
Tidal Flooding	4
River Flooding	5
Rainfall Flooding	4

Soufriere

The facility is located on an open coast, which make it vulnerable to wave impacts and storm surge. The boat ramp has already suffered storm damage, but the pier appears to be of a reasonably robust design to support extreme events.

The upland facilities have the potential to be impacted by coastal hazards and its location adjacent to a river mouth makes it potentially vulnerable to river flooding. These hazards will increase due to climate change. Upland fish landing infrastructure may be flooded during extreme events due to storm surge, river flooding, or stormwater runoff, but visual observations suggest that building elevations are higher than surrounding terrain.

Storm surge databases suggest that 0.67m may occur with a return period of 10 years and 1.66m with a return period of 100 years, but facilities elevation relative to the same datum is not available for comparison purposes. It is unclear if these conditions will cause damage during a design storm, but storm damage will be exacerbated with climate change. Pier deck damage should be expected during a design storm so replacement decks should be available for storm recovery.

There is no functional ramp and winch to store for emergency response in preparation for a hurricane. Boats kept on the beach will be vulnerable to extreme storm surge and wave impacts.

There are significant opportunities to evaluate recreation and tourism co-benefits of fisheries resilience infrastructure. Repairs to the ramp and winch system have the potential to provide good emergency response infrastructure for the fishing fleet and tour operators in the community.

Further improvements to the shoreline and nature-based solutions to coastal protection have an excellent potential to reduce coastal risk of upland development and coastal structures (pier and ramp).

Table 17- Soufriere vulnerability perception

Hazard	GIS	VRA (Avg)	VRA (2022)
Storm Surge	4	4	3
Flood	4	4	3
Trop Storm	0	n/a	n/a
Hurricanes	0	n/a	n/a
Sea Level Rise	0	n/a	n/a
Sargassum	0	n/a	n/a

Table 18 - Soufriere climate hazard and vulnerability assessment

Hazard	Risk Assessment
Hurricane Storm Surge	4
Hurricane Waves	4
Tidal Flooding	3
River Flooding	3
Rainfall Flooding	2
Sargassum	0

Savannes

The facility is located on an open coast, lined with mangroves and with limited natural protection by reefs, which make it vulnerable to wave impacts and storm surge. These hazards will increase due to climate change. The low elevation of the deck, geometrical design and materials are all contributing to the pier vulnerability to storms, waves and tidal flooding induced by climate change. Visual observations suggest that building elevations are on high terrain near the road.

Storm surge databases suggest that 0.67m may occur with a return period of 10 years and 1.69m with a return period of 100 years, but facilities elevation relative to the same datum is not available for comparison purposes. It is unclear how much damage will be caused during a design storm, but any impacts will be exacerbated with climate change. Pier structural damage is expected under extreme events due to storm surge and wave impacts.

There is no ramp and no structure to store for emergency response in preparation for a hurricane. Boats kept on the bay or pier will be vulnerable to extreme storm surge and wave impacts.

Savannes damaged timber deck, ramp remnants, and upland facilities.

Sea moss farm facilities are vulnerable to storm surge and waves during a storm.

Table 19- Savannes vulnerability perception

Hazard	VRA
Storm Surge	4
Flood	0
Trop Storm	4
Hurricane	0
Sea Level Rise	0
Sargassum	5

Table 20-Savannes climate hazard and vulnerability assessment

Hazard	Risk Assessment
Hurricane Storm Surge	5
Hurricane Waves	5
Tidal Flooding	4
River Flooding	0

Rainfall Flooding	2
Sargassum	5

Dennery

The facility is in a fishing port protected by a breakwater; however, the breakwater does not provide adequate agitation protection under operational conditions, so wave penetration under extreme events is expected to be insufficient for vessel protection. Visual observations suggest that the wharf and may have insufficient elevation to avoid storm surge flooding, but this should be confirmed for sea level rise scenarios. Upland fish landing infrastructure may be flooded during extreme events due to storm surge or rainfall.

Storm surge databases suggest that 0.75m may occur with a return period of 10 years and 1.62m with a return period of 100 years, but facilities elevation relative to the same datum is not available for comparison purposes. It is unclear if these conditions will cause damage during a design storm, but storm damage will be exacerbated with climate change.

Tidal and rainfall flooding is expected to be a moderate hazard, depending on the building elevations relative to mean sea level and stormwater design (unknown).

There is no boat ramp in the port that may be used to store fishing vessel for emergency response in preparation for a hurricane. Wave protection is expected to be insufficient to protect vessels during a storm, but this assumption must be validated.

Sargassum impacts have already been suffered at this facility. There is presently no means to remove the floating debris, but it was reported that tidal and wave induced currents eventually remove them.

Table 21- Dennery vulnerability perception

Hazard	VRA
Storm Surge	4
Flood	5
Trop Storm	0
Hurricane	0
Sea Level Rise	0
Sargassum	3

Table 22-Dennery climate hazard and vulnerability assessment

Hazard	Risk Assessment
Hurricane Storm Surge	5
Hurricane Waves	4
Tidal Flooding	4

River Flooding	0
Rainfall Flooding	3
Sargassum	5

Praslin

The facility is located on an open coast, lined with mangroves and with limited natural protection by reefs, which make it vulnerable to wave impacts and storm surge. These hazards will increase due to climate change.

The low elevation of the deck, geometrical design and materials are all contributing to the pier vulnerability to storms, waves and tidal flooding induced by climate change.

Visual observations suggest that building elevations are on high terrain near the road.

Storm surge databases suggest that 0.74m may occur with a return period of 10 years and 1.63m with a return period of 100 years, but facilities elevation relative to the same datum is not available for comparison purposes. It is unclear how much damage will be caused during a design storm, but any impacts will be exacerbated with climate change. Pier structural damage is expected under extreme events due to storm surge and wave impacts.

There is no ramp and no structure to store for emergency response in preparation for a hurricane. Boats kept on the bay or pier will be vulnerable to extreme storm surge and wave impacts.

Sea moss farm facilities are vulnerable to storm surge and waves during a storm.

Table 23- Praslin vulnerability perception

Hazard	GIS	VRA (Avg)	VRA (2022)
Storm Surge	5	4.5	5
Flood	0	n/a	n/a
Trop Storm	0	n/a	n/a
Hurricane	5	4.5	4
Sea Level Rise	0	n/a	n/a
Sargassum	5	3.8	5

Table 24- Praslin climate hazard and vulnerability assessment

Hazard	Risk Assessment
Hurricane Storm Surge	5
Hurricane Waves	5
Tidal Flooding	4
River Flooding	0
Rainfall Flooding	0
Sargassum	5

2.2.3 Seamoss

Sea level rise, storms and hurricanes and increased temperatures can result in negative impacts on the seamoss resulting in breakage of seamoss from their lines with rough seas, seasonal fouling of the crop by epiphytes, spoilage of drying crops in wet seasons.

2.2.4 Aquaculture

The projected warming of surface air temperatures combined with the projected reduced total rainfall in the region will lead to an increase in freshwater demand. A volcanic island, St Lucia's rugged topography, and impermeable rocks mean that most water falling as precipitation on the island becomes runoff with little infiltration and storage as groundwater. As surface air temperatures increase the amount of water removed from the watershed through evapotranspiration will increase. This removal will be exacerbated by the projected reduction in precipitation, making it more challenging to restore and protect the island's freshwater resources. Protracted periods of drought will cause more acute problems with freshwater availability, particularly for facilities that rely on surface sources of freshwater. As surface supplies dwindle, ponds decrease in volume, crowding the fish and concentrating potentially toxic metabolites.

Drought also increases the concentration of nutrients leading to excessive phytoplankton blooms and increased oxygen demand by microbial decomposition. The reduced availability of freshwater may also lead to increased competition and conflict over the resource particularly between the aquaculture sector and the country's much larger agricultural sector. Additionally, a reduction in freshwater availability to agriculture will likely lead to a reduction in the production of fish food, leading to increased costs for the aquaculture sector.

The projected increase in the intensity of major convective storms and tropical cyclones combined with the reduction in translational speed may have major implications on the island's freshwater supply and infrastructure. Flooding events are a major disruption to the island, in terms of damage to infrastructure, as well as the quality and delivery of freshwater. Flooding associated with Hurricane Tomas made the Roseau Dam inaccessible to residents after several landslides damaged roads and bridges on the island. Flooding causes excessive siltation in rivers and reservoirs and flood-induced landslides can damage water intakes in dams and reservoirs and disrupt access.

In the last 10 years there has been an increase in flooding events. A tropical storm caused extreme damage in 2019 due to flooding. The ponds at the Fisheries department were destroyed and the resources to restore these ponds are limited. Many farms are in valley areas which have become unsuitable for fish farming contributing to the decline in fish farming. The availability of suitable sites and land space is a limitation to pond farming.

2.4. Impacts on coastal ecosystems

Mangroves

The area of mangrove habitat in Saint Lucia was 1.62 km² in 2020, this represents a linear coverage of 4.27% of the 184.43 km of the coastline. Of this surface area, most of it is the Mankòte Mangrove system. It is the largest contiguous wetland area in the country. The extent of mangroves in Saint Lucia has decreased by 0.01 km² between 1996 and 2020. It has 7 species of mangroves, none considered threatened by the IUCN Red List. [20]

Mangroves in St Lucia provide a number of ecosystem services. For example, they store carbon. Total organic carbon stored in Saint Lucia mangroves is estimated at 0.27 Mt CO_2e

[20] Global Mangrove Watch (2024). St Lucia

with 0.02 Mt CO_2e stored in above-ground biomass and 0.25 Mt CO_2e stored in the upper 1m of soil. They also provide storm protection, and, most importantly for this project, serves as a nursery for local fishery.

With the increase in storm surge and strong rainfall events, erosion and sedimentation will increase inland, and affecting downstream ecosystems such as mangroves. Sea level rise could lead to mangrove degradation, as well as increasing extreme weather events.[21]

Coral reefs

Approximately 44% of Saint Lucia's shoreline is safeguarded by fringing coral reef ecosystems, which are extremely delicate and sensitive. Corals are particularly vulnerable to increases in sea surface temperatures, with just a 1°C rise above the average seasonal temperature being enough to cause bleaching. Generally, coral cover is declining while macroalgal cover is increasing. In 1998, 45 coral species were recorded on the west coast; however, recent studies have found only 23 species. Additionally, climate change is anticipated to intensify rainfall and tropical storms, leading to increased erosion and sedimentation of near-shore coral reefs, thus impeding the recovery of damaged reefs. Physical damage from these intensified storms negatively impacts fish nursery habitats and can severely affect the abundance and diversity of reef fish that rely on coral for food, protection, and breeding grounds. The economic cost of climate change-induced damage to Saint Lucia's coral reefs could range between USD 1.7 and 3.4 billion by 2050.

2.5 Barriers to climate adaptation and resilience

In a low-carbon, climate resilient scenario, actors in Saint Lucia's fisheries sector would respond to the climate challenges facing fishers, fishworkers, aquaculture farmers and value chain operators in several ways. First, fishers would invest in larger and more robust vessels and adopt safety-as-sea practices that enable them to venture farther from shore and stay out longer. Stakeholders would rehabilitate and reinforce infrastructure at landing sites to reduce impacts from sea level rise and storms and expand productive opportunities across the fish and seamoss value chains. However, multiple interrelated barriers hinder a spontaneous response to the climate challenges facing the sector.

Financial barrier: High operating costs and limited endurance of traditional fishing vessels limit fishers' ability to save and invest in climate resilient practices. Fuel, equipment and labor combined with cancelled trips during periods of wet and windy weather makes fishing expensive and leads to overfishing in nearby coastal areas.

The main costs associated with commercial fishing in Saint Lucia are fuel, equipment, and labor. The typical craft used by fishers is the 5 – 8-meter fiberglass pirogue. Fishers use outboard engines that may be between 15 – 115 HP. The low power range of the engines normally means that fuel consumption is relatively high compared to larger boats whose engines are larger and more fuel-efficient. In addition, the small open-air vessels limit the ability of the fishers to fish during most weather conditions other than sunny, low wind speeds, high visibility. This means that during the rainy season and other periods of the year when unusually wet and windy weather conditions prevail fishing trips often must be cancelled due to inability of the craft to navigate rough seas and heavy rainfall. Facilitating investments in

[21] NAP Saint Lucia (2018)

larger, more robust, fuel-efficient vessels will enable fishers to reduce operational costs of fishing and participate in climate resilient programmes such as acquisition of vessel and equipment insurance.

Financial barrier: Limited productivity due to small plot size and few economies of scale restricts farmers' ability to invest in climate resilient aquaculture.

The small size of Saint Lucia coupled with steep topography on nearly 75% of its terrain limits the capacity of the island to engage in traditional commercial aquaculture. Pond sizes by necessity cannot exceed more than ¼ acre or approximately 1,000 sq meters (10,000 sq feet). To engage in successful and climate resilient aquaculture, farmers must consider construction of multiple small ponds, preferably along mountain ridges and away from valley areas which invariably lie within flood plains or are close to large rivers and or agriculture enterprises. Therefore, if aquaculture is to truly be a mechanism to support climate resilience in fisheries, the establishment of carefully designed and engineered intensive aquaculture systems must be explored. Interested farmers will need support to identify appropriate pond construction and water exchange systems suitable for hilly landscapes. Identification of suitable feeds for intensive culture systems must also be undertaken.

Financial barrier: Limited financial literacy, poor record-keeping and risk aversion reduce ability and willingness to access and secure loans to invest in climate resilience, or insurance products to cover potential losses (often with limited data to highlight climate impacts – see informational barriers).

There are multiple fishers in Saint Lucia who do not have vessel and engine insurance. Through the Department of Fisheries fishers are informed about the importance of investment in insurance including medical and life. Over the past 10 years fishers have experienced losses and or damages to vessels due to rough seas and the presence of excessive amounts of sargassum in near shore waters. Fishers are therefore acutely aware of their vulnerabilities to climatic events, especially those that are more severe than normal and unexpected due to the time of year and or type of events such as sargassum influxes.

The reluctance to purchase insurance by fishers is not necessarily due to lack of data as such but rather partially due to culture – many St. Lucians have no life or medical insurance and do not insure their home or property; and partially due to the perceived high cost and fact that they may invest for many years and still receive small compensation in times of disaster. Many are simply not convinced that insurance is a smart investment. Data is however useful to insurers to help them determine premiums and to enable them to offer fishers packages that are attractive and present win-win scenarios There is thus a need for more in-depth discussions with insurance companies with regards to the creation of group insurance schemes that are easy to implement, reasonably priced / affordable and that have the potential to serve as long term investments by fishers (towards possibly, for example, a pension plan).

Market barrier: Limited investment capacity because fishers are unable to reliably supply the diversity of fish products demanded by the market, leading to competition from imported fish that is cheaper, more diversified and consistently supplied.

A large part of the Saint Lucian market for fish and fish products is the tourism sector as the economy is largely reliant on income derived from short- and long-term visitors who mainly

stay at 3-, 4- and 5-star hotels. Many of these hotels are all inclusive, offering their guests a promise of a wide range of local foods including fish. With the many constraints to fishing experienced by fishers in the past 5 - 10 years, mainly due to weather related hazards, periodic shortages in the availability of certain fish products have occurred and led to hotels seeking and receiving permits to import fish. Fishers struggle to consistently deliver a wide variety of cost-effective fish products to meet consumer demand, meaning the tourism sector often must look elsewhere to ensure regular supply of diversified products at a reasonable price. The importation of more and more fish products has had major negative impacts on the small-scale fishers and processors who currently are unable to compete with the cheaper imported fish. As a result, fish processors do not have the means to purchase fish from local fishers as sales have significantly dropped as more and more hotels and restaurants purchase the imported fish. Fish market processors are thus also wary about developing purchase contracts with fishers as the market for local fish is reduced and unpredictable. This leads to a vicious circle where, in the absence of reliable, long term marketing arrangements, fishers have little incentive to invest in climate resilient and more cost-efficient fishing gear and vessels.

Technical barrier: Limited access to tools, equipment, and training to monitor, analyze and respond to climate information.

Fishers in Saint Lucia rely to a large extent on the Fisherfolk Cooperatives to assist them in accessing tools and equipment for fishing. Many of the items are not easily purchased from regular retail outlets on the island. In many cases fishers express concerns about the high costs of fishing tackle and safety gear and thus do not invest adequately in new and updated technology which would improve their capacity to cope with extreme weather conditions or unexpected changes in fish population sizes, migration patterns and or habitats, which impact fish production. Research and training of fishers and fisheries staff are necessary to ensure that fishers better understand how climate impacts fish health, their habitats and behavior. Identification of tools that can best enable fishers to respond to climate related changes in target stocks and provision of support in the acquisition of such technology are important actions in the building of fisher capacity to adapt to climate related changes in local fisheries.

Information barrier: Limited knowledge of climate change effects on fish habitats and appropriate response measures.

The Department of Fisheries has a research unit that has as part of its workplan the assessment of fish habitats such as mangroves and coral reefs. It is through such research that adjustments are made to open and closed seasons for species such as lobster and other shellfish, and decisions are taken with regards to the issuing of licenses for the harvesting of sea urchins. The ability to project impacts on marine ecosystems is critical in assisting the Department in improving the accuracy of its management of fish stocks in order to ensure that all marine resources are sustainably exploited. Current capacity to assess marine ecosystems and expected responses of these ecosystems to projected changes due to climate is currently not available due to insufficient technical and financial resources by the Department of Fisheries.

Information barrier: Limited access to fish stocks data and management systems

The Department of Fisheries collects daily fish landing data through the use of data collectors. The data collectors obtain landing data by species, location, quantity and time (monthly) and this is provided to the Data Manager at the Department who utilizes a data management programme. This process enables a good analysis of how much fish per species is landed per landing site, and its value. The information is shared annually with various regional fisheries organizations to enable a broader, comprehensive assessment of the value of the fishery locally and comparative levels of exploitation per species. However, this data is not shared frequently enough with fisheries biologists, fisheries extension officers, the Fisherfolk Cooperatives and individual fishers. The data management system currently in use by the Dept. of Fisheries is not set up to provide real time information. The system is also not set up to carry out assessments of stock responses to environmental parameters such as salinity, wave height, temperature, turbidity and pH, just to name a few. To more accurately understand and project climate impacts on fish stocks, an improved data management system is required.

Institutional barrier: Limited Department of Fisheries staff hinders active evidence-based monitoring, engagement, and enforcement of policies.

Currently the Department of Fisheries undertakes very limited research, especially in relation to climate impacts on fishing effort, and fish stocks. Data is routinely collected on fish landings by species and landing sites per month, but other data related to climate, sea conditions, distance fished, and cost of fishing effort is not collected. Monitoring of changes to ecosystems including ocean floor, sea grass beds and coral reefs are rarely undertaken. There is a need to increase the amount of locally initiated and funded research on climate, fisheries, and ecosystems. However, to undertake this requires capacity building, including access to climate change information, training of fisheries staff and undertaking of relevant research and provision of analytical tools. A well-staffed, active and efficient research unit or team within the Department of Fisheries would help improve the data needed to improve fisheries management, but the Department does not currently have sufficient staff with these capabilities.

Institutional barrier: Limited coordination between Government departments responsible for fisheries, waste, agriculture, environment, trade and infrastructure.

The Ministry of Agriculture, in its role as manager of natural resources for food production, does not benefit adequately from the expertise of private institutions and Ministries within the Government. Agriculture is very reliant on information exchange and education of potential fishers and farmers. The Ministry is also responsible for rehabilitation of farmlands, rivers, forests and mangroves, coastal areas, the establishment of standards for food production and export, and development of co-management arrangements with fishers, farmers and or coastal communities, just to name a few. The Department of Fisheries is unable to undertake, on its own, the range of activities which together may enhance fisheries resilience and improve livelihoods for not only fishers but all coastal community residents. It is also recognized that many of the coastal resources are directly impacted by agricultural activities, and that successes will be limited along the coast if changes do not occur inland with regards to land-based sources of pollution, primarily within the agriculture sector. Sedimentation and agrochemicals play significant roles in reducing coastal water quality, coral reef, seagrass beds and mangrove integrity. There is a need for improved communications with other Government and Non-Government Agencies that have been given mandates and resources

to manage agriculture and industrial activities that have the capacity to impact coastal ecosystems. Unfortunately, coordination amongst Government and Non-Government Agencies very often is inadequate. Improved networking supported by appropriate technology, policies, operational standards, and regulatory instruments is necessary to ensure that land-based activities do not reduce capacities of marine ecosystems to withstand climate change impacts.

Table 25 - Barriers to adaptation and resilience and how the project overcomes these barriers

Barrier type	Description	How the project overcomes this barrier
Financial barriers	High operating costs and limited endurance of traditional fishing vessels limit fishers' ability to save and invest in climate resilient practices. High expenses for fuel, equipment and labor combined with cancelled trips during periods of wet and windy weather makes fishing expensive, prevents fishers from saving and leads to overfishing in nearby coastal areas	Under Output 1.2, the project will address the high operating costs and limited endurance of traditional fishing vessels by implementing mandatory training programs for boat operators on safety and communications equipment usage, especially for vessels operating beyond VHF coverage, and by developing better weather forecast information. Combined with the improved constructing techniques for FRP boat safety in rough seas, this will enable fishers to venture out on days of wet and windy weather and will therefore reduce cancelled trips. This, in turn, will limit losses associated with fuel expenditures and labour on trips that are subsequently cancelled, and losses of potential revenue from foregone fishing opportunities.The project will support the deployment of Vessel Monitoring Systems and VHF repeaters to extend communications range at sea, improving safety and efficiency. It will also facilitate the acquisition of long-liner fishing vessels, allowing for long-distance pelagic fishing. This will reduce pressure on coastal areas and increase fishing capacity during adverse weather.
	Limited productivity due to small plot size and few economies of scale restricts farmers' ability to invest in climate resilient aquaculture.	Under Output 1.3, the project will overcome the limited productivity and scale issues in aquaculture by establishing Technological Reference Units and farmer field schools to demonstrate best practices in aquaculture, improving productivity regardless of plot size. It will provide support for energy-efficient and renewable energy-powered pumps and aerators, reducing operating costs and enabling investment in resilience. The project will also offer technical assistance for improved production and

Barrier type	Description	How the project overcomes this barrier
		increased climate resilience of seamoss farming operations, including the adoption of submersible seamoss rafts to reduce vulnerability to storms. Output 3.2 will strengthen or establish cooperatives and associations that allow aquaculture producers to operate at a more efficient scale, enabling them to overcome limitations of small plot sizes. Institutional collaboration between NFOs, aquaculture farmers and the financial sector will also facilitate access to credit and investment opportunities, allowing farmers to invest in climate resilient aquaculture.
	Limited financial literacy, poor record-keeping and risk aversion reduce ability and willingness to access and secure loans to invest in climate resilience, or insurance products to cover potential losses (often with limited data to highlight climate impacts – see informational barriers).	Output 3.1 will conduct financial literacy training workshops targeting registered fishermen, focusing on financial management, record-keeping, and loan application processes. This will directly improve their ability to access and manage loans for climate resilience investments. The project will support financial institutions in mainstreaming climate and gender considerations in their financial policies and loan qualification processes and build the capacity of SLDB in strengthening their expertise in managing climate-resilient fisheries and aquaculture portfolios. It will facilitate the development and relaunch of insurance schemes with reduced premiums for the fisheries sector. This will increase willingness to adopt insurance products by ensuring they meet the specific needs of different groups within the blue economy.
Market barriers	Limited investment capacity because fishers are unable to reliably supply the diversity of fish products demanded by the market, leading to competition from imported fish that is cheaper, more diversified and consistently supplied.	Under Output 3.2, the project will overcome market barriers and improve investment capacity by supporting the upgrading of basic fish processing facilities, including solar-powered ligthing at landing sites, and energy-efficient ice production equipment to improve hygiene and reduce wastage, enabling a more reliable and diverse supply of fish products. It will provide capacity building on HACCP standards and certification, including training for inspect-tors and certification personnel, improving the quality and marketability of local fish products. The project will develop supply and marketing arrangements with hotels, restaurants, retailers, and schools to increase the market for domestically

Barrier type	Description	How the project overcomes this barrier
		harvested fish, creating stable demand. It will support the establishment of enterprises producing value-added fish products and utilising processing waste, creating new market opportunities and diversifying product offerings.
Technical barriers	Limited access to tools, equipment, and training to monitor, analyze and respond to climate information.	Under Output 1.1, the project will address the lack of access to climate information tools and training by conducting outreach and capacity building on climate impacts on landing sites and developing better weather forecast information for fisheries. This will improve understanding and use of climate data. It will provide training on the use of ICTs for accessing and interpreting climate data, enhancing the ability to respond to climate information.
	Limited technical expertise to identify, integrate and adopt climate change adaptation solutions	In addition to activities under Output 1.1 described above, the project will further address this barrier under Output 4.1 by establishing a working group with the Department of Meteorology to improve the weather warning system for fishers and mariculture farmers, ensuring more accessible and actionable climate information.
Information barriers	Limited knowledge of climate change effects on fish habitats and appropriate response measures.	Under Output 2.1, the project will overcome the knowledge gap regarding climate change effects on fish habitats by by building the capacity of fishers to monitor target species stocks and conducting awareness campaigns to discourage ghost fishing, increasing awareness of climate impacts. The project will develop and implement a rehabilitation and restoration plan for mangroves and coral reefs in collaboration with fishers. It will support community-based mangrove replanting, coral farming and management activities, providing hands-on experience with habitat restoration and protection. Under Output 4.1, the project will further address this barrier by implementing long-term fisheries target species stock assessments to detect changes in populations and habitats in the con-text of climate change, improving understanding of climate effects on fish stocks.

Barrier type	Description	How the project overcomes this barrier
	Limited access to fish stocks data and management systems	Under Output 2.1, the project will improve access to fish stocks data by providing equipment to record fish size and other parameters upon landing. It will engage local stakeholders to sup-port ongoing data collection and analysis with the Department of Fisheries, improving data accessibility and comprehensiveness. The project will further address this barrier through Output 4.1 by increasing the frequency of extension officer and data collector visits to landing sites to improve responsiveness to fisheries sector stakeholders and data quality.
Institutional barriers	Limited Department of Fisheries staff hinders active evidence-based monitoring, engagement, and enforcement of policies.	Output 4.1 will address the limitations in Department of Fisheries' capacity by establishing working groups between Fisheries and other relevant departments to review and update regulations, improve vessel registration and tracking, and enhance weather warning systems. It will provide expertise and support to implement emergency climate protocols developed by the Department of Fisheries and NEMO, enhancing response capabilities. The project will train fisheries officers in data collection and reporting to regional fisheries management organisations, and improving monitoring and enforcement capacities.
	Limited coordination between Government departments responsible for fisheries, waste, agriculture, environment, trade and infrastructure.	Under Output 4.1, the project will overcome the coordination barriers between government departments by establishing inter-agency coordination mechanisms to address upstream/land-based sources of fisheries habitat degradation. It will facilitate capacity building and technical support to agricultural extension teams and farmers to monitor nutrient loading in streams and reduce farm runoff, enhancing cross-sector collaboration. The project will also promote policy changes that prioritise the use of domestically produced animal feeds and fertilisers, stimulating increased demand for fish silage and fostering linkages between fisheries and agriculture.
Policy barrier	Non-existent policies that support the coordinated management of the mariculture farms	The project will address outdated and inadequate regulations through Output 4.1 by establishing and enforcing minimum construction and safety standards for FRP boats, improving vessel resilience to

Barrier type	Description	How the project overcomes this barrier
		changing climate conditions. It will review and update regulations concerning the design, construction, and equipment of fishing vessels to address the needs of multiday longliners and distant FAD fisheries, enhancing safety and efficiency in a changing climate. The project will conduct a policy review to increase women's capacity for asset ownership in the aquaculture sector by updating requirements for lease/ownership of land, promoting inclusive growth in the mariculture sector. It will also accelerate discussions of Saint Lucia's representation at ICCAT for the advancement of the offshore pelagic fishery, ensuring the country's interests are represented in international fisheries management.

3. Project description

3.1 Theory of change

The theory of change shows how the proposed package of interventions overcomes barriers to adaptation and resilience (see Section 4.5 above) and leads to concrete outputs and outcomes towards the goal of transforming Saint Lucia's fisheries sector.

The Theory of Change goal statement summarizes the approach to transforming the sector to achieve climate resilience: **IF** vulnerable small fishers and farmers in Saint Lucia receive technical, financial, and institutional support to adopt climate-adaptive fishing and aquaculture practices, **THEN** the fisheries and aquaculture sector will shift toward a more climate-resilient and sustainable model, ensuring long-term economic stability and ecosystem health **BECAUSE** fish sector stakeholders will have improved access to financial mechanisms for income diversification and stabilization, along with strengthened institutional frameworks that support long-term climate adaptation and resilience.

The figure below presents the project's theory of change.

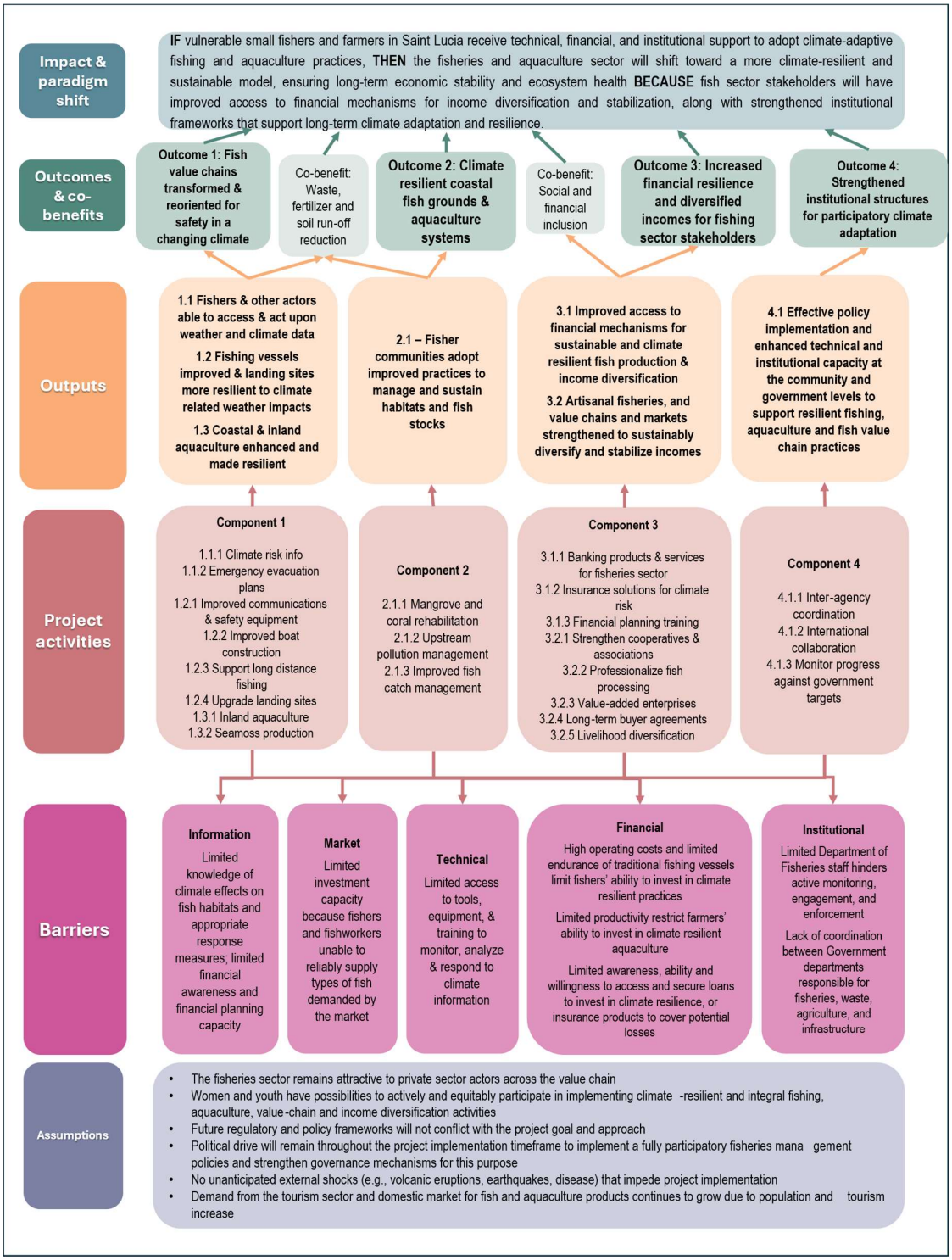


Figure 35 Theory of change diagram

3.2 Project elements

The proposed project builds resilience in Saint Lucia's fisheries sector against the worsening impacts of climate change. The project enhances the livelihoods of those reliant on marine ecosystems by permanently transforming the operation of the sector and aligning incentives between private sector actors, government, and coastal communities for long-term sustainability.

The proposed project has four mutually reinforcing components that combine to overcome barriers to climate resilience:

- Component 1 – Transform and reorient fishing systems for safety in a changing climate
- Component 2 - Implement Nature-based Solutions and sustainable fishing practices to improve ecosystem health and fish stock sustainability in response to climatic changes
- Component 3 – Increase financial resilience and diversify incomes for fishing sector stakeholders
- Component 4 – Strengthen institutional structures for participatory climate adaptation

The project design is based on a detailed investigation of each element of the fisheries sector, an analysis of fisheries value chains, a review of international good practices, and in-depth consultations with a wide range of stakeholders.

Component 1: Transform and reorient fishing systems for safety in a changing climate

Output 1.1 Fishers and other actors are able to access and act upon weather and climate data

Activity 1.1.1 Increase capacity of fishers, fisheries workers and other actors to use and respond to climate risk information, ensuring enhanced participation and access for informal workers, in particular women

This activity engages local stakeholders as partners in the design of small scale climate resilient fish landing site, fish processing, and mariculture infrastructure. Previous surveys have asked fishers and shore-based actors to provide their views about climate risks, but such surveys face methodological challenges when people are asked to estimate the risk of infrequent or unprecedented events. The project will support an iterative approach between this activity and Activity 2.1.2 (see below) to help stakeholders understand the specifics of what climate change may mean at each landing site, and then understand their priorities for how the sites are currently used and could be adapted. This will be achieved through:

> Sub-activity 1.1.1.1 Conduct outreach and capacity building on climate impacts on landing sites

Activity 1.1.2 Develop and implement emergency evacuation plans for fish landing sites

This activity involves enhancing and testing emergency evacuation plans for the fish landing sites through reviewing and updating of emergency risk assessments for landing sites and building capacities and awareness of the emergency evacuation plans which would prepare the stakeholders in the event of an emergency. This will be achieved through:

> Sub-activity 1.1.2.1 Review and update emergency risk assessments and evacuation plans for landing sites

Sub-activity 1.1.2.2 Conduct outreach and capacity building to ensure awareness of revised emergency evacuation plans

Sub-activity 1.1.2.3 Quality assurance and testing of emergency evacuation plans (co-financing from MoA)

Output 1.2 Fishing vessels improved to respond to shifting fishing grounds and landing sites more resilient to climate-related weather impacts

Activity 1.2.1 Promote safety at sea through training (including sanitary safety of installations and practices on board fishing vessels), weather forecasting and acquisition of improved communications and safety equipment for fishing vessels

Shifting fishing effort further offshore beyond VHF range highlights the requirement for reliable weather forecasting, communication equipment, and position reporting. Fisheries management measures could ensure this now by mandating that FADs are not deployed beyond VHF coverage. It is likely that with the ongoing accelerated growth of global satellite coverage (Starlink, etc.) that improvements will be made in weather forecasting and communications, and these developments should be monitored for their applicability to small scale and offshore fisheries.

Sub-activity 1.2.1.1 Implement mandatory training programs for boat operators in the use of safety and communications equipment for all fishing vessels operating within beyond VHF coverage, provide equipment, and support drafting of safety at sea regulations

Sub- activity 1.2.1.2 Deployment of Vessel Monitoring Systems or low-cost alternatives to support fisheries management and assist in search-and-rescue

Sub-activity 1.2.1.3 Support deployment of VHF repeaters to extend communications range at sea and targeted support for adoption of satellite communications for all vessels

Sub-activity 1.2.1.4 Develop a comprehensive accident reporting, recording and analysis system, and train staff in its use, inclusive of accident investigation techniques

Sub-activity 1.2.1.5 Develop better weather forecast information for fisheries and provide training on the use of ICTs

Sub-activity 1.2.1.6 Quality assurance on operation of VMS system and procurement of upgrading equipment (co-financing from MoF)

Activity 1.2.2 Introduce construction standards and techniques to improve FRP boats safety in rough seas

The quality of the construction and repair of FRP fishing vessel hulls visited during the short mission was generally rather poor. This could lead to catastrophic failure when vessels travel at their normal high speeds of 25 knots or more in short steep seas, and these are conditions which might be anticipated to worsen as a result of climate change impacts; at that time many of these poor-quality boats will be fishing progressively further offshore. This activity will support improved construction techniques for FRP boats. This will be achieved through:

Sub-activity 1.2.2.1 Support upgrading of FRP construction facilities and design and construction of high-quality molds for fiberglass hulls

Sub-activity 1.2.2.2 Quality assurance on improved vessel construction techniques (co-financing from MoF)

Activity 1.2.3 Provide technical assistance to facilitate acquisition of long-liner fishing vessels that allow long distance pelagic fishing

This activity aims to establish the supporting infrastructure and enabling environment for long-liner fishing vessels to operate in Saint Lucia. Larger fishing vessels use diesel engines instead of outboard motors; the maintenance infrastructure for diesel engines in Saint Lucia is focused on land vehicles like trucks. Saint Lucia's ability to develop an export market for tuna and other pelagic fish is hampered by an inability to conform to Hazard Analysis and Critical Control Point (HACCP) requirements established by many importing countries. These and other challenges highlight the importance of developing a well-functioning ecosystem for an evolving fishing fleet. This will be achieved through:

Sub-activity 1.2.3.1 Establish exchanges for Saint Lucia fish value chain actors to learn from the experience of the Grenada longline fishing sector

Sub-activity 1.2.3.2 Conduct training and education to support skills required in the offshore tuna longline fishery

Sub-activity 1.2.3.3 Support identification and procurement of appropriately sized second-hand longliner vessels, subject to results from pilot study tours

Sub-activity 1.2.3.4 Quality assurance for the inclusion of longliners into Saint Lucia's fishing fleet (co-financing from MoF)

Activity 1.2.4 Provide technical and financial support to upgrade fish landing sites, including with NbS, with safe spaces for at least 75% of smaller vessels

This activity aims to conduct detailed engineering assessment of risks facing fish landing and mariculture sites. The TORs for these assessments will ensure that the proposed solutions are within risk category C. The comprehensive coastal risk study will provide consistent quantitative information for all sites, which will allow to assess risk across landings with consistent quantitative metrics. These basic studies are necessary to develop reliable quantitative hazard and risk information to make informed decisions regarding investment priorities. This will be achieved through sub-activity 1.2.4.1 and 1.2.4.2.

Building on this, a selection of climate proofing packages for fish landing sites and infrastructure will be developed. Once the adaptation "packages" for each site have been finalized and assessed to be in line with the ESAP category C, the project will issue contracts for the small-scale engineering and nature-based works. Landing sites will be grouped and differentiated between primary and secondary landing sites based on their size, fishers served, and scale of fishing operations. The project will prioritize landing sites based on the level of vulnerability, the importance of the handling site to the local community and the feasibility of implementing adaptation measures, considering factors such as access, land ownership and environmental constraints. Specific measures will include, strengthening existing structures through upgrades and retrofits to climate-proof them, enabling access to smaller boats, improving access and facilities for female fishers, among others. The safeguarding of landing sites will prioritize NbS, with small low impact grey infrastructure interventions used only to complement NbS when necessary. Sample solutions include dredging (only in areas with significant sedimentation caused by anthropogenic activities and only if the assessment confirms it to be in-line with the risk category C), wooden and small pier improvements (rehabilitation and expansion for example to include a haul-out facility to

allow for boat storage off-site), boat ramp improvements (repair or construction), nature-based infrastructure for wave protection (incorporating coral or mangrove ecological features), and beach improvements (sand management such as sand bypassing to avoid beach erosion, restoration, coastal structure modifications through small-scale piers and ramps, see photo of Savannes pier on page 81). The combined green-grey infrastructure may include protected or planted mangrove shorelines, constructed mangrove islands, constructed or reinforced coral reefs, and regenerated beach systems, and establishing small scale breakwaters. Complementary NbS measures as described in Activity 2.1.2 include upstream riparian corridor rehabilitation, reconstruction of riverine pools to slow down runoff, wetland rehabilitation, flood protection with natural vegetation, among others. These solutions have been selected for their ability to provide natural, long-term protection against extreme weather events, while protecting marine life habitats from pollution and siltation. In each case, a project manager and community representative will work together and ensure that distinct elements are coordinated to avoid maladaptation risks and that any proposed solution that is not category C will be removed.

Sub-activity 1.2.4.1 Conduct engineering-informed consultation and incorporate engineering input from ecosystem restoration activities to fine tune design of infrastructure improvements

Sub-activity 1.2.4.2 Conduct ESA for each site to ensure compliance with Category C E&S risk rating

Sub-activity 1.2.4.3 Reduce flood risk and increase resilience of fishing infrastructure and equipment at landing sites

Sub-activity 1.2.4.4 Climate proofing of secondary landing sites (co-financing from MoF)

Output 1.3 Coastal and inland aquaculture enhanced and made resilient against extreme weather

Activity 1.3.1 Increase resilience of farmers and other value chain actors by supplementing and diversifying incomes via robust small-scale aquaculture

This activity aims to optimize fish productivity and climate resilience in the aquaculture and aquaponics sectors through training and technical assistance programs. Accessible knowledge sharing is built upon with videos, updated training manuals, and posters provide farmers with easily accessible and culturally relevant information on best practices, empowering both women and men to participate and thrive in the sector. Establishing Technological Reference Units (URTs) in selected farms creates centres for knowledge dissemination and peer-to-peer learning. Farmers can observe successful practices, share experiences, and replicate successful approaches, accelerating the implementation of improved management techniques across the sector. Practical skills development with Formal NVQ training equips at least 10 female and male farmers annually with essential skills and knowledge in better management practices, fostering a more skilled and resilient workforce. Practical learning implemented by establishing farmer field schools and demonstration farms provides hands-on learning opportunities for farmers to observe and implement best practices in a real-world setting, accelerating knowledge transfer and improving adoption rates. The activity also addresses the Support for energy-efficient and renewable energy-powered pumps and aerators reduces operating costs, minimizes environmental impact, and promotes climate-smart aquaculture practices.

The species considered for aquaculture development will be focused on tilapia, a hardy and fast-growing fish that is well-suited to aquaculture and a popular food in Saint Lucia, , and sea moss, which is a versatile food supplement. The project will promote the integration of aquaculture and agriculture by using pond water from fish farms to irrigate crops, and by integrating aquaculture into existing farms. All URTs will be powered by renewable energy and include energy efficient appliances, such as pumps and blowers.

These results will be achieved through the following:

Sub-activity 1.3.1.1 Capacity building for the Veterinary division in aquatic animal health disease and management

Sub-activity 1.3.1.2 NVQ training of at least 10 female and male farmers per year on sustainable aquaculture practices and management

Sub-activity 1.3.1.3 Establish farmer field schools and Technological Reference Units (URTs)at demonstration farms

Sub-activity 1.3.1.4 Support to obtain energy efficient and renewable energy powered pumps and aerators

Sub-activity 1.3.1.5 Provide technical assistance and training on feeding management

Sub-activity 1.3.1.6 Conduct outreach and support aquaculture farmers to access quality broodstock

Sub-activity 1.3.1.7 Develop a strategy to improve aquaculture's resilience to climate change

Sub-activity 1.3.1.8 Upgrade government facilities for climate-resilient aquaculture production, inclusive of biosafety screening, broodstock and feed production (co-financing from MoF)

Activity 1.3.2 Increase resilience of coastal fisher communities by supplementing and diversifying incomes via sustainably managed seamoss production

This activity aims to improve sustainable management and climate resilience of the mariculture sector. This activity dives into the seamoss farming industry to build on lessons learnt to raise awareness of and scale up practices such as submersible rafts to reduce the vulnerability of seamoss farms to storm damage. Additionally, this output will conduct research into setting up or nurseries to propagate specific species and ensure a continuous supply of seed stock. These actions will provide a measure against seamoss loss due to storms or hurricanes as well as providing capacity for monitoring and collection of data on indicators such as water quality to ensure proper environment for growth.

This activity provides technical expertise for improvement and increased resilience of seamoss farming through establishment of the enabling environment of technical experts within the Government to provide dedicated support to seamoss farmers, development of seamoss nursery methods including integration of other mariculture species and training in good management practices and use of materials for seamoss farming that will pose no adverse impacts on the environment.

The activity will strengthen the sea moss value chain by diversifying sea moss products, exploring and identifying niche markets, developing processing and transformation capabilities for new product creation, and expanding market development through support for local businesses in commercializing sea moss products. This will involve working with local

financial institutions to finance the processing and transformation of sea moss into new products, providing financial services to communities to enable investments in the required processing and marketing facilities.

Sub-activity 1.3.2.1 Provide technical assistance for improved production and increased climate resilience of seamoss farming operations

Sub-activity 1.3.2.2 Support adoption of submersible seamoss rafts and climate-proofing of processing facility to reduce vulnerability to storms (co-financing from MoF)

Sub-activity 1.3.2.3 Development and updating of training and good management practice materials

Sub-activity 1.3.2.4 Support for seamoss value addition and marketing/distribution

Component 2: Implement Nature-based Solutions and sustainable fishing practices to improve ecosystem health and fish stock sustainability in response to climatic changes

Output 2.1 Fisher communities adopt improved practices to manage and sustain fish stocks and habitat

Activity 2.1.1 Develop and implement rehabilitation and restoration plan for mangroves and coral reefs

This activity will support the sustainable restoration of mangrove ecosystems in fisheries priority areas. Mangroves in Saint Lucia are demonstrating levels of decline ranging from low (20-30%) to severe (65-80%) vegetation loss for several reasons (GCF Readiness and Preparatory Support Project, 2023). It has been found that the main pressures on mangroves generally are the illegal dumping of solid waste, coastal erosion, and agrochemical contamination.

The activity aims to restore 25 hectares of mangroves in priority areas, including Praslin Bay and Esperance Harbour. To achieve this target, a variety of methods will be used. Community-based replanting will allow local communities to replant mangroves in degraded areas, while the establishment of mangrove nurseries will provide a source of seedlings for replanting efforts. The activity will restore degraded mangrove areas by removing invasive species, restoring hydrology and planting seedlings. The costs of restoring 25 hectares of mangroves are covered by the project funding, as detailed in Annex 3, Detailed Budget.

The activity will also restore 7 ha of coral reefs in two priority areas, Soufriere Bay and Saline Point Reef. Methods will include coral gardening and transplanting, assisted colonization, establishing land coral nurseries to grow coral fragments, and wider community-based management for coral reefs. It should be noted that coral restoration aims at planting high quality genetic material and diversity for self- propagation. In this case, the area of influence of this restoration work, the Soufriere Managed Marine Area, is approximately 11 km2.

Communities	Location	Name of Mangrove	Status	Threats	Severity
Gros-Islet	North-west	Trou Gaston (between Trouya and Pt Pima) La Vout (South Cas En Bas) Choc	Moderate/Partial : Industrial waste from Grande Riviere, pig pens Solid waste, sewage Solid waste, industrial waste and siltation in the river	Sedimentation (from large rivers such as Grande Riviere, Choc	3
Marquis	North East, north of Grande Anse	Marquis	Moderate to high: intensive vegetable gardening, signs of burning,	Agriculture, Tourism and illegal dumping	3 ,3, 3
Grande Anse	East coast	Grande Anse	Low levels of observable threat.	Solid waste, encroachment (agriculture & fishing, illegal dumping).	2, 2, 2
Castries	West coast	Choc, Vide Bouteille, Bois d'Orange wetlands	Choc -Low, Vide Bouteille – little mangrove left	Sedimentation	3
				Invasive species	3
				Sewage	3
				Solid waste	3
Anse La Raye	West coast		N/A	N/A	N/A
Canaries	West Coast	Anse Mahaut	Unknown	Sedimentation	3
				Illegal dumping	3
				Agrochemical waste	1
Soufriere	West Coast	Not many present	Moderate	Sedimentation	2/3
				Sewage	2
				Illegal dumping of garbage	1

Communities	Location	Name of Mangrove	Status	Threats	Severity
Choiseul	South-west	Sab Wisha, River Doree, Anse John	Moderately degraded	Sedimentation	3
				Coastal erosion	2
				Agro-chemicals	1
				Encroachment by agriculture	1
Laborie	South-west	Black Bay (East) Saphie (West)	Low and partially degraded	Sedimentation	3
				Industrial waste	3
				Coastal erosion	3
				Agro-chemical	2
				Illegal dumping	2
Vieux-Fort	South	Ma Kote Mangrove, Savannes Mangrove (both are Ramsar Sites)	Partially degraded	Die-back	3
				Illegal dumping of garbage	2
				Industrial waste	2
				Agriculture / horses	2
				Sargassum	2
				Sedimentation	2
Micoud	South-east	La Bas Up the line Anse Captain Troumasse (La Bouchee)	Highly degraded	Sedimentation	3
				Sargassum	3
				Sewage (from Escap development)	2
				Hunting of crabs	2
Praslin	East coast	Praslin	Severely degraded	Sargassum : die back	3
				Sedimentation	3
Dennery	East coast				

Figure 36- Mangrove status and threats (GCF Readiness and Preparatory Support Project, 2023) where 3-severe; 2- moderate; 1-low impact; 0- no impact.

Sub-activity 2.1.1.1 Outreach and consultation with community members to refine rehabilitation plan

Sub-activity 2.1.1.2 Baseline assessment and environmental review of sargassum control options

Sub-activity 2.1.1.3 Removal of decayed sargassum from Praslin Bay and Praslin Mangrove

Sub-activity 2.1.1.4 Establishment of floating sargassum barrier: Additionally, a removable sargassum barrier of 150m in length will be provided to the Praslin community in sub-activity in sub-activity 2.1.1.4. This sargassum barrier will need to be removable as required in order to ensure that it does not obstruct marine vessels entering the bay. Figure 39 presents an example of a sargassum barrier. Either fishers or seamoss farmers will be best placed as focal points for deploying the barrier. Sargassum collected will need to be disposed of onshore. Ideally sargassum should be supplied to potential users including companies such as Algas Organics who produce fertilizer from sargassum. Sargassum can also be used in other ways including as biofuels, livestock and fish food, for soap production and in the production of bioplastics (US EPA, 2023).

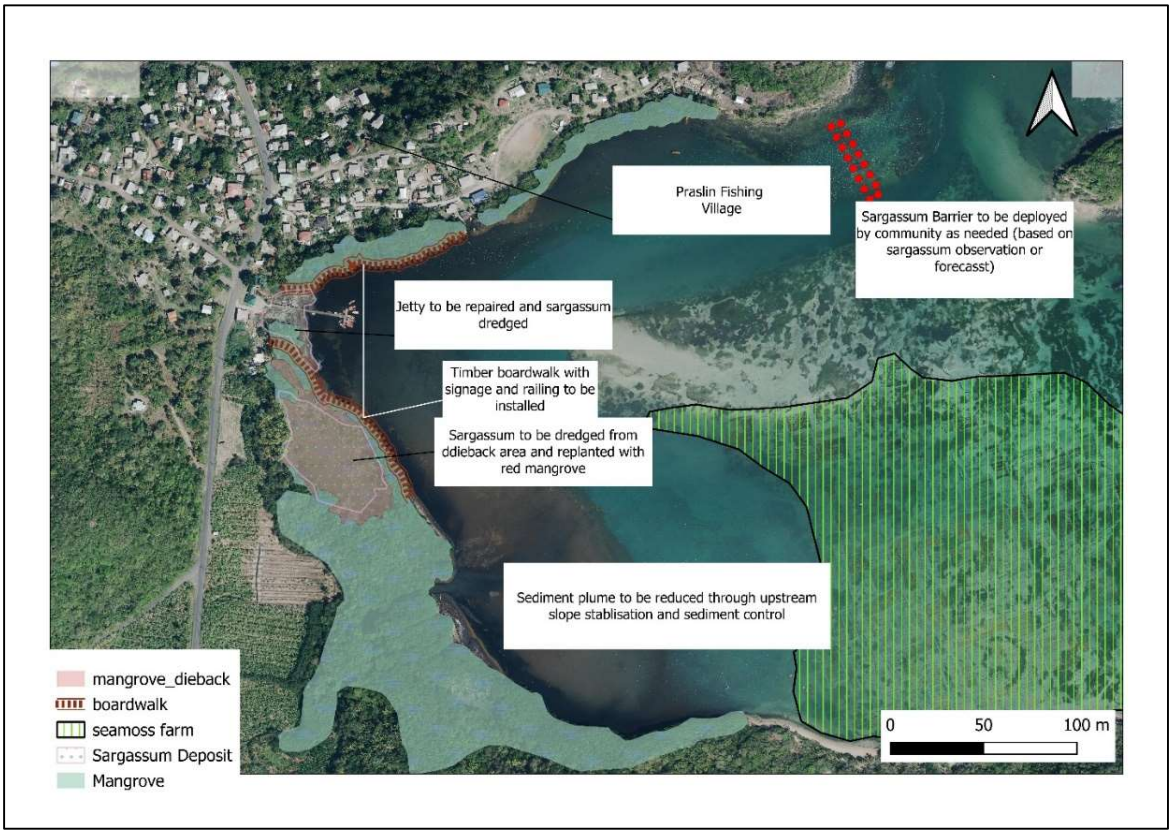


Figure 37- Map showing Praslin Fishing Bay, and the Sargassum barrier

Sub-activity 2.1.1.5 Support community-based mangrove replanting and management

Sub-activity 2.1.1.6 Support community-based coral farming and management

Nature based solutions for reef and seagrass protection and restoration generally entail:

Offshore interventions

1) Restoration of existing reefs through replanting of coral
2) Prevention of fishing on the reef
3) Educating fishers on sustainable fishing practices (e.g. not catching juvenile fish)
4) Restoration of ecosystem balance on reef through reduction of population of invasive species
5) Participatory management of the reef by stakeholders

Onshore interventions

1) Riverbank stabilisation and sediment control measures including
    a. Revegetation or riverbanks
    b. Establishment of vegetated riparian reserves
    c. Construction of natural sediment control and bank stabilisation measures such as check dams, bush berms and wattle fences

d. Development and implementation of spatial plans for watersheds

e. Improving stormwater and wastewater management

Both terrestrial and marine interventions require stakeholder buy-in, public sensitization and a proper legislative and regulatory environment.

Based on previous assessments of ecosystems and feedback from stakeholders, two target locations for coral ecosystem protection and restoration have been identified:

1) Soufriere Coral Reef
2) Saline Point Reef

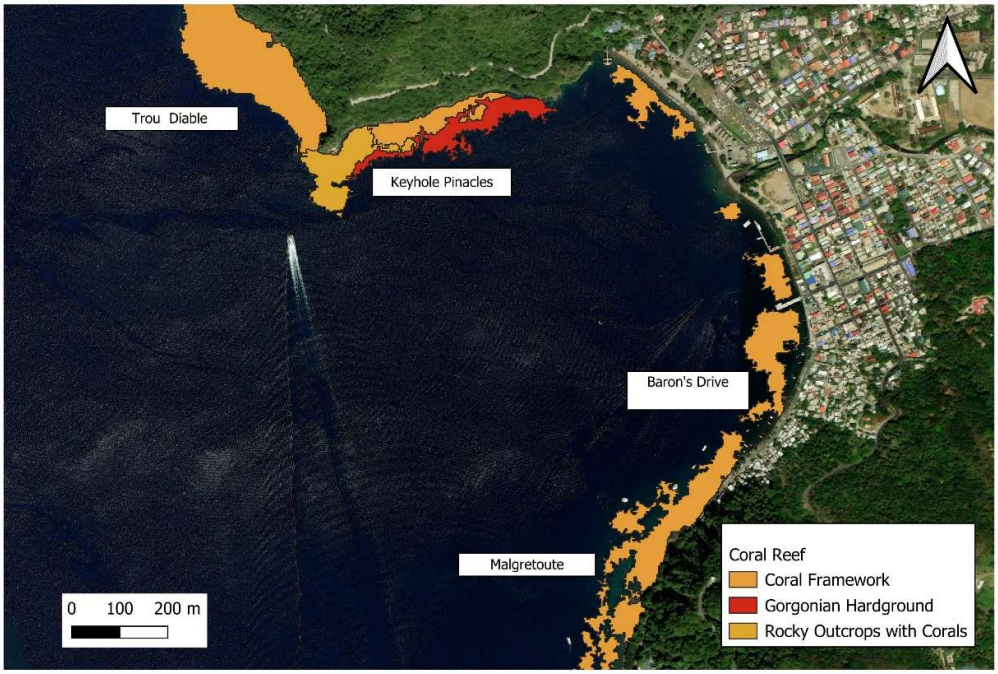


Figure 38 Distribution of Reef Habitat in Soufriere Bay (data source TNC, 2016)

The proposed focus area for protection and restoration at Soufriere will be the reefs within the Soufriere Bay itself, extending from Trou Diables in the north to Malgretoute in the South. Many of these reefs are popular dive sites and are essential to the sustainability of the fisheries industry in the area. In addition to the pressures of overexploitation, anthropogenic activity from the Soufriere town, resorts, farms and areas within the watershed generate increased sedimentation, nutrient loads and other forms of pollution which adversely affect reef and seagrass habitats.

Saline Point is a reef and seagrass habitat located offshore from the Le Sport Hotel in Cap Estate, Gros Islet.

Figure 39 Photo of beachfront at Le Sport (source: Sanctuary Spa Holidays)

The site is heavily used for diving and snorkelling activity as well as fishing. Due to its distance from major fishing communities, the site is used by fishers from all over Saint Lucia.

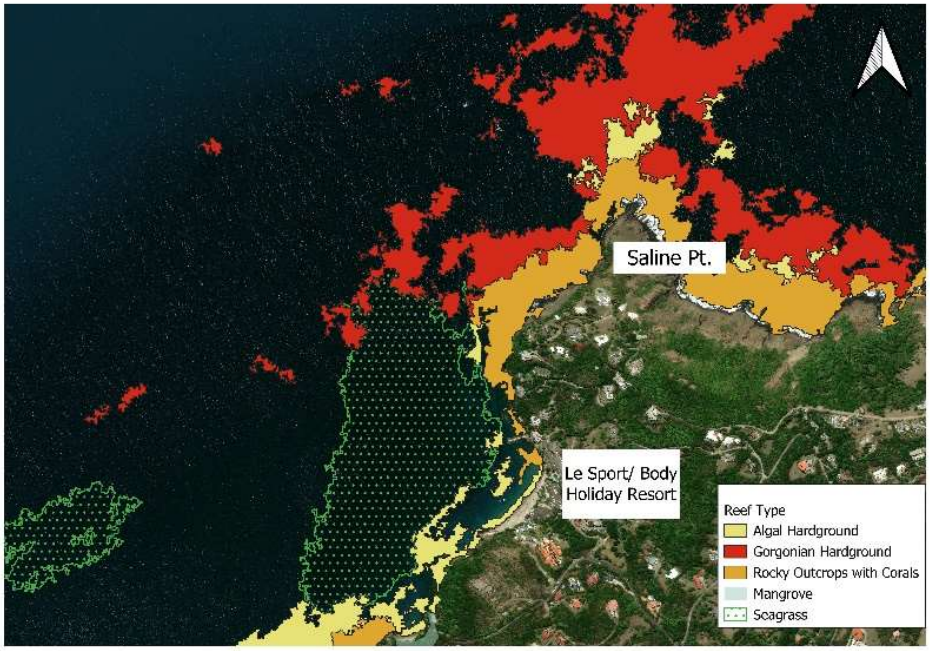


Figure 40 Location of Saline Point (ecosystem data from TNC,2017)

Based on recent assessments (GCF Readiness and Preparatory Support Project, 2023) the site is facing tremendous pressure due to the high number of users including fisherfolk and dive operators. The assessment found that the reef was heavily laden with silt and was heavily degraded (80% coral loss estimated). Stakeholders consulted considered the ecosystem to be under severe threat from sewage, sedimentation, overfishing and solid waste.

Project interventions will focus on upstream measures to reduce pollution and sediment runoff that affects the targeted reefs, and also measures to support coral regrowth.

Sub-activity 2.1.1.7 Support community-based tourism activities around coral reefs and mangroves.

Activity 2.1.2 Implement upstream pollution management plan for mangrove and coral reef protection

The activity will develop and implement an upstream pollution management plan which recognizes the importance of addressing land-based sources of pollution to protect coastal ecosystems. To ensure its long-term sustainability, the pollution management plan will be aligned with key national policies, including the National Environmental Policy and National Environmental Management Strategy (NEP/NEMS), the National Water Policy and the National Wastewater Policy and Strategic Plan.

The plan will involve establishing vegetated riparian buffers in partnership with farmers in Praslin and Esperance. Field visits found that farms, including banana plantations, in the area often cultivate up to the riverbank.

Sub-activity 2.1.2.1 Establish vegetated riparian buffers with Praslin farmers

Sub-activity 2.1.2.2 Praslin Riverbank river bank stabilization[22] and revegetation:

Some sections of the Praslin River show minor – moderate erosion and would benefit from revegetation. The figure below shows riverbank stabilisation options suitable for Saint Lucia based on CBCL's River Rehabilitation Plan. Personnel from the forestry department were trained in the process of selecting and applying these methodologies and also have extensive experience in nature-based approaches to riverbank stabilisation and restoration.

[22] construction measures will avoid the use of hard engineering structures that could alter the hydrology.

Stie Considerations		Re-Planting					Re Planting + Slope Reinforcement				Slope Recon-struction		Toe Protection		
		Live Post	Live Stakes	Branch Packing	Brush Layering	Live Fascines	Tree and Log Revetment	Live Fascines and Reinforced Turf Mats	Brush Mattress	Permanent/ Biodegradable VRSS	Geocellular Confinement System	Vegetated Geogrid	Plant Rolls	Live Cribwall	Root Wad Toe Protection
Max Velocities (after established)	<2m/s	x	x			x							x		
	2 - 4 m/s			x	x		x	x	x					x	x
	4- 6 m/s									x	x	x			
Suitable Bank Slope Range	3:1 to 5:1	x													
	2:1 to 3:1		x	x	x	x	x	x	x						
	0.5:1 -2:1					x		x		x	x	x	x	x	
Erosion Processes	Localized slumps		x	x	x		x								
	Exposed Ground	x	x					x							
	Erosion by overland runoff			x	x		x					x			

Figure 41- Riverbank Stabilization Options for Saint Lucia (CBCL, 2022)

Figure 42 Moderate erosion of outer bank of channel with exposure of mature tree roots in Praslin (Photo C Williams)

Vegetation appears to be well established along the banks of the Esperance River and its tributaries. However, some minor erosion and bank failure has been observed in

some areas. Livestock grazing along the riverbank has also been observed. This practice has led to the removal of grasses and other vegetation from the slope, resulting in bank failure. Incentives for livestock owners to maintain the riparian buffer will be implemented through the Department of Agriculture.

Riverbank Rehabilitation

Minor signs of erosion and slope failure were observed. Revegetation with forest species, fruit trees, vetiver grass and other suitable plants should be used for revegetation.

Figure 43 Example of replanting of Citrus along Riverbank in Canaries (photo by L Monrose)

Where more significant erosion has been observed, it is recommended that nature-based slope stabilization techniques be selected and employed based on the guide provided within (CBCL, 2022) above.

Sub-activity 2.1.2.3 Mandate and support the establishment of temporary silt traps prior to roadworks and other construction near the Soufriere River

Sub-activity 2.1.2.4 Implement nature-based riverbank rehabilitation measures for the Soufriere River

Sub-activity 2.1.2.5 Support establishment of constructed wetlands in and around Palmiste and Barrons Drive to reduce greywater runoff to Soufriere coral (co-financing from MoA)

Activity 2.1.3 Provide tools and technology for greater sustainability in fishing, more efficient measurement of fish catch, reduce landing undersized fish, and eliminate ghost fishing and by-catch

This activity tackles the pressing issue of overfishing and ecosystem degradation in coastal fisheries. This activity focuses on strengthening data collection through training and equipment provision, alongside awareness campaigns to curb harmful practices like ghost fishing.

Recognising the interconnectedness of land and sea, the initiative fosters collaboration between fisheries and agricultural sectors to address land-based pollution. Long-term research and monitoring are central, with programs studying fish populations, ecosystems, and climate change impacts. Finally, engaging local communities in data collection empowers them and leverages their valuable knowledge for sustainable fisheries management and ecosystem restoration.

Sub-activity 2.1.3.1 Capacity development for Fisheries staff and fishers in monitoring of fisheries target species stocks

Sub-activity 2.1.3.2 Provision of equipment to record fish size and other parameters upon landing

Sub-activity 2.1.3.3 Outreach and promotion to discourage ghost fishing

Sub-activity 2.1.3.4 Training and equipment to engage local stakeholders to support ongoing data collection and analysis with Department of Fisheries

Sub-activity 2.1.3.5 Support integration of all collected data into the DoF Information System and computation of data for monitoring and analysis

Sub-activity 2.1.3.6 Quality assurance for the reduction in undersized fish catch, ghost fishing and by-catch (co-financing from MoF)

Component 3: Increase financial resilience and diversify incomes for fishing sector stakeholders

Output 3.1 Improved access to financial mechanisms for sustainable and climate resilient fish production and income diversification

The financial mechanisms proposed under Output 3.1 will promote long term sustainability by creating a shift from ad-hoc support to a more formalized approach. The strategies aim to create a resilient fishing sector where fishers gain financial independence, accessing financial and insurance products without significant external support. Fishers will receive training to develop financial planning and management skills (basic bookkeeping, financial data that tracks expenses, revenue and profitability), allowing them to access financial instruments. The training is made sustainable through "train the trainer" programs, making financial skills upgrades continuous. Engaging with the financial sector through focus groups sessions, including insurance companies, will upgrade their understanding of the fishing sector and facilitate long-term collaboration. Among the proposed financial mechanisms, the project will promote access to the COAST FISH facility to allow fishers to have greater ownership and shared responsibility of the facility, increasing its viability over time. The supply side will be promoted by building capacity of financial institutions to develop targeted products for the fisheries and aquaculture sectors.

Activity 3.1.1 Build capacity of financial intermediaries to stimulate microfinance products and services for male and female fishers, aquaculture and seamoss farmers, value chain actors

This activity focuses on building the capacity of financial institutions to offer microfinance products and services tailored to the needs of fishers, farmers, and other actors in the blue economy, ultimately promoting income diversification and sustainable livelihoods. Partnerships and collaboration are promoted via matchmaking, institutional, and strategic partnerships within the financial sector to facilitate collaboration and knowledge exchange between different institutions. This allows them to pool resources, share best practices, and

develop innovative solutions that meet the diverse needs of the blue economy actors. To help increase financial inclusion and overcome barriers to credit access faced by women, the project will support financial institutions to mainstream gender in their financial policy and loan qualification processes. In particular, SLDB will be supported to: i) strengthen their expertise in managing climate-resilient fisheries and aquaculture portfolios, ensuring that their staff are well-equipped to handle the complexities of these sectors; ii) improve their evaluation processes by training their staff to effectively assess clients' adherence to lending criteria, which will lead to more informed and sustainable lending decisions; iii) enhance portfolio monitoring through the use of an integrated MRV system, allowing them to track performance and make data-driven adjustments to our strategies; provide better guidance to clients on climate-resilient investments, helping them to adopt practices that will ensure long-term sustainability and resilience.

Sub-activity 3.1.1.1 Match-making, institutional & strategic partnerships and development within the financial sector

Sub-activity 3.1.1.2 Support at least 2 financial institutions to mainstream climate and gender considerations in their financial policy, risk assessments and loan qualification processes

Sub-activity 3.1.1.3 Support at least 2 financial institutions to participate in regional training on targeted solutions for the fisheries sector (co-financing from MoF)

Sub-activity 3.1.1.4 strengthen SLDB’s capacity to manage their climate-resilient fisheries and aquaculture portfolio, focusing on specific taxonomies, MRV systems, and assessment frameworks.

Activity 3.1.2 Provide technical, logistical and matchmaking support for introduction of insurance solutions that better ad-dress the climate risks in the fisheries and aquaculture value chains.

This activity aims to improve access to insurance solutions specifically designed to address climate risks faced by the fisheries, seamoss, and aquaculture sector. This promotes resilience and reduces financial vulnerability for those involved. Awareness is improved by training workshops and knowledge-sharing sessions educate fishers, farmers, and other stakeholders about climate risks, the benefits of insurance, and available options. This empowers them to make informed decisions about protecting their livelihoods.

The project will support the development and launch of insurance products based on lessons learned from the COAST insurance program. This fills a critical gap and offers accessible protection against losses. As part of this facilitation effort, the project will support the provision of expert advice on product structuring to ensure insurance products are effectively designed and priced to meet the specific needs and risk profiles of different groups within the blue economy and recognizes the gender-specific constraints faced by women and men in applying for these products.

Sub-activity 3.1.2.1 Training workshops and knowledge sharing on use of insurance in the fisheries sector

Sub-activity 3.1.2.2 Redevelop / relaunch insurance scheme to reduce premiums for the fisheries sector

Sub-activity 3.1.2.3 Provide expert advice on product structuring to support the fisheries sector

Activity 3.1.3 Financial planning training and technical support to help fishers, fish workers, seamoss farmers and fish farmers access credit and other financial instruments for climate resilience investments

This activity empowers members of the blue economy like fishers, farmers, and workers with the financial literacy and tools needed to invest in climate resilience. Skills and knowledge is built on with training workshops and knowledge-sharing sessions equip participants with an understanding of climate change impacts, financial planning, and available financial instruments. This empowers them to make informed decisions about investing in climate-resilient practices and technologies. Tailored outreach support derives from direct engagement and extension outreach with fisheries cooperatives, NFOs, and aquaculture/mariculture farmers and enterprises, ensuring the training and support reach those who need it most. Finally, this activity recognizes and addresses the literacy and numeracy gap that impedes the ability of men to keep records, apply for loans and insurance, and participate in skills development training. This will be achieved through:

Sub-activity 3.1.3.1 Financial literacy training and knowledge sharing on financial management, record-keeping and loan application, targeting registered fishermen

Sub-activity 3.1.3.2 Direct engagement / extension outreach with fisheries cooperatives, NFO, and aquaculture / mariculture farmers and enterprises

Sub-activity 3.1.3.3 Conduct a gender-targeted literacy assessment and facilitate registration of fishers and fishworkers for literacy training

Output 3.2 Artisanal fisheries and value chains and markets strengthened to sustainably diversify and stabilize incomes

Activity 3.2.1 Strengthen or establish cooperatives and associations that allow fishers, fishworkers and farmers to operate at efficient scale

This activity aims to strengthen or establish cooperatives and associations for fishers, fish workers, and farmers, enabling stakeholders to operate at a more efficient scale. Knowledge and best practices are shared by implementing training workshops and direct best practice sharing with existing fish cooperatives and NFOs (National Fisherfolk Organisations), equipping them with the knowledge and skills needed to improve their organizational structures, governance, and business practices. This fosters collaboration, efficiency gains, and collective bargaining power. Study tours and exchanges to neighboring countries allow participants to observe and replicate successful models of cooperatives and associations. This support provides cooperatives and their members with firsthand experience and practical insights to adapt and implement in their own context. Institutional collaboration between NFOs, aquaculture/mariculture farmers, and the financial sector facilitates access to credit, investment opportunities, and technical assistance. This strengthens their financial viability and enables them to scale up operations, leading to increased market access and bargaining power. Finally, this activity will help to identify alternative livelihoods for older fishermen who are less able or willing to adopt new fishing practices.

Sub-activity 3.2.1.1 Training workshops & direct best practice sharing with fish, aquaculture and seamoss farming cooperatives and NFO

Sub-activity 3.2.1.2 Study tours and exchanges to neighbouring countries to observe and replicate applicable good practices

Sub-activity 3.2.1.3 Institutional collaboration between NFO, aquaculture farmers and the financial sector

Sub-activity 3.2.1.4 Capacity building for fish, aquaculture and seamoss farming cooperatives leadership (co-financing from MoF)

Activity 3.2.2 Support the rehabilitation and professionalization of fish processing, marketing and distribution facilities, and support ecosystem for fishing vessel operations

This activity aims to revamp and professionalize fish processing, marketing, and distribution facilities, creating a more resilient, efficient, and inclusive value chain.

The project will support upgrades at other processing facilities and will improve hygiene and reduce waste. Facilities will be future-proofed through an approach incorporating both NbS and grey infrastructure investments, including low impact breakwaters[23], and features such as elevated platforms and resilient materials. An example of such low impact breakwaters is included here:

Breakwater in Barbados.

Health and safety of female and male fishworkers will be improved through designated and secure washrooms and shower facilities, and the installation of solar powered lighting at each landing site. These improvements will be undertaken in parallel with the climate resilient infrastructure improvements in Component 2 above.

Sub-activity 3.2.2.1 Capacity building on HACCP standards and certification, including training the inspectors and certification personnel

Sub-activity 3.2.2.2 Support the upgrading of basic fish processing facilities and energy-efficient ice production equipment to increase opportunities for women fishworkers, improve hygiene and reduce wastage in primary landing sites

Sub-activity 3.2.2.3 Support planning, capacity building and financial matchmaking for the gradual development of reception facilities, transport and exporters for a professionalized and expanded fishing sector

[23] The breakwaters in this project will be designed as low-risk, low-impact structures, using environmentally friendly materials and methods which minimize disruption to marine ecosystems, such as permeable structures, appropriately sized boulders, artificial reefs and soft engineering solutions.. Their construction and operation will focus on enhancing coastal resilience without altering natural hydrodynamic processes or causing significant ecological impact.

Sub-activity 3.2.2.4 Technical support and financial matchmaking to expand existing diesel engine maintenance facilities to support maintenance of larger fishing vessels

Sub-activity 3.2.2.5 Re-skill older fishermen in equipment repair/trap making/fish cleaning and processing

Sub-activity 3.2.2.6 Training workshops for fishers on registration, gear loss reporting, and safe effective fish waste management practices

Sub-activity 3.2.2.7 Support the upgrading of basic fish processing facilities and ice production equipment to increase opportunities for women fishworkers, improve hygiene and reduce wastage in secondary landing sites (co-financing from MoF)

Activity 3.2.3 Support establishment of enterprises producing value-added fish products and utilizing processing waste generated from the fisheries sector

This activity promotes value-addition activities derived from fish processing waste, aiming to optimise its utilization and minimise its environmental impact. Supporting and promoting the use of fish waste in silage and other products like fertilizer transforms waste into valuable resources, reducing disposal costs and creating new economic opportunities. Based on a recent analysis and opportunity assessment, fish waste can be repurposed for compost, fish feed as well as jewelry. Enforcing proper disposal regulations prevents pollution and ensures responsible waste management.

Sub-activity 3.2.3.1 Support and promote fish waste usage in silage and other products and enforce proper disposal regulations.

Sub-activity 3.2.3.2 Develop fishery specific fish waste management regulations and policies with support by Department of Fisheries, SLSWMA, Ministry of Health (environmental), Fishers Cooperative and the business community

Sub-activity 3.2.3.3 Quality assurance for the implementation of circular economy solutions and regulations (co-financing from MoA)

Activity 3.2.4 Establish/implement incentive scheme for long term fish supply agreements with schools, hotels and restaurants

This activity aims to increase the utilization of domestic fish in the tourism sector, boosting both the fisheries sector and tourist experience. This is done by developing supply and marketing arrangements with hotels, restaurants, retailers, and schools, and establishes stable and reliable channels for domestically harvested fish to reach tourist markets. These arrangements create a virtuous circle between fishers and their customers. With a guaranteed market for their products fishers are better able to make long term investments in improved and more lucrative fishing practices, like the tuna long-liners described in above. These improved practices and overall professionalization lead to more consistent supply, and better hygiene and quality control increasing benefits for domestic customers.

Sub-activity 3.2.4.1 Develop supply and marketing arrangements with hotels, restaurants, retailers, and schools to increase the market for domestically harvested fish

Activity 3.2.5 Support low-impact economic diversification linking fishing to other economic sectors

This activity supports the creation of alternatives to traditional fishing activities for fisheries sector actors. Economic diversification can be supported via alternatives such as sport fishing for tourists who might pay more to catch a single fish than a traditional fisherman might earn for his entire catch. Other alternatives could include nature tours, coral reef diving and related pursuits. This activity links directly with the community-based coral reef protection activities described in Component 2 above, and benefits from the financial inclusion and credit facilitation activities described in Component 3.

Sub-activity 3.2.5.1 Develop ecotourism focused retraining and promotion program for fishers in collaboration with the Ministry of Tourism's "Yachting and Water-Based Sector" team

Component 4: Strengthen institutional structures for participatory climate adaptation

Output 4.1 Effective policy implementation and enhanced technical and institutional capacity at the community and department levels to support resilient fishing, aquaculture and fish

Activity 4.1.1 Support inter-agency coordination, policy, regulatory, monitoring and enforcement mechanisms to build fisheries sector resilience and also to address upstream / land-based and other sources of fisheries habitat degradation

Activity 4.1.1. includes an array of interventions led by the Department of Fisheries to transform the operation of Saint Lucia's fishing fleet. This includes measures to improve the design of small vessels so that they are safer, more efficient and reflect the

Sub-activity 4.1.1.1 Establish working group between Fisheries and the Martime Authority to review and update regulations concerning the design, construction and equipment of fishing vessels to address needs of multiday longliners and distant FAD fisheries

Sub-activity 4.1.1.2 Establish working group with Department of Transport to improve approach to vessel registration, inspection and tracking

Sub-activity 4.1.1.3 Establish working group with Department of Meteorology to improve weather warning system for fishers and mariculture farmers

Sub-activity 4.1.1.4 Establish and enforce minimum construction and safety standards for FRP boats

Sub-activity 4.1.1.5 Expertise and support to implement emergency climate protocol developed by DoF and NEMO

Sub-activity 4.1.1.6 Policy review to increase women's capacity for asset ownership in the aquaculture sector by updating requirements for lease/ownership of land

Sub-activity 4.1.1.7 Stimulate increased demand for fish silage by promoting policy changes that prioritize use of domestically produced animal feeds and fertilizers

Sub-activity 4.1.1.8 Capacity building and technical support to agricultural extension teams and farmers to monitor nutrient loading in streams and reduce farm runoff and sedimentation

Sub-activity 4.1.1.9 Interagency coordination to minimize downstream impacts of local property development on mangroves and coral reefs

Sub-activity 4.1.1.10 Support interagency coordination and working groups for long-term sustainability of proposed interventions (co-financing from MoA)

Activity 4.1.2 Explore opportunities to increase Saint Lucia participation in international / regional bodies to sustainably manage Caribbean fisheries.

The total volume of fish landed in Saint Lucia is a very small fraction of the total caught by other Eastern Caribbean nations and by international trawlers operating in the region. Nevertheless, it is important that Government agencies in Saint Lucia are able to contribute to the sustainable management of Caribbean fisheries. This activity will support continued and increased engagement by the Government of Saint Lucia in these efforts.

Sub-activity 4.1.2.1 Review and deepen engagement in OECS, CARICOM and WECAFC regional fisheries management initiatives

Sub-activity 4.1.2.2. Train fisheries officers in data collection and reporting to RFBs &RFMOs to which Saint Lucia is member or intends to become member.

Sub-activity 4.1.2.3 Accelerate discussions of Saint Lucia representation at ICCAT for the advancement of the offshore pelagic fishery

Activity 4.1.3 Collect gender-disaggregated baseline data and monitor progress against government targets

Activity 4.1.3 contributes to the project's knowledge management and monitoring & evaluation goals. At present, the Department of Fisheries has a small number of extension and data collection officers who make periodic visits to all the fish landing sites. The project will support increased visits to improve communication with fisheries stakeholders and improve the frequency and quality of data gathering.

Sub-activity 4.1.3.1 Increase frequency of extension officer and data collector visits to landing sites to improve responsiveness to fisheries sector stake

Sub-activity 4.1.3.2 Establish baseline and conduct monitoring of stakeholder awareness of and engagement on climate risks

Sub-activity 4.1.3.3 Establish baseline and conduct monitoring of frequency and intensity of flooding and wave damage at landing site facilities

Sub-activity 4.1.3.4 Implement long term fisheries target species stock assessment to detect changes in populations and habitat in the context of climate change

Sub-activity 4.1.3.5 Engage local stakeholders to collect local oceanographic and biological marine data

Sub-activity 4.1.3.6 Collaborative data collecting, monitoring and analysis by Department of Fisheries and Commerce

3.3. Complementarity and coherence with other projects, and lessons learned

The proposed interventions will build on lessons learned from the implementation of several projects including 'Supporting member countries implement climate change adaptation measures in fisheries and aquaculture (GCP/GLO/959/NOR),' and 'Climate Change Adaptation of the Eastern Caribbean Fisheries Sector Project (CC4FISH)', which aim at introducing adaptation measures in fisheries management and providing capacity building for fisherfolk and aquaculturists. This GCF project will also build on information generated by fisheries early warning and emergency response systems, weather products that have been successfully implemented, technical analysis and reports on making the pelagic fisheries value chain in Saint Lucia climate resilient, and early resilience design work for fisheries coastal infrastructure developed by the 'Fisheries Early Warning and Emergency Response (FEWER) System' project. This project is aligned to the project 'Assistance for the Development of the national policy on fisheries (TCP/STL/3601)' developed for supporting policy incorporating climate change adaptation priorities to support and guide proper sustainable fisheries management, and is complementary to the project 'Developing Organizational Capacity for Ecosystem Stewardship and Livelihoods in Caribbean Small-Scale Fisheries, Stewardfish', from which recommendations on value chains and market access will be executed through this GCF proposal as an innovative mechanism for enhancing the sustainability of the other activities from the SASAP concept notes to be implemented. The current disaster risk management in Saint Lucia is mainly run by the Saint Lucia National Emergency Management Organization (NEMO), which has a small budget and staff and relies on extension officers from the Department of Fisheries to perform some of its functions. The FEWER app is the main mode of communication dissemination, and it is run in conjunction with the CAP (Common Alerting Protocol) – another app. (World Bank, 2019). The Government also disseminates early warnings to fishers through mass media (sms text, radio bulletins) and cooperatives.

This project will build on governance, strategies and policies results achieved with the implementation of the 'Caribbean Regional Oceanscape Project for Organization of Eastern Caribbean States' and will complement its efforts as well as those activities proposed under the pipeline project 'Blue Economy (BE): Caribbean Large Marine Ecosystem Plus (CLME+): Promoting National Blue Economy Priorities through Marine Spatial Planning in the Caribbean Large Marine Ecosystem Plus (GEF ID 10211)' by improving the information management systems and the institutional capacity and regulatory framework, with the objective of mainstreaming climate change to achieve effective planning and responsive fisheries policy implementation in Saint Lucia. This project also builds on the FIRMS partnership of the Western Central Atlantic Fishery Commission (WECAFC-FIRMS). WECAFC, financed by the European Union (EU), aim at promoting the effective conservation, management and development of the living marine resources of the area of competence of the Commission and addressing common problems of fisheries management and development faced by its members. The proposed project can build upon an active project focused on governance – Support to the Secretariat of WECAFC in implementing targeted actions of the 2019-2020 workplan on improved regional fisheries governance (GCP/SLC/217/EC) – with a sizable component on fisheries by generating and analyzing data, developing guidelines and best management practices for enhanced management decision-making. Finally, the readiness grant 'Improving the Capacity of the Fisheries Sector in Saint Lucia to enhance resilience to Climate Change' has resulted in the preparation of baseline information and activities that this GCF project will build on and scale up.

Table 26 Overview of complementary projects

Project Title	Funding and duration	Description	Lessons learned/ Complementarity
Support member countries implement climate change adaptation measures in fisheries and aquaculture. GCP /GLO/959/NOR	USD 1.31m 2019 - 2021	Global project funded by Norad to support country capacity to develop and implement climate change adaptation plans and actions. In Saint Lucia the activities were implemented by FAO and the Department of Fisheries of Saint Lucia	FISH-ADAPT builds on the activities that have been successfully implemented by the FAO Norad project in particular it will scale up fishing safety to address change in fishing operations and extreme weather, improve accident reporting, and develop further the opportunity to develop pelagic value chains and sustainable resource use
Climate Change Adaptation of the Eastern Caribbean Fisheries Sector Project (CC4FISH)	USD 5.46m GEF finance USD 37.54m co-finance 2016-2023	An initiative financed by the Global Environment Facility (GEF). There are three project components: increased awareness and understanding of climate change impacts and vulnerability for effective climate change adaptation in the fisheries and aquaculture sector, improved resilience of fishers and coastal communities and aqua culturists, and climate change adaptation mainstreamed in multilevel fisheries governance	FISH-ADAPT also builds on information generated under the CC4FISH by fisheries early warning and emergency response systems, weather products that have been successfully implemented, technical analysis and reports on making the pelagic fisheries value chain in Saint Lucia climate resilient, and early resilience design work for fisheries coastal infrastructure FISH-ADAPT Added Value: Expands on CC4FISH by implementing early warning systems, improved resilience designs for fisheries infrastructure, and expanded pelagic fisheries adaptation.
Fisheries Early Warning and Emergency Response (FEWER) System (under CIF-PPCR)	USD 10.39m for PPCR Caribbean Regional Track 2017-2018	FEWER is a set of tools that link small-scale fishers with each other and with agencies that play critical roles in the overall DRM framework. It aims to reduce fishers' risks from natural hazards associated with weather (short term) and climate (long-term) through improved information and communications regarding issues of particular concern to fisheries.	FISH-ADAPT will also align with and build on information generated by fisheries early warning and emergency response systems and weather products that have been successfully implemented by FEWER. This will enable the more efficient use of data systems in decision-making in the sector. Baseline Gaps: FEWER provided early warning tools but lacked full-scale adaptation mechanisms. FISH-ADAPT Added Value: Builds on FEWER's warning systems, integrating climate-smart vessel designs, infrastructure resilience, and adaptive governance frameworks.
Developing Organizational Capacity for Ecosystem Stewardship and Livelihoods in Caribbean	USD 1.78m 2019-2021	StewardFish is focused on empowering fishers throughout fisheries value chains to engage in resource management, decision making processes and sustainable livelihoods, with	The recommendations of the StewardfFsh project such as strengthening inter-agency communication regarding fishers' organizations and ongoing projects, enhancing value chains and enhancing market access for

Project Title	Funding and duration	Description	Lessons learned/ Complementarity
Small-Scale Fisheries, StewardFish		strengthened institutional support at all levels in the Caribbean and North Brazil Shelf Large Marine Ecosystem (CLME+) region	fish products will be executed through this proposed project. Gaps: The project focused on governance and community engagement but did not implement physical climate adaptation measures or real-time fisheries resilience tools. FISH-ADAPT's Added Value: Expands on StewardFish by incorporating climate-proofed fisheries infrastructure, monitoring systems, and new adaptive fishing practices.
Blue Economy (BE): Caribbean Large Marine Ecosystem Plus (CLME+): Promoting National Blue Economy Priorities through Marine Spatial Planning in the Caribbean Large Marine Ecosystem Plus	USD 6.22m GEF finance USD 41.66m co-finance 2022-ongoing	The project will contribute Blue Economic development and implementation plans for the Caribbean/CARICOM region, with tailored national blue economy and financing strategies to support sustainable development and includes the use of MSP to inform establishment of MPAs and promotion of ecosystem-based fisheries management.	FISH-ADAPT focuses on enhancing information management systems, such as the investment into early warning systems and climate information systems to be used in real-time by fishers, will improve access to accurate data to inform decision-making. This will also enhance the institutional capacity and regulatory framework. Baseline Gaps: CLME+ focused on policy frameworks rather than direct fisheries adaptation measures. FISH-ADAPT Added Value: Complements CLME+ by enhancing real-time climate information systems, fisher decision-making tools, and infrastructure improvements for climate resilience.
Improving the Capacity of the Fisheries Sector in Saint Lucia to enhance resilience to Climate Change **GCF Readiness & Preparatory Support Project**	USD 680,499 2021-ongoing	This project will allow Saint Lucia to build its capacity to address some of these barriers and ultimately adapt to climate change impacts that are affecting the fisheries sector. The project will lead to an upgrade and improvement in methodologies and processes used to manage data and integrate climate change adaptation into the fisheries sector. This will include developing early warning communication tools and disaster planning.	The GCF readiness project activities included conducting climate vulnerability studies and analyze information on climate change impacts to strengthen the fisheries sector adaptation investment rationale, collecting baseline data for identifying adaptation solutions, and developing methods and technologies for producing and using socio-economic and environmental information for adaptation planning and investment for the fisheries sector. The readiness project provided useful baseline information for the design of interventions to be delivered in the FISH-ADAPT project.

Project Title	Funding and duration	Description	Lessons learned/ Complementarity
			Gaps: As a readiness project, it focused on adaptation planning and policies but lacked funding for implementation in the areas of resilient infrastructure, vessel improvements, and applied fisher training FISH-ADAPT's Added Value: Uses Readiness Project data to scale up implementation of physical adaptation solutions and financial access for fishers.
FIRMS partnership of the Western Central Atlantic Fishery Commission (WECAFC-FIRMS)	2015-2016	WECAFC-FIRMS, financed by the European Union (EU), aims to promote the effective conservation, management and development of the living marine resources of within the area of member countries.	The FISH-ADAPT project builds upon the WECAFC-FIRMS project with a sizable component on fisheries by generating and analyzing data, developing guidelines and best management practices for enhanced management decision-making. Gaps: Did not address climate risks or implement adaptation technologies (e.g., resilient vessels, weather-tracking). FISH-ADAPT's Added Value: Enhances the WECAFC-FIRMS project by incorporating climate-smart fisheries adaptation, risk reduction, and digital early warning systems.
Global Ocean Alliance 30by30 initiative	2019-ongoing	The Global Ocean Alliance (GOA) is a 73-country alliance that champions ambitious ocean action within the Convention on Biological Diversity. The GOA supports the target to protect at least 30% of the global ocean by 2030, through a network of Marine Protected Areas (MPAs) and Other Effective area-based Conservation Measures (OECMs).	The FISH-ADAPT project does not envision implementing activities in the Marine Protected Areas covered by the 30x30 initiative. We note also that initiatives such as the International Collection in Support of Fishworkers (ICSF) has stressed that the 30x30 initiative must respect the livelihoods needs of small-scale fishers and fishworkers. The project design ensures that the coastal fish nursery management and restoration activities proposed in Component 2 can complement the 30x30 initiative, and it is likely that said initiative may contribute ultimately to the replenishment of fish stocks.

Project Title	Funding and duration	Description	Lessons learned/ Complementarity
Program for Building Disaster and Climate Change Resilience in the OECS Countries	USD 50m 2021-ongoing	The program takes the form of a USD 50M long-term loan and will enhance the disaster resilience of infrastructure and foster disaster-resilient growth for micro, small, and medium-sized enterprises (MSMEs). CDB will re-lend the resources to finance eligible OECS member countries: Antigua and Barbuda, Commonwealth of Dominica, Grenada, Saint Kitts and Nevis, Saint Lucia and Saint Vincent, and the Grenadines. The initiative will identify and address critical disaster and climate change risks to roads and water and sanitation systems. Funded by the Inter-American Development Bank and implemented by the Caribbean Development Bank.	While FISH-ADAPT is not a disaster risk reduction (DRR) project, the objective of reducing exposure and vulnerability to climate hazards is aligned with the IDB/CDB project. FISH-ADAPT will help to ensure that DRR activities focused on roads and other infrastructure are designed to minimize runoff and siltation in sensitive coastal ecosystems.
Saint Lucia COVID-19 Health Resilience Project		The funding will provide micro, small and medium sized enterprises (MSMEs), which can struggle to get financing through the traditional financial sector, with short and medium-term loans. The short-term financing would support working capital and liquidity needs of the MSMEs affected by the Covid-19 breakout, while the medium-term financing would help them invest to expand their business, thereby creating and sustaining jobs. Funded by the European Investment Bank (EIB) and implemented by Saint Lucia Development Bank.	The COVID-19 support project provides training and technical assistance to help promote responsible financial inclusion to reduce poverty and encourage entrepreneurship, targeting women and youth. FISH-ADAPT builds upon this by working with similarly disadvantaged groups to advance financial inclusion for climate resilience, without an explicit focus on covid-19.

Project Title	Funding and duration	Description	Lessons learned/ Complementarity
Building resilience for adaptation to climate change and climate vulnerabilities in agriculture in Saint Lucia	EUR 15m 2022-ongoing	The project goal is to build resilience in Saint Lucia's the agriculture sector for livelihoods security through enhanced adaptive capacities for climate change and climate variability. The project objective is to increase the resilience of rural farm communities, increasing farm productivity, water and livelihood security and reducing vulnerability to natural hazards, climate vulnerability and change. Implemented by the Caribbean Development Bank	FISH-ADAPT contributes to farming livelihoods by supporting the introduction of small-scale and climate resilient fish farming, primarily as a supplementary income and protein source to strengthen livelihoods.
OECS - Unleashing the Blue Economy (UBEC)	USD 60m 2022-ongoing	The aim of the project is to strengthen the enabling environment for the blue economy, economic recovery, and resilience of selected coastal assets in St Lucia, Grenada, and St Vincent and the Grenadines. This project is funded by the World Bank.	The project is aligned with the goals of the FISH-ADAPT and will provide a source of co-financing, with particular emphasis on coastal resilience for landing sites and seamoss farms, and for strengthening access to financial services for fishers, fishworkers, aquaculture farmers and other fisheries sector actors.

3.4 Project location(s)

The proposed GCF project will target Saint Lucia's main fishing communities, seamoss production areas, coastal fish habitats, and sites of current and prospective inland aquaculture ponds and aquaculture tanks. Government capacity building and interagency coordination activities will be focused on those locations where Government staff are based, particularly Castries.

The criteria for ecosystem restoration activities focused on fish habitats were based upon:

1. Levels of degradation
2. Level of threat to ecosystems from human activity and climate change
3. Potential scalability or transferability of the nature-based interventions designed and implemented for the habitat
4. Value of ecosystem (ecosystem services provided, social and economic value).

Based on previous assessments of ecosystems and feedback from stakeholders, four target locations for restoration have been identified for the development of nature-based restoration and rehabilitation. The sites are:

3) Praslin Mangrove
4) Esperance Mangrove
5) Soufriere Coral Reef
6) Saline Point Reef

All four sites were assessed in 2022 during the preparation of the report on *Physical Status and threats to Mangroves, Coral Reefs and Sea Grass Beds.* The four sites are a subset of the ecosystems in need of restoration and rehabilitation. The figure below shows the fisher communities in Saint Lucia. All of these sites will be targeted by the project as some activities will be implemented at the national and community level.

Figure 44 Primary, secondary and tertiary fish landing sites

The map shows all the fisher communities in Saint Lucia and their categories. Those highlighted in orange are the locations of the island's major Fishermen's Co-operatives. Project activities will also include inland agriculture and aquaculture locations. Freshwater aquaculture activities comprise of small farms with one or two earthen ponds of 500 – 1,000 sq meters surface area. These ponds are scattered throughout the island and generally located close to freshwater sources. There are two hatcheries with the one in the north being the main facility which supplies freshwater fish and shrimp to farms island wide. A back up source of brood fish and shrimp is located at a holding facility at Beausejour, Vieux-fort, in the south of the island. Both facilities are located in highly flood prone areas.

Figure 4545 Aquaculture sites

Seamoss Production

Seamoss (seaweed) production is located primarily on the southeast coast of the island. There are a few farms also on the northeast coast. A review of potentially new sites for seamoss expansion was undertaken in 2020 by the Department of Fisheries (V. Serieux, personal communications, Sept. 2021). These sites will be used to facilitate new entrants into the industry and thus support increased managed expansion of seamoss production.

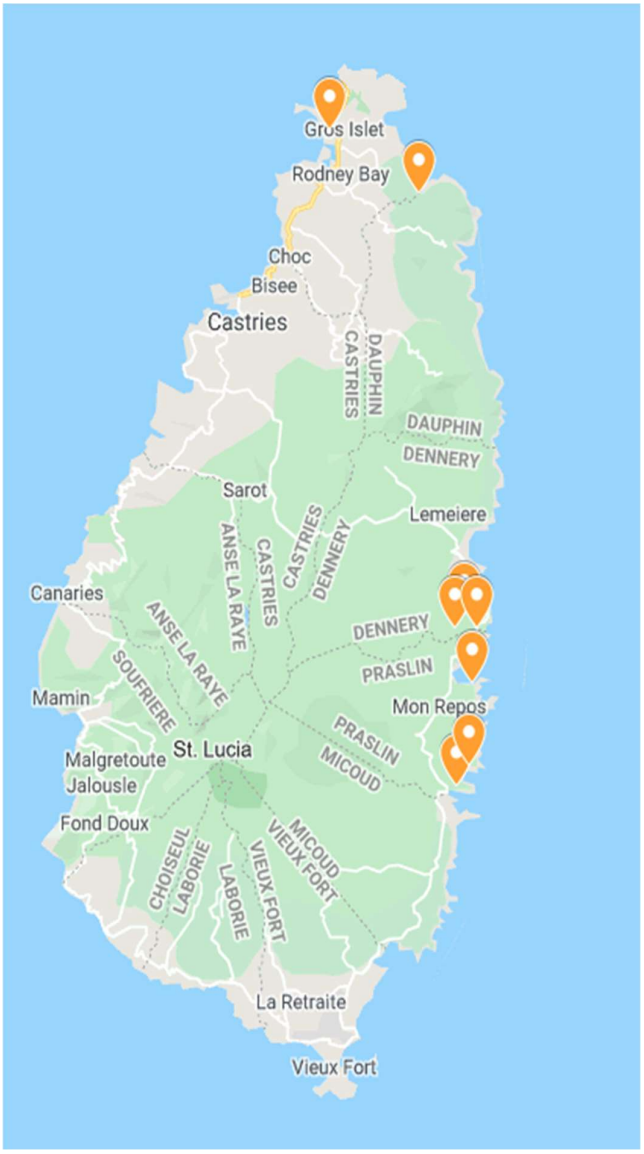


Figure 46 Seamoss sites

3.5 Beneficiary selection

The project will target all existing and prospective actors in Saint Lucia's fisheries sector and related value chains.

The project aims to reach a total of **72,000 beneficiaries**, comprising **10,000 direct beneficiaries** and **62,000 indirect beneficiaries**. This represents approximately 39% of Saint Lucia's 2020 population of 183,629. The direct beneficiaries include individuals actively engaged in the fisheries sector: 3,500 in marine fishing, 800 seamoss farmers, 500 fish vendors and processors, and 200 inland aquaculture farmers, and their direct families[24].

[24] The average household size in St. Lucia is 2.6 people per household, according to the 2022 Population and Housing Census.

Based on current sector demographics estimates, a gender distribution of 84.3% male (4,215) and 15.7% female (785) for direct beneficiaries is assumed, reflecting that women comprise approximately 10% of fishers and 20% of other stakeholders in the fisheries, seamoss (mariculture), and aquaculture (coastal and inland), as well as other value chain actors.

Table 27 Estimates of project direct beneficiaries excluding direct family members.

Source: expert judgment based on in-country visits.

Direct Beneficiaries (excluding family members)	Direct	% women	Total women	Total men
Fisherfolk (captains, crew, fish vendors, cleaners)	2,000	10%	200	1,800
Seafood processors and retailers	250	20%	50	200
Seamoss producers	500	20%	100	400
Pot / reef fishermen	500	20%	100	400
Mangrove users such as farmers, charcoal producers, and tour guides	500	20%	100	400
Aquaculture farmers	50	20%	10	40
Dive operators and crew	50	10%	5	45
Aquaponics	50	20%	10	40
Pleasure divers, conch fishers, water taxi operators	100	10%	10	90
Coastal zone dwellers and property owners[25]	1,000	20%	200	800
TOTAL	**5,000**		**785**	**4,215**

In addition to these direct beneficiaries, household members are also included in the total direct beneficiaries. Since households have 2.6 members, on average (2022 census), there are an additional 5,000 direct beneficiaries. At a 40:60 ratio of women to men this is an additional 2,000 female and 3,000 male beneficiaries.

Type	Number
Fisherfolk (captains, crew, fish vendors, cleaners)	2,000
Seafood processors and retailers (not fishers)	250
Seamoss producers	500
Pot / reef fishermen	500
Mangrove users such as farmers, charcoal producers, and tour guides	500
Aquaculture farmers	50
Dive operators and crew	50
Aquaponics	50
Pleasure divers, conch fishers, water taxi operators	100
Coastal zone dwellers and property owners	1,000
Subtotal	5,000
Additional household members as per 2022 census (additional 1.6 persons/household,	5,000

[25] Concentrated mostly in Soufriere (population 8,472) and Praslin (population 576). Population figures obtained from 2010 census.

discounted by 0.6 to account for the case where there are multiple beneficiaries per household)	
TOTAL	**10,000**

The remaining 62,000 are indirect beneficiaries, including family members dependent on fishers and fishworkers, those who sell fishing gear to fishers, net menders, boat repair workers, and actors in the tourism sector dependent on the supply of fish and the health and wellbeing of coastal ecosystems. Indirect beneficiaries will benefit in multiple ways, including from a greater variety of sustainably sourced, high-quality fish. In addition, indirect beneficiaries working in the tourism will benefit from healthier fisheries and surrounding ecosystems.

For indirect beneficiaries, a 60-40 gender split (37,200 male, 24,800 female) is assumed, for the following reasons:

- The general population gender ratio according to the World Bank was 51.4% female and 48.6% male[26]
- However, supporting industries such as gear sellers, net menders, boat repair, and tourism have a higher proportion of males

Considering these factors, a reasonable assumption is a skew towards men for indirect beneficiaries.

Indirect beneficiaries have been calculated using the following estimates: For each direct beneficiary, excluding family members, an additional 3.4 people are engaged in support roles or the grey economy. However, in the tourism sector, approximately 45,000 workers, including their families, are expected to benefit indirectly. For each beneficiary household, we have accounted for those supporting their trade formally (e.g., gear sellers, net menders, boat repairers, cleaners) as well as those involved in the grey economy. Based on regional figures, the grey economy is estimated to represent about 35% of GDP. Overall, we estimate that for each direct beneficiary, 3.4 additional individuals benefit through both formal support roles and the grey economy. This figure is based on estimates from our local fisheries experts.

Indirect (support + grey economy)	Number supporting family head	Total	% women	Total women	Total men
Fisherfolk (captains, crew, fish vendors, cleaners)	3.4	6800	40%	2720	4080
Seafood processors and retailers	3.4	850	40%	340	510
Seamoss producers	3.4	1700	40%	680	1020
Pot / reef fishermen	3.4	1700	40%	680	1020
Mangrove users such as farmers, charcoal producers, and tour guides	3.4	1700	40%	680	1020
Aquaculture farmers	3.4	170	40%	68	102
Dive operators and crew	3.4	170	40%	68	102

[26] https://data.worldbank.org/indicator/SP.POP.TOTL.MA.ZS?locations=LC

Aquaponics	3.4	170	40%	68	102
Pleasure divers, conch fishers, water taxi operators	3.4	340	40%	136	204
Coastal zone dwellers and property owners	3.4	3400	40%	1360	2040
Subtotal		17000	40%	6800	10200
Tourism - indirect - estimated at 15,000 people, plus extended families	3	45000	40%	18000	27000
Grand total indirect		62000		24,800	37,200

Outcome 1 will significantly enhance the resilience and productivity of Saint Lucia's fishing systems, directly benefiting fishers, aquaculture farmers, and associated value chain actors. By improving vessel safety and communication equipment, fishers will be able to operate more safely in changing sea conditions and access new fishing grounds, potentially increasing their catch and income. Aquaculture and seamoss farmers will benefit from climate-resilient practices and technologies, reducing their vulnerability to extreme weather events and enhancing production. The upgrading of landing sites and processing facilities will improve working conditions and product quality, potentially opening up new market opportunities.

Under **Outcome 2**, beneficiaries will experience improved sustainability and productivity of their fishing grounds and aquaculture systems. Through the implementation of ecosystem restoration activities and sustainable fishing practices, fish stocks are expected to become more resilient to climate impacts, leading to more stable yields over time. Aquaculture farmers will benefit from climate-adapted production systems. The improved health of coastal ecosystems will also support alternative livelihoods such as eco-tourism, providing additional income opportunities for fishing communities and overall contributing to long-term economic stability for both direct beneficiaries and the wider community.

Outcome 3 will empower beneficiaries through enhanced participation in decision-making processes and improved access to financial services. Fisherfolk organisations will be strengthened. The introduction of tailored financial products and insurance schemes will provide fishers and aquaculture farmers with better tools to manage climate risks and invest in climate-resilient practices. Improved market linkages and value chain development will open up new economic opportunities. Furthermore, capacity building in financial literacy and climate-resilient practices will enable beneficiaries to make more informed decisions about their livelihoods.

Outcome 4 will enhance technical and institutional capacities at the community and department levels to support resilient fishing, aquaculture and fish value chain practices. Beneficiaries, including women, will be supported through policy reviews targeting increased capacity of asset ownership. Greater data collection and reporting, and increased frequency of officer visits to landing sites will improve responsiveness to the needs of fisheries sector stakeholders.

Beneficiaries per output are estimated as shown in the table below:

Table 28 Estimates of project beneficiaries per output

Project element	Estimate of beneficiaries	Key assumptions and sources
Component 1 - Transform and reorient fishing systems for safety in a changing climate		
Output 1.1 - Fishers and other actors are able to access and act upon weather and climate data	Direct: 10,000 (2,785 women + 7,215 men) Indirect: 62,000 (24,800 women + 37,200 men) Benefits delivered by the project: Support the implementation and use of modern technologies to provide early insights into suitable/unsuitable conditions for fishers, allowing them to plan ahead Lower damage and associated costs to fishing equipment due to improved communication and warning systems	This output will benefit all fishers in St Lucia. In 2017 there were 3,328 fishers of which 6% were women[27]. A small growth rate of 0.5% has assumed over 10 years. The project works to support women in the sector, so a 10% share in the workforce is assumed. In addition, the direct beneficiaries include 250 seafood processors and retailers, 500 seamoss producers, 500 pot/reef fishermen, 500 mangrove users (such as farmers, charcoal producers, and tour guides), 50 aquaculture farmers, 50 dive operators and crew, 50 aquaponics operators, 100 pleasure divers, conch fishers, and water taxi operators, and 1,000 coastal zone dwellers and property owners. In addition to this, there are 5,000 direct beneficiaries who are household members making a total of 10,000 direct beneficiaries[28] Indirect beneficiaries include support and grey-economy services for the fishers and their family members (3-4 indirect beneficiaries supported by the direct beneficiaries) = **17,000** indirect beneficiaries, plus those in the tourism sector. In 2021 there were an estimated 15,000 people directly supporting the tourism sector, and 55,000 indirectly[29]. We have assumed a conservative **45,000** indirect beneficiaries (15,000 formally in tourism + 30,000 from families, support and grey economy) from these sectors, 60-40 gender split.
Output 1.2 - Fishing vessels improved to respond to shifting fishing grounds, and landing sites more resilient to climate related weather impacts	Direct: 4,500 (1,150 women +3,350 men) Indirect: 30,150	These are the same direct fishers beneficiaries and indirect beneficiaries as for Output 1.1 (overlap).

[27] https://www.fao.org/fishery/en/facp/lca?lang=en
[28] Expert judgment based on 2023 country visit
[29] See https://stats.gov.lc/wp-content/uploads/2021/07/L.M.N.A.S-2020-Final.pdf and https://www.govt.lc/news/slhta-president-s-world-tourism-day-message

Project element	Estimate of beneficiaries	Key assumptions and sources
	(12,060 women + 18,090 men) Benefits delivered by the project: Local fisherman will have access to climate resilient fishing vessels that can withstand weather conditions, have less cost to repair and will have more time spent fishing Increase in time spent at sea during periods of good weather Fishers, fishworkers and farmers are able to invest in and acquire appropriate equipment that reduces climate vulnerability and increase resilience	Data as above but ***including*** only fisherfolk and seafood processors and retailers, and their direct household members. Indirect beneficiaries support the direct beneficiaries and are from the tourism sector. . We have assumed a conservative **30,150** indirect beneficiaries from these sectors, 60-40 gender split.
Output 1.3 – Coastal and inland aquaculture enhanced and made resilient against extreme weather	Direct: 3,200 (960 women + 2,240 men) Indirect: 5,440 (2,176 women + 3,264 men) Benefits delivered by the project: Diversification and stability of incomes.	Direct beneficiaries include seamoss producers, pot/reef fishers, mangrove users (such as farmers, charcoal producers, and tour guides), aquaculture farmers, and aquaponics operators, and their direct households. The indirect beneficiaries support these family members from formal and informal sectors The gender split for direct beneficiaries is based on 20% women for seamoss producers, mangrove users, pot/reef fishers, aquaculture farmers, and aquaponics operators. For indirect beneficiaries, we maintain a 60-40 gender split (male-female).
Component 2 - Implement Nature-based Solutions and sustainable fishing practices to improve ecosystem health and fish stock sustainability in response to climatic changes		
Output 2.1 Fishers and communities adopt improved practices to manage and sustain fish stocks and habitat	Direct: 4,500 (1,150 women +3,350 men) Indirect: 30,150 (12,060 women + 18,090 men) Benefits delivered by the project:	This output will directly benefit all fishers in St Lucia. The beneficiaries overlap with those in other outputs. See Output 1.2 for calculations

Project element	Estimate of beneficiaries	Key assumptions and sources
	Enhanced ecosystem services from restoration and sustainable management increase fishery habitats, ecosystem health and net primary productivity.	
Component 3 - Increase financial resilience and diversify incomes for fishing sector stakeholders		
Output 3.1 - Improved access to financial mechanisms for sustainable and climate resilient fish production and income diversification	Direct: 10,000 (2,785 women + 7,215 men) Indirect: 62,000 (24,800 women + 37,200 men) Benefits delivered by the project: Diversification and stability of incomes.	This output will directly benefit all fisheries sector stakeholders in St Lucia. The beneficiaries overlap with those in other outputs. See Output 1.1 for calculations
Output 3.2 - Artisanal fisheries and value chains and markets strengthened to sustainably diversify and stabilize incomes	Direct: 10,000 (2,785 women + 7,215 men) Indirect: 62,000 (24,800 women + 37,200 men) Benefits delivered by the project: Diversification and stability of incomes. Fishers, fishworkers and farmers are able to invest in and acquire appropriate equipment that reduces climate vulnerability and increase resilience.	This output will directly benefit all fishers in St Lucia. The beneficiaries overlap with those in other outputs. See Output 1.1 for calculations
Component 4 - Strengthen institutional structures for participatory climate adaptation		
Output 4.1 - Effective policy implementation and enhanced technical and institutional capacity at the community and department levels to support resilient fishing, aquaculture and fish value chain practices	Direct: 10,000 (2,785 women + 7,215 men) Indirect: 62,000 (24,800 women + 37,200 men)	This output will directly benefit all fishers in St Lucia. The beneficiaries overlap with those in other outputs. See Output 1.1 for calculations

Project element	Estimate of beneficiaries	Key assumptions and sources
	Benefit delivered by the project: Increased economic stability for fishing communities Reduced vulnerability and increased recovery capacity after climate shocks via improved performance of artisanal fishing, aquaculture and fishworker enterprises Fish stocks are kept at a sustainable level thanks to adapted fisheries management measures put in place based on timely and reliable collected data	

The project will utilise the following direct and indirect beneficiary indicators that assess the specific contributions of the project interventions to each of the GCF's eight results areas:

- ARA1 Most vulnerable people and communities
  - Core 2: Direct and indirect beneficiaries reached
  - Supplementary 2.5: Beneficiaries (female/male) adopting innovations that strengthen climate change resilience
- ARA2 Health, well-being, food and water security
  - Core 2: Direct and indirect beneficiaries reached
  - Supplementary 2.1: Beneficiaries (female/male) adopting improved and/or new climate-resilient livelihood options
- ARA 3 Infrastructure and built environment
  - Core 2: Direct and indirect beneficiaries reached
- ARA 4 Ecosystem and ecosystem services
  - Core 2: Direct and indirect beneficiaries reached

For ARA1 Core 2, the project targets 9,000 direct beneficiaries (2,500 women, 6,500 men) and 15,300 indirect beneficiaries (6,120 women, 9,180 men). Direct beneficiaries include:

- Fisherfolk (captains, crew, fish vendors, cleaners)
- Pot/reef fishermen
- Seamoss producers
- Mangrove users (such as farmers, charcoal producers, and tour guides)
- Coastal zone dwellers and property owners[30]
- Plus their direct households.

[30] Concentrated mostly in Soufriere (population 8,472) and Praslin (population 576). Population figures obtained from 2010 census.

Indirect beneficiaries under ARA1 Core 2 include support services to direct beneficiaries and individuals benefiting from ecosystem restoration activities.

For ARA1 Supplementary 2.5, an estimated 6,000 direct beneficiaries (1,600 women, 4,400 men) are expected to adopt innovations that strengthen climate change resilience. These include:

- Crew members of vessels with improved communication and safety equipment
- Seamoss farmers implementing improved practices
- Employees/operators of aquaculture production systems
- Fisheries value chain actors engaged in exchanges for commercial pelagic fishing

The 10,200 indirect beneficiaries (4,080 women, 6,120 men) under ARA1 Supplementary 2.5 include formal and grey economy actors supporting the direct beneficiaries.

ARA2 Core 2 encompasses all 72,000 project beneficiaries (30,785 women, 41,215 men), including 10,000 direct beneficiaries (2,785 women, 7,215 men) and 62,000 indirect beneficiaries (28,000 women, 34,000 men). The project is expected to have a broad impact on the overall wellbeing and resilience to climate change of the entire target population.

For ARA2 Supplementary 2.1, an estimated 2,000 direct beneficiaries (500 women, 1,500 men) are expected to adopt improved or new climate-resilient livelihood options. These include:

- Fishers and aquaculture farmers that are expected to be covered by climate risk insurance
- Employees in new value-added businesses
- Fishers engaging in tourist-related fisheries activities
- Fisheries sector actors receiving financial planning, training, and technical support

The 3,400 indirect beneficiaries (1,360 women, 2,040 men) under ARA2 Supplementary 2.1 include household members of those adopting new livelihood options.

For ARA3 Core 2, the project targets 6000 direct beneficiaries (1,600 women, 4,400 men). Counting family members, these include:

- Fisherfolk (captains, crew, fish vendors, cleaners)
- Seamoss producers
- Pot/reef fishermen

The 10,200 indirect beneficiaries (4,080 women, 6,120 men) under ARA3 Core 2 include formal and grey economy actors supporting the direct beneficiaries.

ARA4 Core 2 encompasses 72,000 total beneficiaries, as all project beneficiaries benefit from improved ecosystems and ecosystem services. This includes 10,000 direct beneficiaries (2,785 women, 7,215 men) and 62,000 indirect beneficiaries (28,000 females, 34,000 males).

Mid-term targets are set at 30% of final targets, reflecting the project's implementation timeline and expected acceleration of progress in later years.

The fish landing site and seamoss activities will prioritize the sites that (1) have the largest fishing fleet and land the greatest volume of fish, and (2) support the largest seamoss farming operations. Figures 36 and 37 below illustrates the prioritization of the fish landing sites. Site inspections during funding proposal preparation identified which interventions (e.g., pier rehabilitation and reinforcement) are best suited to each of the priority sites.

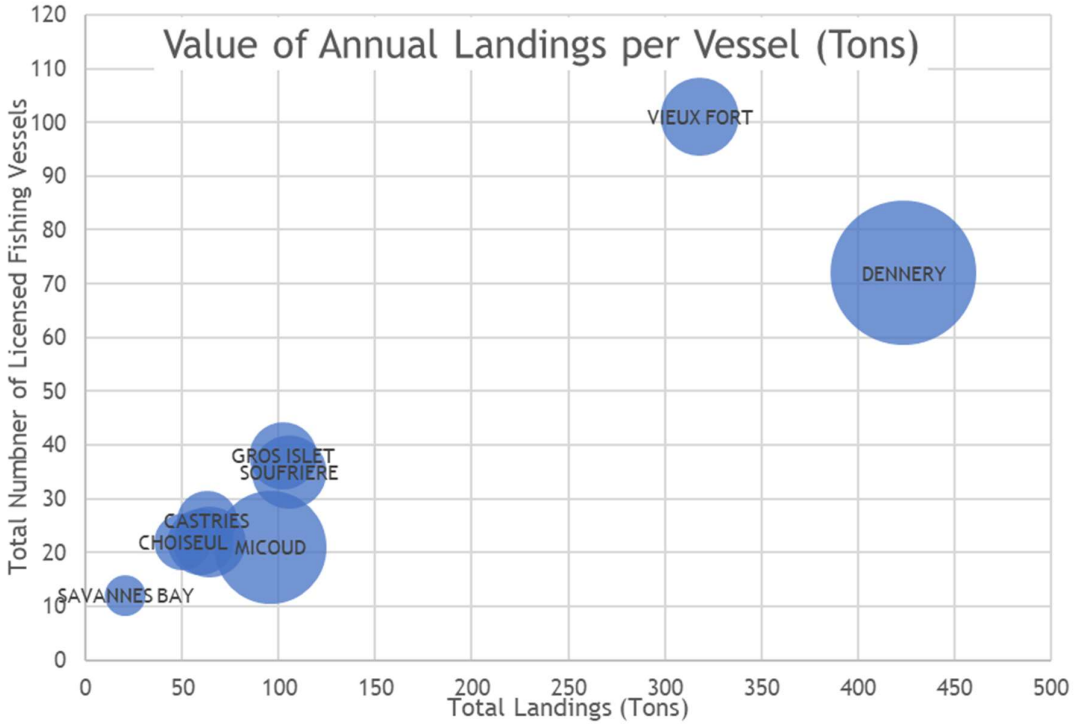


Figure 47 Fish landing statistics per landing site (Dept of Fisheries)

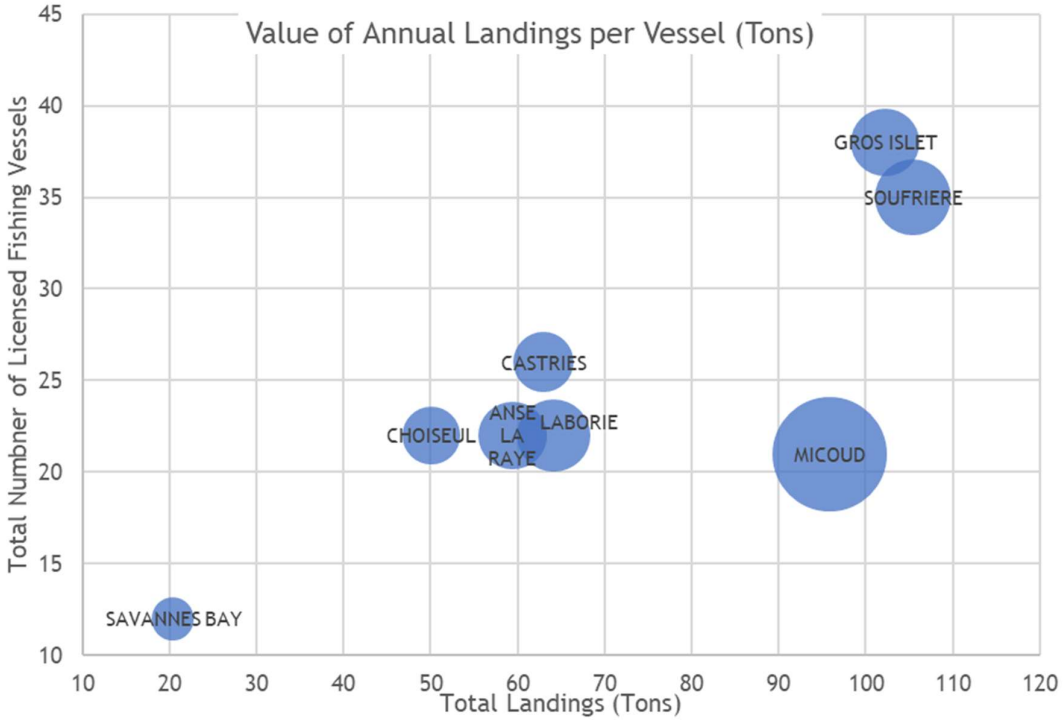


Figure 48 Fish landing statistics of smaller landing sites (Dept of Fisheries)

3.6 Gender mainstreaming

Annex 4 presents in detail the gender analysis and gender action plan for the proposed GCF project. It includes a legal and policy framework assessment, a contextual analysis of gender and the enabling environment, and a mapping of stakeholders relevant to gender and social considerations for the sector. These findings inform the climate context for the project by clarifying the roles of women and men in the fisheries, seamoss and aquaculture value chains, the gender-specific constraints that affect their ability to respond to climate challenges.

Among the challenges faced by women and men in the sector, the gender analysis notes the following:

- Men hold most registered jobs; they hold 96% of marine fishing jobs compared to 4% for women.[31] Women typically occupy roles in processing, selling and financial management, however, since there is no formal registration of fish processors and vendors, women, who predominantly occupy these roles are excluded from data-capture in the Ministry of Agriculture, Fisheries, Physical Planning, Natural Resources and Co-operatives' database;
- Male literacy and numeracy rates are lower than female rates, with high youth unemployment, limiting ability to undertake training and further education;
- Classification rules for fishing boat registration prohibit vessels from having washroom infrastructure, posing a challenge for female participation in fishing activities;
- Men and women have differing perceptions of safety and security during the day and in the evening at fish landing and processing sites;
- Women have traditionally worked alongside husbands and male family members who hold ownership rights and access to financial resources, but this often renders women invisible in commercial financial markets;
- Women play a disproportionate role in financial resource management in the sector, but are less able to qualify for credit due to lack of documents such as land registers, title deeds, financial statements and building plans;
- Although it is reported that 57.3% of women are in management positions in Saint Lucia[32], most women occupy lower management positions, with little access to decision-making power.[33]

The gender action plan aims to position project beneficiaries as stakeholders in the implementation and success of the project, utilizing the knowledge and experience of women and men in sustainable practices and resource management to ensure sustainability and buy-in for project activities. Activities under the plan respond directly to the unique vulnerabilities of beneficiaries that limit their full participation in climate adaptation action, targeting the needs of women and men while acknowledging their intersectional identities as youth, elderly, and persons with disabilities. Ultimately, the GAP's proposed activities aim to challenge gender norms that hinder men's and women's autonomy and access to decision-making, reduce disproportionate burdens, and highlight the critical role women play in the fisheries sector in Saint Lucia

[31] UN Women. (2021). *Gender Inequality of Climate Change and Disaster Risk in Saint Lucia*. EnGenDER. https://caribbean.unwomen.org/sites/default/files/2022-02/EnGenDER_Gender%20Inequality%20CC%20DRR%20Brief_Saint%20LuciaF_20220203.pdf

[32] UN Women Count. 2024. "Saint Lucia. https://data.unwomen.org/country/saint-lucia

[33] D. Rose. CiWIL. Interview. 16 February 2024. Virtual.

The recommendations from the gender analysis and action plan have been integrated into the project design to ensure that interventions are gender responsive and transformative. Activities and sub-activities include measures to reduce and remove barriers to women's participation in fishing activities; enabling environment measures that improve literacy and training opportunities for men (and especially older men who are less able to go out to sea); safety and hygiene improvements at fish landing and processing sites; gender sensitivity training, and other measures. Please see Annex 4 for details of the gender analysis and gender action plan.

Figure 49 Gender Action Plan outputs

3.7 Implementation arrangements

The following governance mechanisms for project execution, coordination and oversight have been agreed in close consultation with the Government of Saint Lucia Ministry of Finance, Economic Development and the Youth Economy (MoF) and the Department of Fisheries (DoF) of the Ministry of Agriculture, Fisheries, Food Security and Rural Development (MoA).

FAO will serve as both Accredited Entity (AE) and Executing Entity (EE) of the GCF proceeds for this pro-ject with a setup that supports strong government ownership and implementation, and serves the capacity development objectives of the project. The GoSL will act through the MoA and the MoF, who are EEs for the project. CLEAR Caribbean, a not-for-profit organization based in Barbados dedicated to the protection and restoration of marine ecosystems across the Caribbean, is also an EE. The Executing Entities will undertake activities co-financed with their own resources, except for CLEAR Caribbean, which is mobilizing USD 2.2m in parallel financing through the BResilience4SIDS project.

In its role as AE, FAO will be responsible for the overall management of this project, including: (i) all aspects of project appraisal; (ii) administrative, financial, and technical oversight and supervision throughout project implementation; (iii) ensuring funds are effectively managed to deliver results and achieve objectives; (iv) ensuring the quality of project monitoring, as well as the timeliness and quality of reporting to the GCF; and (v) project closure and evaluation. FAO will assume these responsibilities in accordance with the detailed provisions outlined in the GCF policies as well as Accreditation Master Agreement (AMA) and Funded Activity Agreement (FAA) between FAO and GCF.

To perform these AE functions, FAO will set up a FAO-GCF project supervision team comprising relevant staff from the FAO Sub-Regional Office for the Caribbean in Barbados (SLC), the FAO Regional Office for Latin America and the Caribbean in Santiago (RLC), and FAO Headquarters (HQ) in Rome. The project supervision team will remain independent of the EE Functions also performed by FAO SLC.

FAO SLC will act as Executing Entity and will be responsible for the management of the GCF proceeds and will bear the overall responsibility for fulfilling the EE functions of this project.

FAO, as AE will be responsible for the GCF proceeds and in its role as the EE will manage all GCF-funded project activities. In this context, the FAO SLC will set up a Project Management Unit (PMU) based in Saint Lucia with project-recruited staff. This PMU will coordinate the work of the implementing partners and service providers. The PMU will support EE functions for this project, including (inter alia) the preparation of Annual Work Plans and Budgets (AWPBs) in collaboration with key Government counterparts, and the overall day-to-day project management, monitoring project progress, and reporting to the Project Steering Committee (PSC) and FAO-GCF project supervision team in HQ. The PMU will work with relevant partners to deliver in-dividual outputs and activities, as outlined below. Along with specialized technical experts who will directly support the project. The project-recruited staff and government staff in the PMU will collectively comprise a project delivery team. The project delivery team will lead the execution of all GCF-funded activities included in this project. FAO will ensure there is no direct overlap between (i) these staff who comprise the project de-livery team and (ii) the staff who comprise the project supervision team and fulfill FAO's AE functions. This will ensure built-in project oversight and supervision functions are fulfilled under separate supervision lines.

The GoSL acting through the MoA and the MoF, as well as CLEAR Caribbean will execute activities fund-ed by their own co-financing resources. As such, they will be responsible for managing and executing their co-financing funds but will not execute any GCF proceeds. The GoSL acting through the MoA and MoF, as well as CLEAR Caribbean will coordinate the implementation of these activities through the Project Steering Committee.

The PSC will be responsible for the highest level of project governance, and will guide overall project implementation, ensuring inter-institutional coordination. The PSC will be comprised of high-level representatives from the MoA; the MoF (NDA and the UBEC project PMU); Ministry of Education, Sustainable Development, Innovation, Science, Technology and Vocational Training (MEd); Ministry of Equity, Social Justice and Empowerment (MEq); Ministry of Commerce, Manufacturing, Business Development, Cooperatives and Consumer Affairs (MoC); St. Lucia Fisherfolk Co-operative Society Ltd (SLFCS), and FAO. The MoF will chair the PSC and FAO will act as the Secretariat. The PMU will keep the documentary and logistical record for the operation of the PSC.

A Technical Committee (TC) will be responsible for the overall project coordination and for ensuring its strategic approach, coordination among the partners and consistency of the outputs with the project's strategic framework. The TC will be comprised of technical staff from the MoA's Department of Fisheries, the MoF (PMU of UBEC project), CLEAR Caribbean and FAO. The Department of Fisheries will chair the TC and the PMU will act as the technical secretariat and provide support to the TC. The Executing Entities through the PSC will retain final decision-making over the implementation of the Project and the use of proceeds and other final decisions and approvals.

A Project Management Unit (PMU**)** will be responsible for the implementation of the Project. The PMU is the technical-administrative unit for the Project. The personnel for the PMU will be hired by FAO. The PMU coordinator and a team will be hosted in the offices of the MoA in Castries, with administrative and programmatic support from SLC in Barbados. The PMU will coordinate and support project implementation, performing day-to-day implementation, coordination, and supervision activities during the project lifecycle, operating in close consultation with the governing structures of the project. While the PMU will be located physically at or adjacent to the MoA's offices, it will remain under the supervision of FAO, as EE of the GCF proceeds. The PMU will follow FAO's operating procedures and will execute activities according to AWPBs approved by the TC and the programme team in SLC. Key administrative matters for the project (including procurement and financial plans, periodic reports, etc.) will be approved by the TC. The PMU will include the following staff: (i) National project coordinator, (ii) Finance & administration assistant), (iii) Procurement specialist.

The governance and implementation structure and flow of funds for the project are summarized in the figure below:

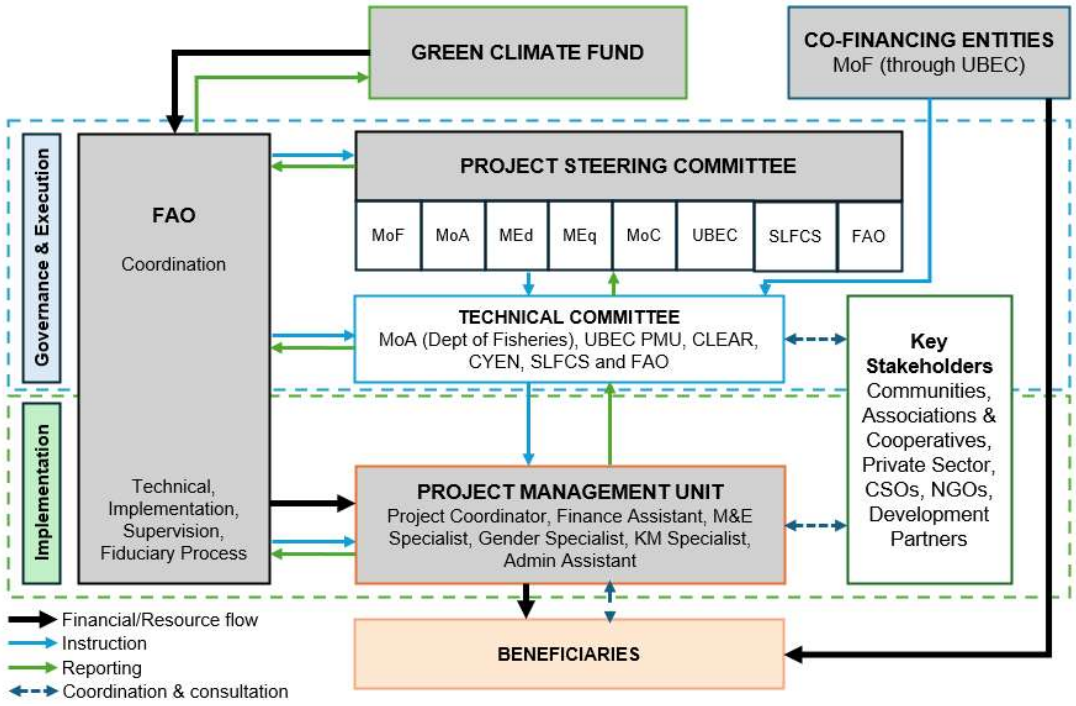


Figure 50- Project implementation arrangements

3.8 Risks and risk management

The below table summarizes the main risks facing the project and the approach to mitigating those risks.

Table 2929 Risks and risk management summary

Selected Risk Factor 1		
Category	**Probability**	**Impact**
Technical and operational	High	Medium
Description		
Inadequate human resources or qualified service providers for project implementation. In small island developing states (SIDS), the relatively small population often results in a limited pool of specialized human resources and service providers. This shortage can significantly impact the project's ability to find and recruit individuals or organizations with the necessary knowledge and experience to manage and implement project activities effectively		
Mitigation Measure(s)		
The project will recruit on a competitive and transparent basis the project staff and PMU personnel, who will benefit from technical support from the FAO sub-regional office for the Caribbean (based in Barbados), the FAO Regional Office for Latin America and the Caribbean (based in Chile), and the FAO Headquarters. In addition, the project will invest in strengthening the planning and implementation capacities of key line ministries and agencies. The GCF Readiness project and the FP preparation work have allowed the AE to pre-identify a cohort of specialists and increased their familiarity with the requirements to deliver FISH-ADAPT. Where possible, the project will benefit also from the expertise of		

the teams delivering elements of the World Bank UBEC project and other initiatives. FAO has already identified reliable service providers in the region and country through procurement processes undertaken in previous projects. These service providers will be invited to submit expressions of interest and formal bids as needed.
Selected Risk Factor 2

Category	Probability	Impact
Governance	Medium	Low

Description
Change in the development and climate priorities of the Government of Saint Lucia (e.g., as a result of national elections in 2026).
Mitigation Measure(s)
FISH-ADAPT is designed to reflect the needs and priorities of local stakeholders in Saint Lucia's fishing and farming communities. The project also responds directly to the priorities identified in the Government of Saint Lucia's national adaptation plans, via an inclusive multi-year process involving a wide range of stakeholders. This bottom-up and top-down alignment will help to ensure strong support that transcends political affiliation. The project's implementation arrangements will include high-level Government representatives from line Ministries and the NDA. The FAO representative on the project steering committee will remain in constant dialogue with Government counterparts to anticipate potential changes in policies and strategic direction, and to propose – together with the PMU – necessary adjustments to ensure alignment with changes to Government policy.
Selected Risk Factor 3

Category	Probability	Impact
Other	Medium	Medium

Description
Social and cultural inertia against adopting new practices
Mitigation Measure(s)
FISH-ADAPT takes into account lessons learned from previous efforts to modernize Saint Lucia's fisheries sector. The project focuses on proven practices and technologies to reduce the perception of risk for beneficiaries. Activities take a step-wise approach to removing barriers to action and introduce fishers, farmers and value chain actors to good practices already adopted in neighbouring countries. The project includes budget for FAO experts in several disciplines to provide in-country technical backstopping and training to national counterparts to ensure sustainable transmission of knowledge, skills and expertise to relevant stakeholders.
Selected Risk Factor 4

Category	Probability	Impact
Technical and operational	Medium	Medium

Description
Increased competition over resources leads to community conflict as economic opportunities increase
Mitigation Measure(s)
The project is designed via participatory community consultations and will be implemented largely by small fishers, farmers and cooperatives. The project will promote dialogue and consensus-building processes through consultation and coordination to achieve inclusive decision-making and design of solutions. The project also will support public agencies to improve demarcation and licensing for improved management of public resources.

Selected Risk Factor 5		
Category	**Probability**	**Impact**
Gender	Low	Medium
Description		
On SEAH/GBV, there could be incidences of Gender Based Violence/Sexual Exploitation Abuse and Harassment		
Mitigation Measure(s)		
To reduce the possible incidences, an action plan on SEAH/GBV will be developed during the project inception phase. The plan will include activities like annual awareness workshops for contractors, subcontractors and people living in the immediate project area; contractual clauses to enforce the required lawful conduct and legal consequences for failure to comply, the commitment to cooperate with law enforcement agencies investigating cases of GBV, against rape, defilement and other GBV, and a Code of Conduct; sensitize beneficiaries on the prohibition of child labor; and the dissemination of laws protecting the rights of women and girls including raising awareness on families, workshops on gender, and a communication strategy on the prevention of violence and harassment. In addition, budgeted project activities and sub-activities include gender sensitivity training for beneficiaries, and upgrading of facilities with improved lighting and other measures to improve safety.		
Selected Risk Factor 6		
Category	Probability	Impact
Other	Medium	Medium
Description		
Exogenous risks include: i) Climate change and severe weather (similar to Hurricane Beryl in July 2024) impacting project activities; (ii) COVID-19 and other sanitary crisis disturb implementation. These risks would translate into operational disruptions and discontinuation of activities' implementation (if COVID related), and would threaten investments, livelihoods and fishers' resilience (if climate related).		
Mitigation Measure(s)		
The FISH-ADAPT project is intended by design to reduce vulnerability and exposure to climate risks related to extreme weather. The project prioritizes "quick wins" that produce climate vulnerability reduction benefits in Year 1, even while longer term resilience measures are put in place over the rest of the project period. The emphasis on low-impact and nature-based measures makes it easier for national stakeholders to maintain, repair and rehabilitate facilities that are damaged by storms during and after the implementation period. Implemented solutions, such as aquaculture farms and improved landing sites will include vulnerability assessments and adaptation strategies to minimize impacts from climate change and sever weather. Risks mitigation strategies against the COVID-19 pandemic will include (i) adjusting stakeholders' engagement plans, adopt higher flexibility and adaptive management and use remote communication whenever possible, (ii) maintaining social distancing, (iii) reviewing and adjusting implementation and stakeholder engagement arrangements to compensate staff shortages. These actions will lower the impact of risk to medium.		

4. Project justification

4.1 Climate impact potential

As a Small Island Developing State, Saint Lucia has very high vulnerability to climate change, especially in the fisheries sector due to the predominance of small-scale fishers, as well as vulnerable rural coastal communities. The country does not have the financial resources to deliver climate resilient priorities on top of existing developmental challenges, and the current limited availability of climate finance is a significant barrier for pursuing climate resilient development. Adoption and dissemination of climate change adaptation practices and technologies are rarely being taken up by the private sector and civil society, due to the knowledge gaps, and the financial and other barriers outlined in section 4.5 above.

GCF support will catalyze a sustainable transformation in the operation of Saint Lucia's fisheries sector. At present, the sector is characterized by fishers and fish workers, who operate with limited awareness of climate hazards and an inability to reduce their exposure and vulnerability to these risks. The proposed GCF project will provide an interlocked and mutually reinforcing set of interventions that align incentives across a wide range of actors and result in a paradigm shift for the sector. The project will help actors in the sector anticipate, monitor and respond to the effects of climate change on fisheries, vessels, and infrastructure. The project will support concrete measures that reduce direct exposure and vulnerability.

GCF support reduces the risk of maladaptation. A traditional coping strategy known with fishers to recoup their low income from a poor catch of low prices for landed fish, is to fish even more intensively. This response, confined to restricted and less-productive coastal areas would put even more pressure on vulnerable ecosystems and ultimately exacerbate the problems facing fishers. When fishers have a good catch and if the post-harvest and marketing conditions are better, fishers usually find little reason to conduct more fishing trips or risk catching undersized fish. GCF support for financial products that facilitate private investment in more "climate smart"[34] fishing practices, improved policy adoption, livelihoods diversification, value-chain enhancement and other measures will drive a climate resilient transformation in the country's fishing sector.

4.2 Co-benefits

The project activities will result in two primary co-benefits.

- Co-benefit 1: Improved social and financial inclusion for women and men. The project will remove barriers to women's safe and active participation in fishing sector activities, and remove barriers that limit their access to credit and investment. At the same time, the project will overcome literacy / numeracy barriers that limit men's role in the financial management of fishing activities and will support the re-skilling of older fishermen.
- Co-benefit 2: Environmental improvements from reducing improper disposal of fish waste and reduced fertilizer and soil runoff into waterways.

[34] "Climate smart" here refers informally to practices that reduce both exposure and vulnerability to climate hazards without encouraging maladaptation.

4.3 Environmental and social assessment

See the Environmental and Social Action Plan (ESAP-Annex 12) of the FP.

4.4 Consideration of alternatives

The following table presents alternative interventions that were considered for inclusion and the reasons they were rejected.

Table 3030 Consideration of alternatives

Proposed Intervention	Reason for rejection
Direct purchase of larger fishing vessels to replace / supplement smaller boats	This approach was trialed in a previous project, where an international donor donated several long-liner vessels to the Government of Saint Lucia. This approach did not sufficiently align incentives with commercial fishers and did not overcome other barriers to action. The existing long-liner vessels remained under-used despite the positive experience of neighbouring islands.
Exclusive focus on coastal fisheries habitat restoration	Saint Lucia's fisheries sector is significantly less productive than in neighbouring countries like Grenada. While preserving and restoring coastal fisheries habitats is important, experience in other countries shows that this is not sufficient to ensure economic and food security for coastal communities. The project therefore includes support for increased pelagic fishing as well as / inland aquaculture.
No action – allow fisheries sector actors to respond to climate challenges on their own	As noted in Section 4.5, multiple barriers prevent a spontaneous response to increase climate resilience. Without support to overcome these barriers, the fisheries sector contribution to food and economic security in Saint Lucia would continue to decrease. In the absence of investment in the fisheries sector, the continuous decrease in fish availability will likely trigger a "race to the bottom" in terms of resource use: with less fish caught, with the same post-harvest losses and without aquaculture alternatives, fisher folk will accelerate the depletion of fish stocks. An example is already visible at many landing sites, where the net size has increasingly reduced: as a result of resource depletion, fishermen use illegal net mesh sizes that capture small, juvenile fish, which in turn further diminishes future stocks. The paradigm shift requires investment with the lowest possible concessionality to generate immediate adaptation alternatives.

4.5 Paradigm shift

The proposed GCF project is built around four interlinked and reinforcing components that together will deliver long-term transformative changes in the fisheries and aquaculture sectors in Saint Lucia. Taken together, these interventions create paradigm-shifting pathways that will transform the enabling environment to permanently overcome the barriers to climate

resilience. The project will contribute to the transformation of the fisheries and aquaculture sectors, from vulnerable, low-productivity systems to a climate-resilient and sustainable ones of livelihood security, and economic growth. This shift will be achieved through a comprehensive approach that addresses multiple interconnected barriers and aligns incentives across public and private stakeholders.

Scale: The project aims to reach approximately 39% of Saint Lucia's population as direct and indirect beneficiaries. By targeting the entire fisheries value chain, from small-scale fishers to processors, vendors, and coastal communities – the project will create a "critical mass" of actors adopting climate-resilient practices. The introduction of improved fishing vessels, safety equipment, and sustainable fishing techniques will enable fishers to access previously unreachable offshore fishing grounds, significantly increasing the sector's productivity and resilience. The project's focus on enhancing aquaculture and seamoss farming will likewise support in climate-proofing the livelihoods of a significant number of value chain actors.

Replicability: The project's replicability potential is high, both within Saint Lucia and across the Caribbean. The multi-faceted approach that addresses technical, financial, and institutional barriers can be adapted to other SIDS facing similar climate change challenges in their fisheries sectors. The project's facilitation of access to loans for climate-resilient fishing equipment and promotion of insurance products tailored to the fisheries sector can serve as a model for other countries. The NbS for coastal ecosystem restoration likewise provides a model that can be replicated along other sections of Saint Lucia's coastline, as well as neighbouring islands.

Sustainability: By aligning incentives between fishers, financial institutions, and government agencies, the project creates a self-reinforcing system that will continue beyond the project's lifespan. The emphasis on capacity building, from financial literacy training for fishers to institutional strengthening of government departments and CSOs, ensures that key stakeholders will have the skills and knowledge to maintain and expand climate-resilient practices. The project's support for policy reforms and establishment of inter-agency coordination mechanisms in government will create a lasting enabling environment for sustainable fisheries management. The project's approach to enhancing value chains and market access for fisheries products will create long-term economic incentives for sustainable practices. Lastly, by connecting fishers to higher-value markets and supporting the development of value-added products, the project will demonstrate the economic benefits of climate-resilient fishing practices, encouraging their continued adoption. All these actions will be carried out with a gender and youth centered approach to incentivize participation of marginalized groups and their access to emerging opportunities.

The project addresses the root causes of vulnerability in the fisheries sector. By improving the safety and efficiency of fishing operations, strengthening social protection, diversifying livelihoods, and restoring critical ecosystems, the project builds intrinsic resilience that will enable the sector to adapt to future climate challenges, and will serve as a model for sustainable blue economy development in SIDS globally.

Table 31 Paradigm shifting pathways for agriculture and food security

Sector		Alignment with GCF Strategic Plan					
Agriculture and Food security		Transformational planning & programming	Catalysing climate Innovation	Mobilising finance at scale		Coalitions & knowledge to scale up success	
Paradigm shifting pathway	Pathway 1: Promoting Resilient Agro-ecology	Integrated planning for fisheries and mariculture development that mitigates the risks of maladaptation Enabling community-responsive policies, frameworks & policies	New business models for fishers, fishworkers and value chain actors Integration of climate-responsive technologies, services & programs Landscape-level NRM for to protect fishery habitats	Facilitation of improved access to financial services (e.g. credit, insurance) for fisheries sector stakeholders	Technical assistance to financial sector institutions	Interagency coordination to leverage synergies and share knowledge	Monitoring, evaluation & learning to inform scaling based on context and priority issues Promoting public awareness and capacity building for scale
	Pathway 2: Facilitate Climate Informed Advisory & Risk Management Services	Assessments to understand needs & identify gaps for information, advisory & extension systems Co-designing delivery of extension and information systems to meet users' needs	Support the development of new financial products for credit and insurance to fishery sector stakeholders Supporting training and re-skilling for income and livelihood diversification	Integrating climate information and awareness into financial product offerings		Participation in regional platforms to share knowledge and best practices	
	Pathway 3: Reconfiguring Food Systems	Supporting integrated transformation of fishing, mariculture and aquaculture practices for climate resilience Strengthening policy coherence and cross-institutional coordination	Support for quality & sustainability certification and regulation (e.g., HACCP)			Supporting private sector actors to mainstream climate risk in business models Engaging cooperatives and industry groups	

Table 3132 Paradigm-shifting pathways for ecosystems & ecosystem services

Sector	Alignment with GCF Strategic Plan			
Ecosystems and Ecosystem services	**Transformational planning & programming**	**Catalysing climate Innovation**	**Mobilising finance at scale**	**Coalitions & knowledge to scale up success**
Pathway 1: Ecosystem-based management of coastal and marine environments	Implementation of social and environmental safeguards for blue economy interventions Improved enabling environment for EbA in coastal areas Landscape level planning for coastal ecosystem resilience	Develop and implement policies and practices for sustainable seamoss / seaweed farming Integration of nature-based and grey infrastructure for erosion control and disaster prevention	Increase domestic institutional capacity for credit and insurance for marine / fisheries economic activity Multi-stakeholder partnerships for innovative finance Novel circular economy value chains to reduce fisheries pollution Support for quality & sustainability certification and regulation (e.g., HACCP)	Multi-criteria environmental and social impact monitoring Participation in regional platforms to share knowledge and best practices

4.5 Efficiency and effectiveness

The total project cost is USD 16.713million, of which USD 14.75 million is financed by GCF and USD 1.964 million is provided via co-financing. This corresponds to a co-financing ratio of 0.133:1.

GCF grant support will provide the minimum concessional funding necessary to make the project viable. GCF support will address several critical needs including economic security and the need for small-scale fishers, fish workers, farmers and value-chain actors to address the challenges posed by climate change. At present, public resources are insufficient to meaningfully reduce climate change vulnerability and exposure, to improve the resilience of beneficiaries and achieve national adaptation goals.

Support for public services and facilities: The project supports the Government of Saint Lucia to invest in adaptation-related improvements to fisheries related public services and facilities. This includes publicly-owned piers and ramps, fish processing sites, and boat storage facilities used by fishers and fishworkers. As described in B.1 above, and detailed in the feasibility study, these facilities show evidence of disrepair, and their location and general condition do not allow them to withstand ongoing and expected impacts from climate change. GCF investment will leverage co-financing from the Government and other sources to accelerate improvements and ensure that climate change considerations are incorporated.

Support for public goods: The proposed GCF project supports the provision of ecosystem services provided by healthy coastal mangroves and coral reefs. These sites are threatened by upstream impacts, while the benefits they provide cannot be captured by a single group of beneficiaries. As is the case with many public goods, the protection and rehabilitation of

mangrove and coral reef sites are “nobody’s and everybody’s” problem, thus justifying public investment. In addition, the project provides investment that helps reduce or avoid the costs that would otherwise be borne by the Government under business-as-usual. The project invests in im-proved communications and other safety equipment for fishing vessels, and training and support for the adoption of safer fishing practices. The communications infrastructure provides a critical public service. While these interventions target private fishers, they maintain characteristics of public goods. Specifically, many of the costs of unsafe fishing practices are borne by the public sector and society at large via (a) the cost of search and rescue missions, (b) sickness and employment injury payments by the National Insurance Corporation, and (c) increased Public Assistance Program (PAP) payments to compensate for lost income.

Facilitation and support for private actors: The project uses targeted grant financing to align incentives and mobilize private resources to achieve climate adaptation goals. The project supports private beneficiaries to acquire and adopt improved equipment but does not purchase or grant income generating equipment to fishers, farmers and value-chain actors. For example, Output 1 supports fishers to acquire larger, safer and more efficient vessels to conduct long-line pelagic fishing, but project funds will not be used to purchase these vessels. Instead, the project will support fishers to understand the pros and cons of different vessel choices, help them identify and negotiate the acquisition of the vessels, and work with fishers, lenders and insurers to arrange appropriate financing. The project sets the stage for beneficiaries to generate savings or access credit for productive investments and obtain insurance to redistribute risk where appropriate. GCF technical assistance includes financial literacy training to help improve access to financial services for fishing vessels, equipment, aquaculture and seamoss production, and new fisheries value chain and related business opportunities. This financial facilitation will contribute to the long-term sustainability of the project interventions by creating a virtuous circle where project beneficiaries can qualify for loans and insurance on affordable terms and continue making investments into climate resilient activities beyond the project’s implementation phase.

The AE has evaluated the cost-effectiveness of the proposed interventions and their contribution to financial and economic benefits for beneficiaries.

Table 3233 Cost-effectiveness of the proposed interventions and their contribution to financial and economic benefits for beneficiaries.

Proposed Intervention	Reason for rejection
Direct purchase of larger fishing vessels to replace or supplement smaller boats	This approach was trialed in a previous project, where an international donor donated several long-liner vessels to the Government of Saint Lucia. This excessively concessional approach did not sufficiently align incentives with commercial fishers and did not overcome other barriers to action. The existing long-liner vessels remained under-used despite the positive experience of neighboring islands. The project avoids capital purchases for private actors and instead facilitates access to loans and other financial instruments, an approach that is both more cost-effective, and more likely to be sustainable over the long term.
Exclusive focus on coastal fisheries habitat restoration	Saint Lucia’s fisheries sector is significantly less productive than in neighboring countries like Grenada. While preserving and restoring coastal fisheries habitats is important, experience in other countries shows that this is not sufficient to ensure economic and food security for coastal communities. The project therefore includes support for safer traditional fishing vessels, increased pelagic fishing, expansion of climate-adaptive inland aquaculture, enhanced value chains, and

Proposed Intervention	Reason for rejection
	livelihood diversification
No action – allow fisheries sector actors to access existing sources of finance and respond to climate challenges on their own	As noted in Section B.1, multiple barriers prevent a spontaneous response to increase climate resilience. Without support to overcome these barriers, fishers, farmers and value chain actors cannot or will not access the financial and technical resources to adopt more climate resilient practices. As a result, the fisheries sector contribution to food and economic security in Saint Lucia would continue to decrease. In the absence of investment in the fisheries sector, the continuous decrease in catch per unit effort will likely trigger a "race to the bottom" in terms of resource use: with less fish caught, with the same post-harvest losses and without aquaculture alternatives, fisher folk will accelerate the depletion of local fish stocks. An example is already visible at many landing sites: as a result of resource depletion, some fishermen use illegal net mesh sizes that capture small, juvenile fish, which in turn further diminishes future stocks, leading to a vicious circle.

Analysis on the cost effectiveness of projects addressing similar sectors in coastal communities show a wide range of benchmark figures. In general, small-scale community-based projects focusing on, for example, training and gear provision have lower costs than medium-scale infrastructure projects with activities like improved landing sites and cold storage. An overview of recent projects funded by the GCF, and the Adaptation Fund is given in the table below. The FISH-ADAPT project is shown first, followed by two fisheries / aquaculture projects for direct comparison. Following these are other coastal projects that have not specifically focused on fishing communities. This table shows that the expected cost per beneficiary of $229 is comparable to other projects, with a lower cost than recent fisheries specific projects (Peru and Nauru).

Table 3334 Benchmarking FISH-ADAPT against other similar projects

Project	Funder	Total budget (USD)	Direct beneficiaries	Indirect beneficiaries	USD / beneficiary
FISH-ADAPT: Transforming Climate Resilience and Sustainability in Saint Lucia's Fisheries Communities	GCF	16,713,962	10,000	62,000	232
Adaptation to the Impacts of Climate Change on Peru's Coastal Marine Ecosystem and Fisheries	Adaptation Fund	6,950,239	700	8,000	799
Resilient Coastal Fisheries and Aquaculture in Nauru	Adaptation Fund	7,999,493	875	10,800	685
FP135: Ecosystem-based Adaptation in the Indian Ocean – EBA IO	GCF	49,200,000	88,000	610,000	70
FP184: Vanuatu community-based climate resilience project (VCCRP)	GCF	32,700,000	90,157	110,000	163
SAP029: Ecosystem-based Adaptation (EbA) for Reducing Community Vulnerability to Climate Change in Northern Pacific Small Island Developing States (SIDS)	GCF	9,900,000	34,200	42,163	130

Restoring marine ecosystem services by restoring coral reefs to meet a changing climate future	Adaptation Fund	10,000,000	1,001	80,325	123
Strengthening the Adaptive Capacity of Coastal Communities in Fiji to Climate Change through Nature-Based Seawalls	Adaptation Fund	5,764,000	2,466	30,000	178

Other projects where indirect beneficiaries have not been identified have higher direct beneficiary cost benchmarks to the FISH-ADAPT project, including the World Bank Unleashing the Blue Economy of the Caribbean (cost per direct beneficiary of $2,143) and the Adaptation Fund's Belize Marine Conservation and Climate Adaptation Initiative (cost per beneficiary of $2212), compared to the FISH-ADAPT project cost of $1,671.

Landing site investments

To assess the cost-effectiveness of the landing site investments in the FISH-ADAPT project, we compared it to a similar initiative – the PROREFISH project in the Gambia (FP188). FISH-ADAPT aims to rehabilitate 15 landing sites for a total of $2.24 million, averaging $150,000 per site and benefiting 5,000 people. In contrast, the PROREFISH project is investing $910,000 per landing site, to benefit 13,243 people. This difference in cost per site is attributed to several factors, including the scale and complexity of interventions, and the specific climate-proofing measures implemented in each project. However, when comparing the cost per beneficiary, FISH-ADAPT ($232) appears slightly more cost-effective than PROREFISH ($481). This suggests that the FISH-ADAPT project's cost-effectiveness is reasonable.

Cash flow analysis demonstrating viability of loan instruments for component 3

While this SAP proposal does not require a formal Economic and Financial Analysis (EFA), under Component 3, the key output is enabling fishers to access financial products and services through financial institutions (FIs) participating in the project. In order to assess the potential for borrowers to repay loans based on cash flow or income, we developed a simple cash flow analysis for a single case: Pond Aquaculture.

We used data from the 2022 FAO-GCF readiness project report "An Economic Evaluation Report of The Fisheries Sector (Inclusive of Seamoss and Aquaculture)", developed by L. Mathurin, combined with typical production figures for Tilapia fish production. This analysis is available as an Excel model accompanying this Feasibility Study.

Without a loan, assuming the farmer could make the initial investments with savings, the IRR is 28.4% and NPV is $10,457, with a simple payback period of 5 years.

With a 100% loan, and 6-year tenor the IRR is 21.6% and NPV is $1,145, indicating viability of the loan even at 100% coverage.

This high-level analysis is indicative of financial viability.

Benefits for artisanal fishers

As indicated in the figure below, estimated catch per unit effort (CPUE) peaked in 2001, and has been on a downward trend since 2011. Fishers' vulnerability and exposure to climate hazards will likely contribute to a further reduction in CPUE under business-as-usual.

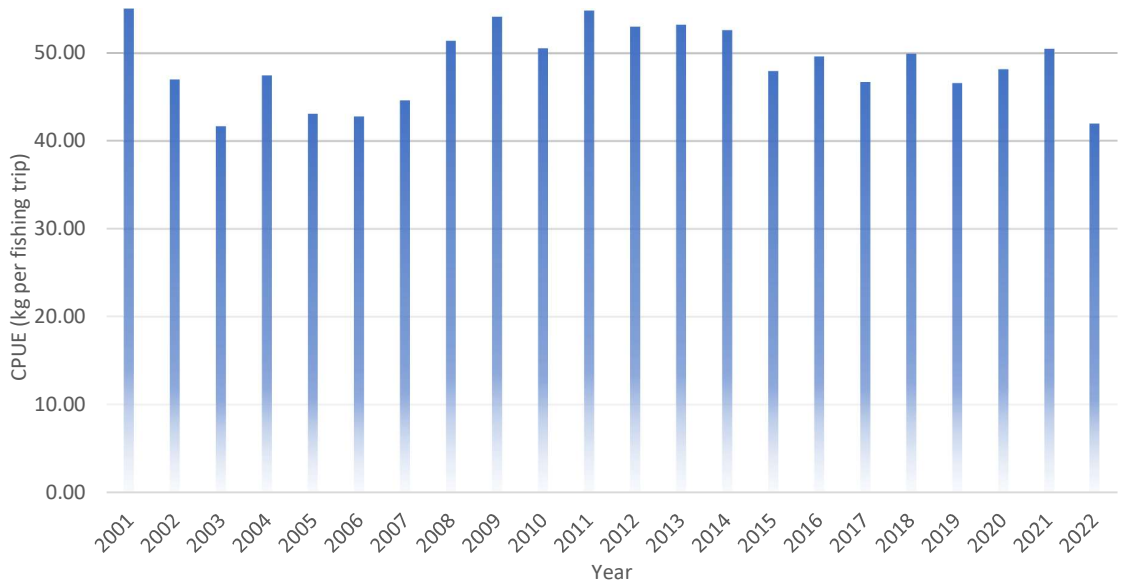


Figure 51 Estimated CPUE (catch per unit effort, catch per trip in kg) per year by small-scale fisheries in St. Lucia, Caribbean. Source: Department of Fisheries of St. Lucia (GoSL, 2022)

Table 3435 Fishing productivity in Saint Lucia & Grenada (source: unpublished technical study prepared by J. Turner, January 2024)

	Saint Lucia	Grenada
Population	181,000	113,000
GDP per capita (USD)	8,400	9,300
Employment in fisheries sector (approx.)	3,210	4,000
Imports of fish and fish products – 2020 (USD)	7,458,700	4,350,110
Exports of fish and fish products – 2020 (USD)	159,690	2,259,710
No. of active fishing vessels (total)	593	835
No. of Category 1 longliner fishing vessels (4.5 to 7 meters)	0	100
No. of Category 2 longliner fishing vessels (5 to 8 meters)	0	75
No. of Category 3 longliner fishing vessels (9 to 25 meters)	4-5 not operational	170

Benefits of livelihood diversification activities: the project will help to decouple improvements in fishing related livelihoods from the total volume of fish catch. This represents an evolution of existing practice, where fishers supplement their income with casual labor or farming, by adding other diversified income sources such as guiding tours. CLEAR Caribbean's coral restoration pilot project has developed a fully costed business plan (currently confidential) that employs community members as guides for kayaking and snorkeling tours. Projections indicate that guiding tours 2-3 days per week during the 7-month tourist season would allow

guides to achieve incomes in excess of the national average of USD 8,400 per year. These types of supplemental income streams would reduce pressure to overfish, or to go to sea during inclement weather.

GCF project preparation support enabled a detailed analysis of existing technologies and practices in Saint Lucia's fisheries sector, and a consideration of the best available alternatives taking into account the local context and potential barriers to adoption. In each case, the project preparation team consulted with stakeholders to understand the rationale for employing current technologies and practices and the features that might make an alternative attractive (or unattractive). Some examples of the use of best available technologies and practices that will be employed by the project are provided in the table below:

Table 3536 Best available technologies and practices

Baseline technology or practice	Best available alternative(s)
• Small fishing boat/pirogue – wood or poor-quality fiberglass mold, poor seaworthiness, unable to operate far from shore or in heavy seas	• Improved fiberglass molds to improve seaworthiness • Second-hand longliner boats to enable long-distance pelagic fishing
• VHF radios – limited range reduces ability to fish safely far from shore; reduced effectiveness of search and rescue efforts	• VMSand VHF repeaters to improve coverage • Satellite communications
• Outdated and inefficient electric icemakers – limited volume and very high operating costs	• Modern and efficient icemakers to improve fish cold chain • Use of solar power to reduce running costs
• Locally produced "banana" feed for aquaculture fish production – low nutrient content resulting in reduced fish productivity	• Acquisition of higher quality fish feed • Conversion of silage/fish waste to high-protein feed
• Makeshift seamoss production using sticks and plastic bottles as floaters	• Submersible rafts to reduce storm vulnerability • Circular economy/biodegradable materials to reduce marine plastic waste
• Informal fish processing and marketing in unsanitary conditions	• Professionalized processing, distribution and marketing of fish in accordance with HACCP standards, with improved cold chains
• On- and off-shore dumping of fish waste, contributing to land and water pollution	• Circular economy processing of fish waste into silage and other added-value products

The improved technologies and practices supported by the project are each intended to achieve one or more objectives: (a) reduced vulnerability to loss and damage from climate related impacts, (b) reduced cost, (c) im-proved effectiveness, (d) reduced likelihood of negative environmental impact.

4.6 Justification of financial instruments

The project operates on the principle of minimum concessionality. FAO and the Government of Saint Lucia request GCF grant financing to support the climate resilience of the country's fisheries sector. Grant finance is used for activities that build capacity, improve the enabling environment for transformational change, have characteristics of public goods, or are otherwise subject to market failures. The project sets the stage for beneficiaries to generate savings or access credit for productive investments and obtain insurance to redistribute risk where appropriate. GCF technical assistance includes financial literacy training and facilitation to help improve access to financial services such as loans and insurance. This financial

facilitation will contribute to the long-term sustainability of the project interventions by creating a virtuous circle where project beneficiaries can qualify for loans and insurance on affordable terms and continue making investments into climate resilient activities beyond the project's implementation phase.

All interventions in the proposal are designed in line with the use of GCF grant finance and comply with the principles set out in Annex III to decision B.05/07. In line with GCF guidance (B_10_06) grant elements are tailored to i) the incremental cost or the risk premium required to make investments viable ii) for demonstration effect, i.e., where there is clear demonstration effect in relation to new technology, approach or market, iii) to cover technical assistance, or iv) to meet the additional costs of climate action that would otherwise not be available, particularly for vulnerable groups including women and youth. The proposed interventions clearly meet these criteria, with a focus on public goods (e.g., climate resilient marine ecosystems), as well as capacity building and technical assistance to scale-up climate resilient fisheries activities. The interventions are targeted to provide climate support for one of the most vulnerable sectors (artisanal fisheries) and groups (independent fisherfolk and aquaculture farmers).

Given the limited resources available for climate adaptation in Saint Lucia, the project coordinates closely and leverages several other initiatives to ensure complementarity and coherence. The landing site infrastructure investments build upon existing commitments by the Government of Saint Lucia, ensuring that those investments take into account climate impacts and best engineering practices. Other interventions are based on an awareness of the lending requirements of commercial banks and other credit providers in Saint Lucia and establish the basis for long-term financial relationships between fisheries sector actors and these lenders.

5. Conclusions and recommendations for project

In conclusion the proposed project appears well-suited to address the climate challenges facing Saint Lucia's fisheries sector. As documented in Section 4, fishers, seamoss farmers and aquaculture farmers in Saint Lucia are threatened by climate hazards that affect the productivity of fishing vessels, the integrity of fish landing sites and the operation of seamoss farms and aquaculture ponds. The project overcomes barriers to resilience and adaptation by increasing safety at sea for small vessels and transforming pelagic fishing practices, increasing the climate resilience of operations at fishing landing sites and seamoss farms near key fishing villages, improving coral and mangrove ecosystems that serve as important fisheries habitats, and strengthening economic security across the sector.

The project takes a gender responsive and gender transformative approach that builds on a deep understanding of the respective roles, resources and constraints facing men and women in Saint Lucia's fisheries sector. Project co-benefits foster social, financial and economic inclusion, and contribute to environmental protection and ecosystem restoration in Saint Lucia's coastal areas.

The project supports the transition to paradigm shifting pathways by sustainably transforming the operation of the sector and building a mutually reinforcing ecosystem that provides incentives for long-term technical, operational and financial sustainability. This approach will help ensure that the project continues to deliver resilience and livelihood benefits beyond the GCF funding period.

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[NOTE: The following references were used to prepare both this feasibility study and the detailed technical studies that were prepared as inputs to the feasibility study and project design.]

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