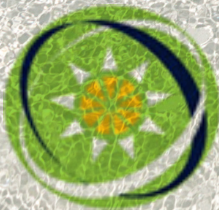




Stakeholder Maps of the Conch Value Chains of Grenada, Saint Lucia and Saint Vincent and the Grenadines



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UNCTAD-OECS Blue BioTrade Project
in cooperation with CITES

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Note

Reference to “dollar” and “\$” indicate United States dollars, unless otherwise stated. Reference to “EC\$” indicates the Eastern Caribbean dollar.

Use of a dash (–) between dates representing years, e.g., 2015–2018, signifies the full period involved, including the initial and final years.

Reference to meters is represented by “m”, centimetres by “cm”, and hectares by “ha”. Reference to kilograms is represented by “kg”, and pounds by “lbs”. Reference to nautical miles is represented by “NM”.

To reflect the closest estimate for data, decimals and percentages are rounded off. Number in money is rounded to the nearest dollar, unless otherwise stated. Decimals and percentages in this document do not necessarily add to totals because of rounding.

Acronyms and abbreviations

| | |
|--------|---|
| CITES | Convention on International Trade in Endangered Species of Wild Fauna and Flora |
| CRFM | Caribbean Regional Fisheries Mechanism |
| FAO | Food and Agriculture Organization of the United Nations |
| HACCAP | Hazard Analysis and Critical Control Points |
| OECS | Organisation of Eastern Caribbean States |
| UNCTAD | United Nations Conference on Trade and Development |

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Executive summary

Queen conch is a highly appreciated seafood delicacy with important non-food uses, including therapeutical products and handicrafts. While global demand is booming, small-scale coastal producers in the Eastern Caribbean do not fully seize the opportunities offered by sustainable conch markets. In 2020, the United Nations Conference on Trade and Development (UNCTAD), the Organisation of Eastern Caribbean States (OECS) and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) joined forces to design a pilot project to test the application of the revised UNCTAD BioTrade¹ Principles and Criteria (2020)² to the marine environment, focusing on the queen conch value chain in the countries of Grenada, Saint Lucia, and Saint Vincent and the Grenadines.

In the preparation of case studies on the queen conch value chains in beneficiary countries and working towards the development of a Blue BioTrade Action Plan for the OECS, UNCTAD has worked to produce a map of stakeholders in the queen conch value chain in the three participating countries and an initial scoping of opportunities and challenges that will be further explored to improve environmental and economic outcomes.

Some of the main findings of the stakeholder mapping activity are as follows:

Socio-economic findings

- **Production.** The combined production of queen conch meat by the participating project countries represented 15 per cent of the Caribbean Regional Fisheries Mechanism (CRFM) production volume in 2017.
- **Investment.** Since the \$4.6 million project for improvement of fishery equipment and machinery in Saint Vincent and the Grenadines, and the subsequent improved accesses to external markets through airport construction, the fishery has produced an additional \$8.3 million in production value when compared to pre -2017 baseline levels, demonstrating the potential returns to fisheries investment.
- **Adding value through market access.** Significant additional income could be earned in the industry through investments in regional traceability and direct access to high value export markets in the neighbouring island of Martinique.
- **Gender dynamics.** Men specialise in harvesting of queen conch and artisanal processing; both women and men are involved in formal processing operations and women are more represented in the sale of value-added conch products. All stages of the value chain require some specialisation and knowledge to maximise value.
- **Female participation.** Female participation is highest towards the end of the value chain, with women specialising in the preparation and sale of value-added conch products at fish fries, in the form of fritters, soups, grilled meat and sausages.
- **Power and equity.** Power, defined as the ability of a firm to exert influence over other actors in the value chain (Sturgeon, 2009), is primarily held by private fisheries centres in Saint Vincent and the Grenadines and by boat owners in other countries.

Socio-economic opportunities

- **Cost sharing to improve market access.** The costs of these investments, particularly in much needed stock assessments, could be shared across project countries. Due to the close geographic proximity of project countries and high costs associated with stock assessments, project countries in association with other queen conch producing OECS countries should seek to establish an OECS stock assessment unit to share costs.
- **Geographical proximate export markets.** Focusing on geographically proximate export markets, and local value-added goods would increase total income earned at all levels in this value chain significantly. Conch fishers serving the United States export market receive \$2.5-4 per lb while prices as high as \$8.5 per lb are paid in Martinique.
- **Reducing waste and adding value.** Commercializing by-products of conch processing represents an opportunity to increase income.
- **Conch meat trimmings.** Conch trimmings have demonstrated potential for value addition yet are not fully

utilised across the value chain. Best practice processing methods for conch sausages, burgers, stewing meat and other products should be identified and shared.

- **Conch operculum.** Caribbean conch operculum³ carries a price premium in east Asian markets yet is typically discarded during processing (with the exception being Union Island, which has exported opercula to Dubai, United Arab Emirates).
- **Conch shells.** The stockpiling of conch shells across the Grenadines presents both a challenge and an opportunity, as large volumes of shells may have eventual value as a natural construction material for coastal engineering.
- **Increasing processing efficiency.** Processing of conch involves up to six steps, namely: deshelling, removal of operculum, removal of visceral bag, removal of proboscis tips, filleting, and tenderisation. Efficiency could likely be increased through further specialisation in processing and introduction of mechanisation in certain steps.

Socio-economic challenges

- **Health cost of fishery.** Unsafe diving practices can have serious health impacts on divers in the fishery, resulting in paralysis, blindness and in extreme cases, death. The long term social and economic costs of these impacts is likely significant. Investment in health and safety practices would likely yield a positive social and economic return and contribute to the long-term economic sustainability of the fishery.
- **Lack of Hazard Analysis and Critical Control Points (HACCAP) certified facilities.** The lack of HACCAP certified processing facilities in Grenada and Saint Lucia present a challenge to maximizing value of conch production through export to high value markets.

Environmental findings

- **Limited reports landing of juvenile conch but monitoring mechanisms in need of strengthening.** Fishers and fisheries officers report limited to no fishing of juvenile conch (without flared lip). Additionally, fishers report that they do not harvest juvenile conch due to its low meat yield, which is positive for the fishery as juvenile conch should not be landed. However, with the removal of conch meat from the shell at sea, and limited at sea monitoring, the possibility of juvenile harvest exists. Further, the lack of a closed season for conch means that legislation against juvenile harvest may not be sufficient to prevent stock depletion.
- **Increased landings.** Conch landings have increased by 73 per cent from 2010–2020 in Saint Lucia and by 203 per cent in Saint Vincent and the Grenadines between 2017 and 2020. While fishers report conch availability in fishing grounds, this increase in fishing activity means the risk of localised stock depletion is real. Increased pressure on the fisheries resource due to the opening of fisheries centres should be closely monitored with stock assessments to ensure fisheries pressure is not unsustainable.
- **Interest in additional environmental measures to enhance sustainability.** Positively, fishers, private sector operators and fisheries divisions all report interest in the implementation of stock assessments and to establish closed seasons and scientific based catch limits to preserve the fishery.
- **COVID-19 effects on fishing activity.** The COVID-19 pandemic has reduced pressure on the fishery through the enactment of lockdowns preventing fishers from going to sea, as well as declines in demand due to slowdowns in tourism and entertainment activities. This reduction in activity may have a positive effect on stock, but the scale of this effect is yet to be determined.

Environmental opportunities

- **Establishment of a conch nursery for conch aquaculture.** Due to its central location amongst project countries and large amounts of suitable habitats, the cost effectiveness of establishing a conch nursery in Saint Vincent and the Grenadines should be further investigated. Sufficient demonstrated science of conch aquaculture exists in the region. Collaboration with research institutions should be further explored.

Environmental challenges

- **Habitat degradation.** Human-driven pollution from land-based sources is a significant threat to the ecology of OECS habitats and the livelihoods of conch fishers. Coastal development, water pollution, release of untreated sewage and siltation of coastal waterways due to run off, combined with increasing intensity and frequency of extreme events all place pressure on conch ecology. These factors also pose a threat to the

livelihoods of queen conch fishers who depend on the availability of the resource.

- **Enforcement of legislation.** The deshelling of conch at sea limits monitoring and enforcement of existing legislation.
 - **Stock assessments.** Stock assessments for conch in OECS waters require significant resources and technical capacity that is currently lacking, this presents a challenge to effective biological management of the fishery and meeting important technical requirements to access export markets.
 - **Meeting CITES requirements.** Conducting a stock assessment to produce a non-detriment finding report is critical to the environmental and economic survival of the fishery in Grenada. Meeting the Legal Acquisition Findings⁴ (LAF) and Non-Detriment Findings⁵ (NDF) requirements under CITES is necessary to be able to legally trade internationally, including between neighbouring countries in the region. Meeting these requirements pose a challenge to countries due to lack of resources to conduct necessary scientific research and issues of internal coordination.
-

1. INTRODUCTION

In 2020, UNCTAD, the Organisation of Caribbean States (OECS) and Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) joined forces to design a pilot project to test the application of the revised UNCTAD BioTrade Principles and Criteria⁶ to the marine environment. The value chain selected for this pilot project was queen conch (or *Strombus gigas*, an Appendix II CITES-listed species)⁷ in the first phase, and sea moss and sargassum in the second one.⁸ This led to the design and launch of the OECS and European Union-funded project, “Seizing the trade and business potential of Blue BioTrade products for promoting sustainable livelihoods and conservation of marine biodiversity in selected Organisation of Eastern Caribbean States (OECS) Countries”.

Blue BioTrade aims to promote trade and investment in marine biological resources in line with social, economic and environmental sustainability criteria, known as the BioTrade Principles and Criteria⁹ (2007 and revised in 2020). Integrating BioTrade principles and criteria into the marine environment can promote the sustainable use of scarce and vital oceanic living resources (at the genetic, species and ecosystem levels) and can lessen the negative impacts of human and economic activity over marine ecosystems. Blue BioTrade is a spinoff of the UNCTAD’s Oceans Economy and Fisheries Programme and the BioTrade Initiative.

Queen conch (*Strombus gigas*), is a highly appreciated seafood delicacy with important non-food uses, including therapeutical products and handicrafts. While global demand is booming, small-scale coastal producers in the Eastern Caribbean do not fully seize the opportunities offered by sustainable conch markets. In many locations, early uncontrolled harvesting has resulted in overfishing, illegal landings and a rapid deterioration of endowments. Supply-side issues include the absence of traceability systems, limited landing and trade evidence, limited understanding

and use of CITES processes and permits, lack of common handling practices and sanitary standards and a low level of associativity of fishers. From a trade perspective, limited access to markets, international buyers and the absence of certification schemes for producers are major challenges ahead.

1.1. Objectives

The objective of this document is to complete a stakeholder mapping following the updated BioTrade Principles and Criteria, Blue BioTrade approach and value chain methodology. It is intended to provide an overview of the queen conch value chain in the countries of Grenada, Saint Lucia, and Saint Vincent and the Grenadines.

1.2. Methodology

This project is guided by the Guidelines for a Methodology to Support Value Chains for BioTrade Products.¹⁰ A key aspect of this approach is the mapping of stakeholders in the value chain. This document outlines the results of the mapping of stakeholders in the queen conch value chain in the countries of Grenada, Saint Lucia, and Saint Vincent and the Grenadines.

For this document, researchers conducted a desk review of available information on conch fisheries in the targeted project countries to develop a draft value chain map outlining the main actor types and flows of conch products from harvest to eventual consumer consumption. This desk review was supplemented with interviews with key national stakeholders in each project country.

Preliminary draft stakeholder maps were also presented at the “Regional stakeholder webinar on Blue BioTrade and BioTrade Principles and Criteria including CITES requirements”¹¹ for comments from stakeholders and their validation. Invaluable insights were provided by key actors from the fisheries divisions of participating project countries through their presentations at this webinar.

2. OVERVIEW OF CONCH TRADE GLOBALLY

Queen conch is a large marine mollusc found throughout the Caribbean Sea, Gulf of Mexico and some parts of the Atlantic Ocean (see Figure 1). Queen conch are found routinely from shallow waters to 30m in depth and are seen in depths of up to 80m in certain parts of the region if habitats are favourable. Queen conch can grow shells up to 30cm in length and can live up to 30 years (Davis & Cassar, 2020). Its bright pink shell, slow moving nature, tendency to occupy shallow waters and large amount of 'boneless' meat, makes the species a relatively easy and attractive target by fishers across the Caribbean (Catarci, 2004). In the 1970-1980s, expansion of tourism in the Caribbean region and southern United States increased the demand for queen conch products beyond normal domestic demand, and for export to service tourism centres and diasporic markets in the United States (Tan, 2018). Since then, global commercial catch has increased in response to global market demand (Paris, Perez, Kool, & Aranda, 2006).

Table 1. Conch meat grades seen in the Caribbean conch industry

| Processing grade | Description |
|--|---|
| Live weight | Complete animal, including the shell |
| Without processing ("dirty") | Complete animal extracted from the shell, meat with skin, viscera, sexual organs, digestive organs and operculum/nail |
| 50% clean | Operculum and the visceral bag are removed |
| 75% clean (also known as "market clean") | White meat, with some pink, orange meat only |
| 85% "clean" | White meat, with some pink, orange meat only, skin on |
| 100% "clean" | Fillet of white meat only |

Source: Hutchinson and Girvan (2021).

Global trade in queen conch is primarily of frozen or chilled processed conch meat. However, domestic and regional sales occur along a wide spectrum of meat grades, frozen, fresh, and chilled. Table 1 provides a summary description of main processing grades seen in the Caribbean market.

Figure 1. Queen conch range in the Caribbean Sea



Note: Queen conch distribution across the Caribbean Sea (orange zones).

Source: (Prada, et al., 2009).

Globally, the trade in queen conch meat is currently dominated by Nicaragua¹² (with 26.2 per cent of global market share), the Bahamas (20 per cent), Jamaica (18.8 per cent) Belize (15.2 per cent) and Honduras (8.8 per cent). Production and export levels across conch producing countries shows variation year on year, thus the industry is quite dynamic, Nicaragua has emerged as a major conch exporter primarily in the past decade, and Caribbean Regional Fisheries Mechanism (CRFM) producers of the Bahamas, Jamaica and Belize rotating the second place export position since then, as their export volumes are similar.

While the trade is dominated by the sale of conch meat, the conch is notable for its yield of multiple additional products such as, conch shell, pearls, operculum (claw/foot), and mother of pearl. These products have multiple end uses in medicine/pharmaceuticals, jewellery, handicraft, cosmetics, and perfumes. Table 2 summarises the main products derived from the queen conch at a range of prices paid for these products globally.

While queen conch may be one of the most recognisable of the sea snails and molluscs, it is not the only traded mollusc species globally. The global market for molluscs is estimated to be worth \$177,367,209 (United Nations Comtrade Database, 2021). Within the mollusc market, queen conch is notable for its large size, slow growth and high meat quality when compared to other types of conchs. Queen conch is further notable as a marine conch, as many other species are harvested in brackish waters, wetlands and rivers that have high levels of marine pollutants. Due to this, Caribbean queen conch products are notable in the global conch/mollusc market as they generally command a higher price when compared to other conch species caught in other locations.

Some stakeholders interviewed in the context of this project expressed that there is additional variety of meat quality within the queen conch species, with some claiming that eastern Caribbean conch which occupy deeper waters (Saint Lucia) is of a higher quality. Additionally, some interviewed indicate consumer preference for mature conch due to its higher quality.

Currently, the primary end market for conch is the United States, which is the destination for 70 per cent of recorded internationally traded conch meat. France

Table 2. Products derived from the queen conch and average retail prices

| Product | Formats sold | Retail price range | Notes |
|------------------|--|---|--|
| Conch meat | 100% "clean" (white meat only) Frozen and Chilled. | \$11-30 per lb | Large range in price reflects high prices paid for conch in export markets. |
| | 85% "clean" (white meat with some orange/pink meat) | \$6-20 per lb | |
| | "Dirty" conch meat (whole animal extracted from shell) | \$3-9 | |
| Operculum 'Beak' | Whole cleaned wholesale | \$35 per kg | Caribbean conch operculum commands a higher price when compared to other sources |
| Shells | Whole polished wholesale | \$ 1-12 per shell | The vast majority of conch shells harvested are discarded. |
| | Whole polished retail | \$30-45 | |
| Pearls | Individual | \$2,000-\$7,000 per carat (Over 2 carats is large ¹³) | Quite rare. Found in every 10-15,000 shells. ¹⁴ One in 100,000 considered gem worthy. ¹⁵ |

Source: Author's own compilation.

Note: Shell Price: Alibaba.com; Beak Price: Alibaba.com accessed on 29 April 2021.

is the second largest destination market, largely in relation to its territories of Martinique and Guadeloupe (CITES Trade Database, 2021).

3. REGIONAL PERSPECTIVE ON CONCH TRADE

Queen conch has been valued for its meat (for subsistence) and shell (for decoration) since it was first harvested (Island Arawaks and Island Caribs) in pre-colonial times (Price, 1966). While some commercial harvest has existed since the mid-18th century in the Northern Caribbean, commercial harvest has significantly increased in the past 50 years. This has been driven by growing populations, increased tourism activity, and growing global demand by the diaspora and other external markets (Theile, 2001).

Regionally, queen conch is one of the most important economic fisheries second only to lobster in export value. Within the Caribbean Regional Fisheries Mechanism (CRFM) region, Jamaica followed by Belize and the Bahamas are the largest producers of queen conch. The large production values of these countries are reflective of their active participation in global markets, in particular the export markets to the United States. It is notable that when the production volumes of the three beneficiary countries of this project: Grenada, Saint Lucia, and Saint Vincent and the Grenadines, are combined they total 350 tonnes or 15 per cent of total production making it the 4th most important CRFM producer by volume (CRFM, 2020) (Table 3). This comparison is apt as the beneficiary countries are geographically clustered, part of the same economic union and have strong economic and cultural connections.

The fishery in the Caribbean is largely artisanal, particularly in the eastern Caribbean, where fishing is conducted by small canoes/dories or pirogues from 7-10 meters in length with outboard engines operating with a crew of 2-4 people, with up to 3 divers and with no cold storage. Typical trip length is daily with fishers leaving in the early morning (4am) and returning

Table 3. Production of queen conch in CRFM economies in 2017 (tonnes)

| Economy | Tonnes |
|----------------------------------|--------|
| Antigua and Barbuda | 233.83 |
| Bahamas | 438.53 |
| Belize | 444.25 |
| Grenada | 23.74 |
| Haiti | 200.00 |
| Jamaica | 500.00 |
| Saint Kitts and Nevis | 59.00 |
| Saint Lucia | 98.58 |
| Saint Vincent and the Grenadines | 227.68 |
| Anguilla | 80.00 |
| Turks and Caicos Islands | 96.80 |

Source: CRFM (2020).

4-8 hours later. Smaller operators typically operate in near shore regions. In some cases, artisanal harvest is conducted in more distant fishing grounds, with the support of larger ships with known as 'mother boats' (10-15m long), which work with support ships and with a crew of up to 10 divers.

In countries with more mature conch industries (such as the Bahamas and Jamaica) and with the presence of offshore banks distant from shore (40-160 NM) industrial fishing occurs, where larger mother ships (35M in length) operating with up to four divers can spend several weeks at sea. In these cases, mother ships have freezers onboard and conch meat is cleaned on board and frozen, with the shell discarded. These industrial operations are not typically seen in the western Caribbean but primarily in the northern Caribbean, and Central America (Theile, 2001). More detail on the harvest methods of beneficiary countries is found later in the next section.

Figure 2. Map of beneficiary countries



Source: Peter Hermes Furian – stock.adobe.com.

4. SAINT LUCIA STAKEHOLDER MAPPING

Saint Lucia is the furthest north and largest of the project countries with a population of 182,000 people (United Nations, 2019). Like most Caribbean islands where queen conch is present, this mollusc has been consumed and fished in this country since the time of the Amerindians (Price, 1966). In modern times, queen conch is known by its French name '*lambie*' and continues to be a major part of the island's culture and cuisine due to Saint Lucia's strong historic French influence and close cultural relations with neighbouring islands. Conch is harvested throughout the year and across the island, primarily to meet domestic demand by consumers, local restaurants and hotels and illegal export demand driven by the French Caribbean. In the past 30 years, Saint Lucia has seen increasing landings of queen conch largely as a response to higher demand by food vendors and restaurants due to a growing tourism industry and increased export demand due to declining queen conch stocks in neighbouring Martinique (King-Joseph, Lendor-Gabriel, Serieux, & Omer, 2008).

Saint Lucia has approximately 40 fishers participating in conch fishing. Over the past decade (from 2010-2020), the fishery harvests an average of 74 metric tonnes of 'dirty' conch meat annually. This represents a 73 per cent increase in average landings from the previous decade where, an average of 41 metric tonnes was harvested (2000-2010) and a 121 per cent increase from the landings in the period 1993-1999 which was 32 metric tonnes. Over the past decade, the value of conch landed has averaged EC\$2.4 million peaking at EC\$3.2 million (\$1.18 million) in 2017 with a low of EC\$913,601 (\$ 0.33 million) in 2020, largely due to bans of fishing during the pandemic.¹⁶

Historically, queen conch was thought to be distributed across the coastal areas of the island of Saint Lucia and caught around the island in these coastal waters using traditional methods (open canoes and freediving) for subsistence purposes. While subsistence catch across coastal areas still occurs, commercial harvest of conch where they agglomerate is now much more typical.

Currently, two primary biological populations of conch have been identified in the North and South of the Island as seen in Figure 2. Harvest of conch in modern times is concentrated on exploiting these stocks with

some additional landings of conch seen in the east of the island.

4.1. Harvest phases¹⁷

4.1.1. Harvest method

The majority of conch is harvested offshore by a two- or three-person crew. The crew typically uses traditionally made boats with offboard motors called 'pirogues'. Fishing gear needed for conch harvesting include a fibreglass pirogue boat, outboard motor, fuel scuba gear and water. Fuel costs for a trip can vary from EC\$214¹⁸ up to EC\$650 for longer trips and is the highest input costs by fishers. Boats are built in Saint Lucia but also purchased from other islands in the Grenadines with more developed boatbuilding industries. The members of the crew typically share roles with the primary roles being the boat captain who directs and operates the boat, the diver who dives using scuba gear and collects conch underwater using bags or baskets, and a third person in a supporting role collecting conch that has been floated or deshellings the conch. Conch that is harvested underwater is either lifted using a crane or floated using special float bags. In some cases, the three-person crew will use two divers instead of one. In most cases, fishers report rotating the dive duty to mitigate the physical strains and medical risks associated with scuba diving.

Once the conch has been floated, it is typically deshellled at sea on the boat by crew members prior to return to port. This is largely due to costs, conch shells can weigh up to three pounds and have a volume that is an order of magnitude more significant than the conch meat. This significantly increases the space requirement and transportation costs associated with returning conch to shore for deshellling. Meat is removed by cutting a small hole in the shell and severing the spinal column to allow the conch to slip out. Once the entire body of the conch has been removed from the shell, this is considered 'dirty' conch meat and requires additional processing prior to consumption. This whole conch meat is then placed in storage boxes on the boat.

While freediving was used historically to catch queen conch in nearshore areas, scuba is now used for all commercially onshore harvest of conch, due to the depths required but also because collecting commercial quantities of conch requires significant time underwater. Divers in Saint Lucia report going to

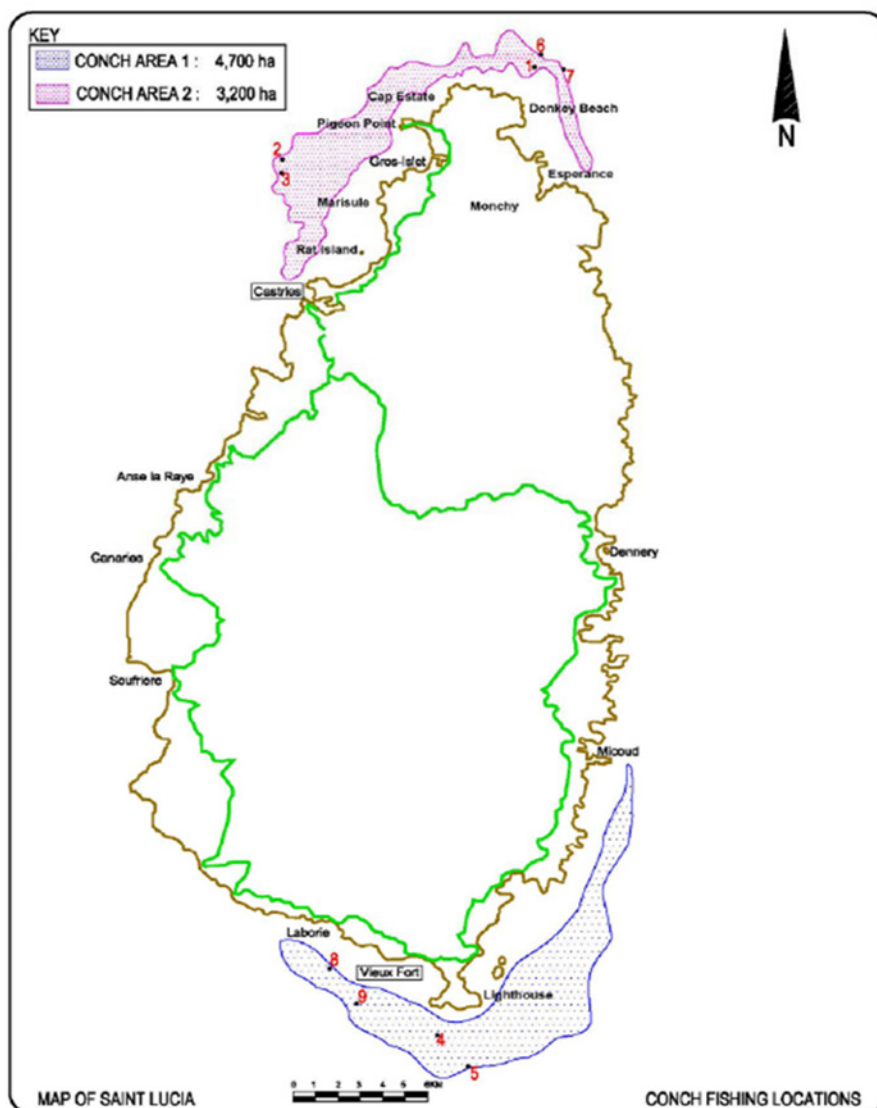
depths of between 100 and 120 feet. Unfortunately, most fishers are not formally scuba certified for the depths at which they operate, due to the costs associated with certification. Additionally, fishers indicate that adhering to safe practices such as taking diving breaks etc., significantly reduce 'bottom time' making fishing more resource intensive.

Unsafe diving practices have resulted in costly health impacts for some fishers, with reports of the bends having negative impacts on diver health, with three former fishers being paralysed from the waist down, some divers suffering permanent deafness, blindness or becoming bedridden. Up until recently, Saint Lucia did not have its own hyperbaric chamber and divers

suffering the bends had to be airlifted to neighbouring islands (Barbados, Martinique) for treatment. The costs associated with treating the impacts of the bends are significant, and the lifetime cost of care of injured divers is also very expensive. Impact investments in health and safety of the fishery should be researched along with dive insurance mechanisms as methods of reducing the total cost associated with the healthcare of divers participating in the fishery.

Income from conch harvest is divided amongst boat actors depending on their role in harvesting and ownership of input capital based on a 'shares' system, with the owner of the boat and the diver receiving the largest proportion of income from sales. Some crew

Figure 3. Location of queen conch stock in Saint Lucia



Source: King-Joseph et al. (2008).

members can act in multiple roles, with boat owners also performing diving duties. Typically, diving duties are rotated to reduce frequency and associated risks. Table 4 summarises the division of income amongst actors in Saint Lucia based on interviews with stakeholders.

Table 4. Division of income from conch landings in Saint Lucia

| Actor | Shares | % Income from sales |
|----------------------|--------|---------------------|
| Boat (boat + engine) | 2 | 33.33 |
| Captain | 1 | 16.67 |
| Diver | 2 | 33.33 |
| Crew (Matleo) | 1 | 16.67 |
| Total | 6 | 100.00 |

Source: Stakeholder interviews, 4 May–1 June 2021.

The northern population of queen conch located in the administrative quarter of Gros Islet is the more important stock in terms of annual landings and value. Additionally, its popular Friday night street party makes it a centre of domestic sale of value-added conch by restaurants and vendors. Furthermore, its proximity to Martinique makes it an important trading centre of the export and re-export of conch to the French Caribbean. There are conflicting reports on the precise location of this stock, with older studies saying it is located towards the Northeast Atlantic side of the island, while other more recent accounts indicate its location as between Castries and Esperance Harbour with an approximate area of 4,700 ha (Figure 3) (King-Joseph, Lendor-Gabriel, Serieux, & Omer, 2008).

The landing site of Gros Islet in the north represents one of the most important fishing communities for the conch fishery by landing volume and value, varying between 78 per cent of the total value and volume of all conch landings in Saint Lucia caught between 2015–2020 (Saint Lucia Fisheries Division 2021). Approximately, six boats at this port focus on conch fishing with approximately 25 active fishers. Fishers from this landing site focus their efforts on the Atlantic side of the fishing ground.

The southern population of queen conch located from Laborie to Micoud is less exploited than the northern population and is served primarily by the landing sites of Laborie and Vieux Fort which accounted for 16 per cent and one per cent of the total value of all conch

landings between 2015 and 2020 accordingly (Saint Lucia Fisheries Division 2021).

Along Saint Lucia's East Coast the landing site of Dennery has also recorded consistent catches of queen conch although in quite limited quantities representing three per cent of total harvest between 2015 and 2020 by value. This site is interesting as it one of the only remaining sites where conch are caught using gill nets. Historical reports indicate small harvests of 10-15 conch per net (King-Joseph, Lendor-Gabriel, Serieux, & Omer, 2008).

Table 5. Average annual landings of queen conch in Saint Lucia (2015–2020)

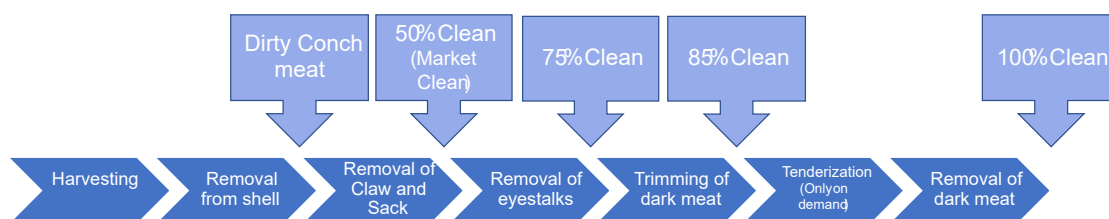
| | Site | Average value conch landings 2015–2020 (ex-vessel value, EC\$) | Average value conch landings 2015–2020 (ex-vessel value \$) |
|-------|--------------|--|---|
| North | Gros Islet | EC\$1,932,358 | \$715,687.96 |
| | Castries | EC\$21 | \$7.72 |
| West | Dennery | EC\$65,072 | \$24,100.62 |
| | Micoud | EC\$4,667 | \$1,728.64 |
| South | Laborie | EC\$397,091 | \$147,070.74 |
| | Vieux Fort | EC\$31,866 | \$11,802.16 |
| | Savannes Bay | EC\$262 | \$97.04 |
| Other | Choiseul | EC\$0 | \$0.00 |
| | Soufriere | EC\$0 | \$0.00 |
| | Anse La Raye | EC\$10 | \$3.52 |
| | Other sites | EC\$54,296 | \$20,109.76 |
| Total | | EC\$2,485,598 | \$920,591.98 |

Source: Saint Lucia Fisheries Division (2021).

Note: \$1 = EC\$2.7 as at June 10 2021 (xe.com).

4.2. Post-harvest phase

Once the harvested conch is landed at the port, the post-harvest phase of the value chain begins in several ways. The level of processing that occurs upon landing depends on the final buyer (see Figure 4). For sale to consumers and small-medium wholesalers (less than five employees), conch is processed at least to the 50 per cent level at the landing site. A combination of local processors (called 'cleaners' or 'boat boys'), and crew of the boats remove the operculum (called

Figure 4. Steps in conch processing and conch meat grades

Source: Author's own elaboration.

'hook' locally) and the visceral bag. For small and medium wholesalers, the "pounding" or tenderization of conch meat prior to sale is not typical but is done for certain buyers on request and at extra cost. Small-medium operators are typical in southern and eastern landing sites. Most processing done at this scale is done by men.

If being sold to larger wholesalers (over five employees), conch is sold directly from the boat as 'dirty' meat, through direct purchase agreements. This 'dirty' meat is cleaned by a team of processors to the 75-85 per cent level, typically leaving some of the remaining pink and orange meat. These wholesalers also typically will pound (tenderise) the conch as a part of processing. This meat is then sold on to restaurants, hotel restaurants and consumers typically in two to five pound plastic bags.

Small-medium and large wholesalers will also sell processed conch onto supermarkets and retailers such as Massy Stores¹⁹ (a supermarket chain) who then vacuum pack the conch for retail sale. This is one of the most complex sectors of the value chain, as actors will frequently shift roles from direct retail to consumers, to wholesaler/aggregator depending on product availability and demand.

The coronavirus disease of 2019 (COVID-19) pandemic has accelerated the use of online tools such as Facebook Marketplace²⁰ to market and sell conch by medium sized processors.²¹

Small amounts of conch are sold by fish vendors directly to consumers at any number of the landing sites/ fish markets in Saint Lucia. Anse La Raye, Canaries, Soufriere, Choisel, Laborie and Vieux Fort all have local fish markets where vendors operate. This is not considered to be a major channel of food in the value chain, as most sale arrangements for conch are made directly to wholesalers.

As noted above, much of the conch consumed

domestically is sold as a value-added product by local restaurants and at local fish fries. These restaurants represent one of the largest buyers of conch in the value chain and where female participation is most active. These restaurants typically operate with one to three employees and are found throughout the island.

Conch pearls are found in Saint Lucia, typically by fishers or cleaners of the conch as a by-catch product. Information on this is limited, however, prices of up to EC\$40,000²² have been reported.²³

4.2.1. Large retailers / processors

Lucian Blue Ocean Seafoods²⁴ is the largest retailer and processor of conch in Saint Lucia. Formally a publicly owned entity called the Saint Lucia Fish Marketing Corporation, it was privatised in 2017. Lucian Blue Ocean Seafoods has 35 employees operating out of Castries with an additional facility in Vieux Fort, which is currently not operational. This facility is not currently Hazard Analysis Critical Control Point (HACCP) certified. This operator focuses on purchasing high value seafood from regional and local fishes to satisfy the local retail market. Lucian Blue Ocean Seafoods mainly looks to the Grenadines to source conch, purchasing approximately 2,500 lbs directly from Bequia in the Grenadines every two to three months. It also sources some conch domestically, reporting purchasing up to 1,000 lbs annually from Saint Lucian fishers. Due to their capacity to process, they purchase conch hook-on directly from aggregators in Saint Lucia. Generally, large retailers reported the belief that domestic sources could not provide the product volume and availability of conch for their needs; additionally, these operators reported that fishers can get better prices in Martinique. Notably, most processors of conch in this operation are male.

Other retailers of conch are Superior Fish and Seafood Suppliers Inc.²⁵ and Francis Fish and Seafoods Ltd.²⁶ Both of these supplier's report purchasing the majority of their conch from Saint Vincent and the Grenadines

and supplementing this with purchases from local suppliers. Both suppliers provide retail conch at prices of EC\$20 per lb and EC\$17.50²⁷ per lb directly to consumers.

Large retailers noted the seasonality in local demand, noting that retail demand for fish is highest during the lent months and drops in the following months. They also indicated that the domestic retail market for packaged conch was satisfied, partially due to sufficient supply but largely due to the high demand by local consumers for alternative protein sources, which compete for price and convenience.

4.2.2. Importance of Martinique to Saint Lucia's conch trade

At its closest point, the distance between southern Martinique and Saint Lucia is less than 80km. Beyond this proximity, cultural relations between Martinique and Saint Lucia are very strong, with familial ties across the islands, and extensive interlinkages between the economies particularly as it relates to seafood and ocean products. Martinique's invertebrate fisheries (sea urchins and conch) are considered overfished (Martín, 2007). Thus, it largely has to rely on imported supply and supply harvested outside of their waters to satisfy local demand and re-export demand in other Caribbean French speaking nations and markets in mainland Europe. Due to this, in the 1990s, up to 50 per cent of total queen conch landings in Saint Lucia were exported to Martinique (King-Joseph, Lendor-Gabriel, Serieux, & Omer, 2008).

Martinique thus acts as a key importer of conch for consumption but also "re"-export to European Union markets (though not 're-export' *per se*, as Martinique is an overseas region of France and thus a part of the European Union) through its strong transportation links, well established adherence to European Union Sanitary and Phytosanitary measures (SPS). One interviewee noted that the well-equipped boats from Martinique can reach Saint Lucia fishing waters in as little as 25 minutes. Unfortunately, a strong price incentive exists for illegal and unregulated sales to Martinique, with wholesale values of €15²⁸ per kg for 'dirty' conch meat reported, which is 64 per cent more than received per lb locally, and in the form of strongly desired foreign currency.

Regularising this trade between Martinique and Saint Lucia is critical for securing the full value of conch harvested in the OECS waters.

4.3. Institutional actors and national regulations

The conch sector in Saint Lucia is managed by the Fisheries Department under the Ministry of Agriculture, Fisheries, Physical Planning, Natural Resources and Co-operatives. The Fisheries Department is staffed by approximately 20 people, with seven extension officers, a resource management unit, and a data collection unit.

Conch is managed by the specific Saint Lucia Fisheries Act Cap. 7.15 (revised edition of 31 December 2001),²⁹ which manages fisheries within the exclusive economic zone of Saint Lucia. This legislation outlines fisheries management and development, marine reserves and conservation methods, enforcement and general provisions. The legislation is based on the FAO-OECS model for fisheries legislation and as such has similar features with other project countries.

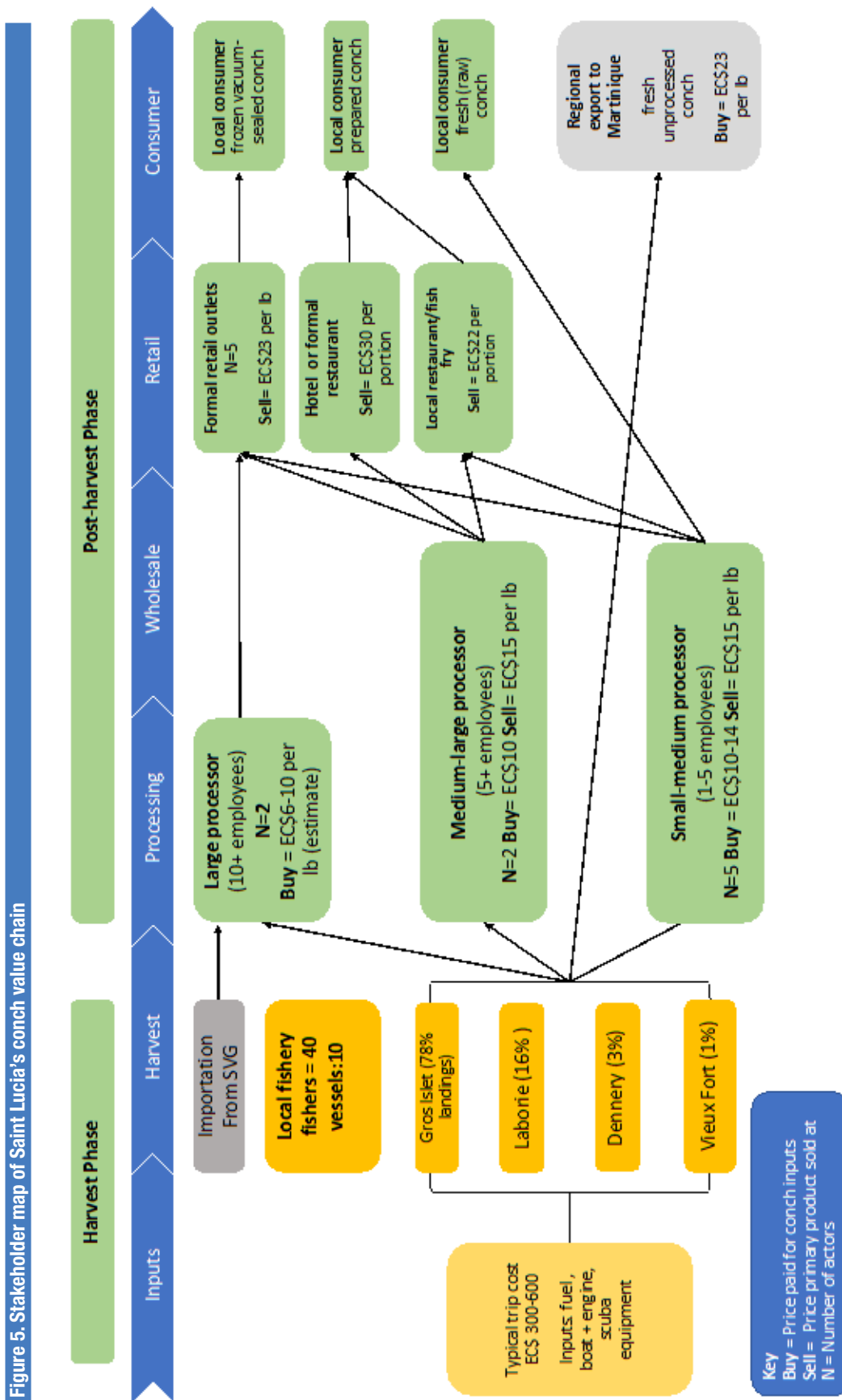
This legislation outlines the permission to use various gear types such as scuba gear which is used in the conch fishery. Currently, no-take zones for conch do not exist. Currently there are no national legislations outlining a closed season for the conch fishery. However, article 35 (2) of the Fisheries Regulations³⁰ limits and controls the sale of 'immature conch', which is defined in article as conch with "(i) total weight of less than one kilogramme, (ii) meat weight of less than 280 grammes after removal of the digestive gland, (iii) shell which is smaller than 18 centimetres in length, or (iv) a shell which does not have a flared lip."

Currently fishers are required to register with the Fisheries Department to operate scuba gear for commercial fishing. The Department of Fisheries is currently working to develop a strategic plan related to queen conch.

Other guiding policy related to fisheries include the government of Saint Lucia's Sectoral Adaptation Strategy and Action Plan for the Fisheries Sector (Fisheries SASAP 2018-2028),³¹ There is also a proposed Fisheries Policy 2020 that is currently in drafting stage.

4.4. Opportunities and challenges

1. Stakeholders in Saint Lucia expressed a strong desire for a comprehensive stock assessment of queen conch in Saint Lucian waters. Notably, Saint Lucian conch fishing grounds are typically deeper and with poorer visibility than traditional Caribbean



Source: Author's own elaboration. Note: \$1 = EC\$2.7 as at June 10 2021 (xe.com).

- conch fishing grounds and thus stock assessments are a more resource intensive activity.
2. Value addition of landed conch by informal producers is high in Saint Lucia, the creation of artisanal conch sausages presents a potential best practice for small scale producers enhancing value from conch by-products.
 3. Regularizing the trade with the French Caribbean presents a significant opportunity to increase income for not only Saint Lucia but the entire OECS. However, regulatory challenges exist, as currently no seafood facilities have HACCAP certification or meet the requirements for legal exportation to the European Union. While some interest in the United States market was expressed, competing in price with central American producers in Nicaragua and Guatemala was deemed a significant challenge to entering this market.³² Meeting the Legal Acquisition Findings³³ (LAF) and Non-Detriment Findings³⁴ (NDF) requirements under CITES is necessary to be able to legally trade internationally, including between neighbouring countries in the region.
 4. While fishers and fisheries officers report limited harvesting of juvenile conch, the deshelling of conch at sea limits the possibilities for monitoring and enforcement of existing legislation.
 5. Unsafe diving practices have resulted in costly health impacts for some fishers, with reports of the bends having negative impacts on diver health, including fishers being paralysed from the waist down, some divers suffering permanent deafness, blindness or becoming bedridden. Impact investments in health and safety of the fishery should be researched along with dive insurance mechanisms as methods of reducing the total cost associated with the healthcare of divers participating in the fishery.
 6. Depth and currents of Saint Lucian waters present a challenge to authorities in charge of stock assessments and resource management.

Figure 6. Lobster fishing and conch fishing both use scuba techniques



Note. Lobster fishers will routinely fish for conch during the lobster closed season. Here, lobster fishers are seen preparing scuba tanks before a day of fishing in Petite Martinique.
Photo credit: © Alexander Girvan (2019).

5. GRENADA STAKEHOLDER MAPPING

Grenada is a tri-island state with a population of 112,000 persons (United Nations, 2019), comprising of the main island of Grenada, with the smaller islands of Carriacou and Petite Martinique, which are parts of the Grenadine chain of islands. While Carriacou and Petite Martinique comprise less than 10 per cent of the total land area of the country, they are important hubs of marine capture fishery production and an important connection between the economies of Grenada, and Saint Vincent and the Grenadines.

Of the countries considered in this analysis, Grenada has the lowest current production of queen conch (also known locally as '*lambi*') by volume and value. Grenada is the only case study country which is currently subject to a suspension of international trade under CITES. Within the CRFM region, Grenada has the smallest active conch fishery with an average

Figure 7. Conch basket used to collect conch on seafloor and transport them to boat/surface in Petite Martinique



Photo credit: © Alexander Girvan (2019).

landing of 63,000 lbs between 2013 and 2017 and an estimated 90-105 fishers participating (CRFM, 2020) (Grenada Fisheries Division).

Grenada has a very active marine capture fisheries industry, dominated by fishing for pelagic species such as yellowfin tuna, blackfin tuna and Atlantic sailfish. While conch has some export importance, conch is not one of the top ten species landed by volume in Grenada. Longlining for pelagic species dominates this fishery.

Grenada is subject to a recommendation to suspend trade under CITES based on lack of annual report submissions. In order for the recommendation to suspend trade to be withdrawn, Grenada would need to submit annual reports dating back to at least 2013.

Furthermore, it has also been subject to a recommendation to suspend trade in queen conch under the CITES Review of Significant Trade,³⁵ which prohibits the export of conch to receiving countries. Currently, the Fisheries Division of Grenada is not the national focal point for the CITES Secretariat. This has resulted in gaps in communication between the CITES Secretariat and key authorities in the country. Despite this, Fisheries authorities have expressed strong commitment to working with CITES to resolve current trade limits.

Despite the CITES suspension on trade, there have been some reports from private sector stakeholders of export of queen conch to Trinidad and Tobago due to Grenada's proximity and regularity of transportation between the islands for food products.³⁶ Exports to the United States also occur and are typically seized due to the CITES suspension on trade (CITES Trade Database, 2021). Historically, exports were also made to the French Caribbean (Fisheries Division, Grenada, 2021).

5.1. Harvest phase

Historically conch fishing was traditionally done using hand paddled canoes and freediving methods across the islands of Grenada wherever seagrass or sandy bottoms exist within 100-300 m of shore (Fisheries Division, Grenada, 2021). In modern times, conch fishing in Grenada is concentrated in Carriacou, Petite Martinique and the southeast coast of Grenada in Woburn.

The approximately 35 vessels participating in the conch value chain in Grenada are on average six

Figure 8. Partially cleaned conch landed in Grenada



Source: Grenada Fisheries Division, 2021.

Figure 9. "Pounding" or tenderisation of conch the final stage of processing prior to sale



Source: Grenada Fisheries Division, 2021.

meters in length and are typically built in Grenada. Teams of up to three to four crew members will go offshore, departing at six a.m. and returning six to eight hours later. Crews will have one or two divers on board who will descend to depths of between 40 and 100 feet to search for conch. Divers will gather conch into sacks or wire baskets that can hold up to 25 adult conchs. Once baskets are filled, they are pulled up to boat and emptied. One crew member will then deshell the conch using hammering methods and deposit the whole conch into buckets for storage onboard.

Traditionally, conch was brought onshore whole in their shell, resulting in a few shell "piles" across the tri-island state. In a potential best practice case, discarded conch shells were used to build an artificial pen and fish corral in the Woburn area. This was done as a part of the Global Environment Facility's (GEF's) Small Grant Programme Project 'Restoration of the Woburn Historical Conch Site within the Woburn Clarks Court Bay Marine Protected Area'. Conch shells were used to reclaim land and provide a foundation for footpath/boardwalk³⁷ out to the water.

Commercial conch harvesting on mainland Grenada is focused on the southern part of the country, with most conch activity in the communities of Woburn and Caliste. Conch is also landed in limited quantities at the landing sites of Isle De Rhon, Sauteurs, Grenville Woburn Petite Bacaye and Fort Judy. All the main

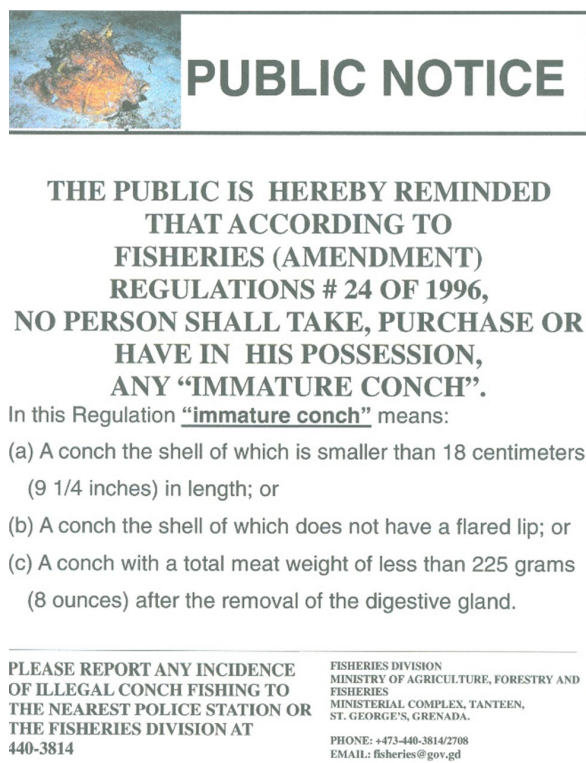
landing sites in Grenada are government owned (VanAnrooy, Josupeit, Williams, Johnson, & Pereira, 2018).³⁸

As the southernmost Island of the Grenadines, Carriacou and Petite Martinique have good access to fishing ground off the Grenadine bank. As such, these are two of the main landing sites for conch across Grenada.

5.2. Post-harvest phase

Once landed, 'dirty' conch meat destined for domestic consumption is typically processed on shore. By fishers and cleaning assistants (typically male), processing at this stage involves removal and discarding of the opercula, removal of the sack, and only partial removal of dark meat (Figure 8), finally conch is pounded³⁹ to tenderize the meat (Figure 9). The resulting conch for domestic consumption is bagged into 1-5 lb bags for consumers,⁴⁰ and larger for restaurants/hotels. This type of processing is typical across the landing sites of Grenada, at both formal and informal processing facilities. Processed conch is sold directly to the consumer and stored at places of residence of fishers. Domestically, conch is normally sold directly through informal networks, through word of mouth to both consumers and restaurants. Some fish vendors do supply conch directly to consumers, but this is not a typical channel in the Grenadian Value chain.

Figure 10. Public notice related to conch regulations distributed by Grenada Fisheries Division



Source: Grenada Fisheries Division, 2021.

Conch destined for export is typically purchased by directly by large processors and wholesalers such as Vineyard limited or Fresh Frozen Limited, or Spice Island Fish House.⁴¹

Vineyard Limited⁴² is one of the main export capable processors of conch from Grenada, they operate out of the Gouyave fish market complex. This company has a well-equipped processing and freezing facilities, focused on the processing of queen conch and spiny lobster. This facility is not currently HACCAP certified. They specialise in the cleaning of landed deshelled 'dirty' conch meat to 100 per cent clean meat, which is then frozen and bagged in regular plastic bags for export. Most of the cleaning and processing of the conch is done by women in this facility. Vineyard is notable for their production of value-added conch products such as seasoned tenderised conch and conch burgers. Spice Island Fish House also processes conch but in smaller quantities, this company has a HACCAP certified processing facility at Grand Mal Bay.

5.3. Institutional actors and national regulations

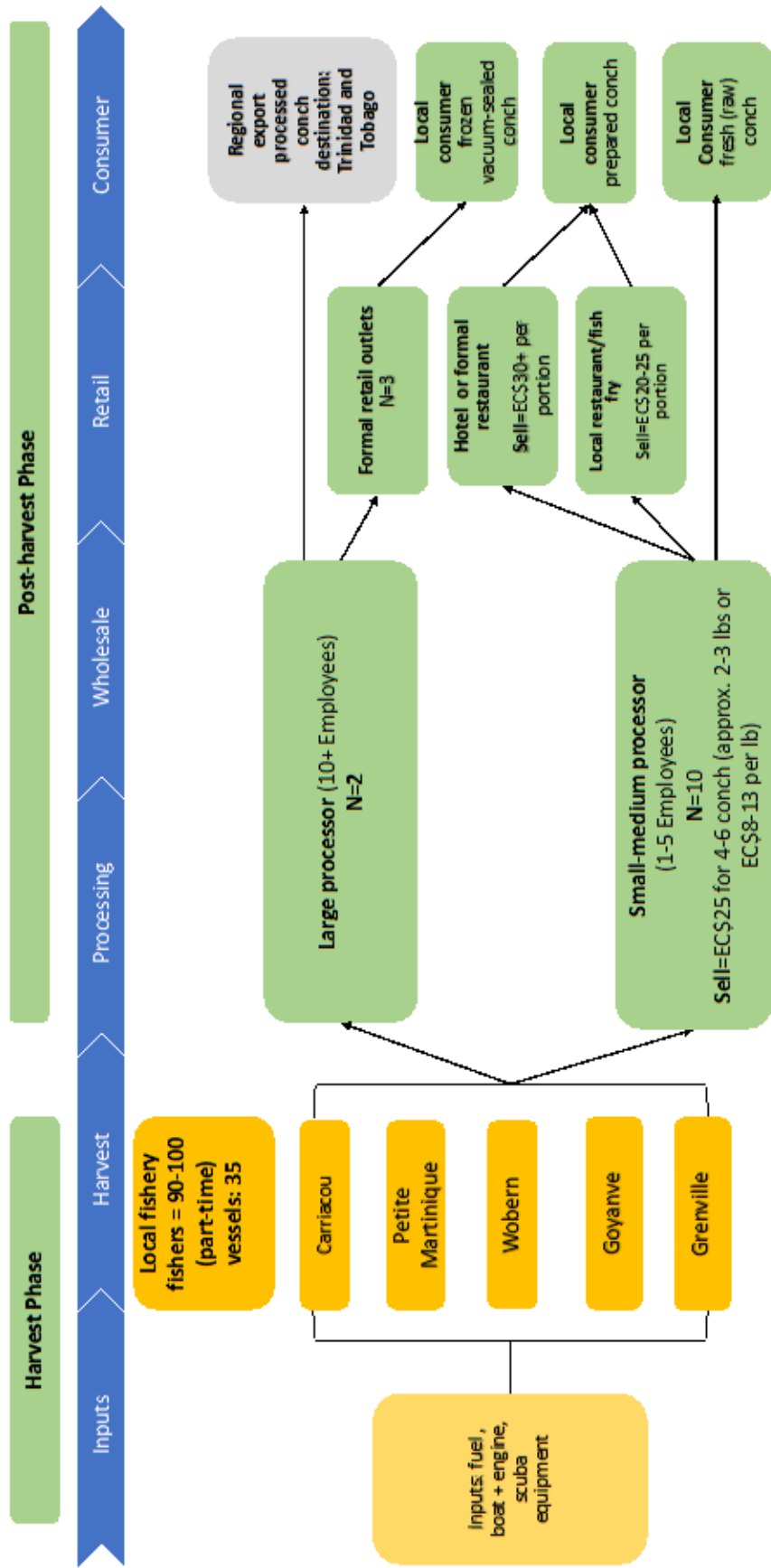
Fisheries in Grenada are managed by the Grenadian Fisheries Department,⁴³ a unit of the Ministry of Climate Resilience, the Environment, Forest Fisheries, Disaster Management & Information. The department is composed of approximately 34 staff members but has reported staff shortages in the areas of fisheries biology, extension methodology and data management.

The Grenada Fisheries Act of 1986⁴⁴ is the parent law that addresses the development and management of Fisheries and the regulations of fishery and fishing related activities in Grenada. This Act is also based on the FAO-OECS model for fisheries legislation.⁴⁵ This Act focuses on regulating the processing of fishing products and regulating the exportation of fishing products among others. The Act gives the Minister of Fisheries the authority to create new regulations to ensure the optimum utilization of the fisheries resources in the fishery waters of Grenada. This regulation also states that the Minister relevant to fisheries has the authority to enact a closed season of any fishery through publication of notice through local newspapers and the local gazette (Figure 10).

Specifically related to the queen conch (*Strombus gigas*), according to the Fisheries Amendment Regulations No. 24 of 1996⁴⁶ - "No person shall take, purchase or have in his possession any "immature conch". Immature conch is defined in article 18(4) as "... (i) a conch the shell of which is smaller than 18 centimetres or 9¼ inches in length; or (ii) a conch the shell of which does not have a flared lip; or (iii) a conch with a total meat weight of less than 255 grams (8 ounces) after the removal of the digestive gland..." Notices regarding these restrictions are distributed across the main landing conch landing sites in Grenada.

The National Focal point for CITES is Grenada's Forestry and National Parks Department, meaning there is not a direct communication between the CITES Secretariat and Grenada's Fisheries Division. This results in gaps in communication between the CITES Secretariat and key authorities in the country. Despite this, the Fisheries authorities have expressed strong commitment to working with national CITES focal points and the CITES Secretariat to resolve current trade limits. Conducting a stock assessment to produce a Non-Detriment Finding report is critical

Figure 11. Stakeholder map of the Grenadian queen conch value chain



Source: Author's own elaboration.

to the Environmental and Economic survival of the Fishery.

5.4. Opportunities and challenges

1. Strong export demand exists, presenting a strong economic opportunity to the fishery if Grenada is able to meet the Legal Acquisition Finding (LAF) and Non-Detriment Finding (NDF) requirements under CITES.⁴⁷
 2. Grenadian processors have demonstrated high capacity in conch processing, cleaning and value-added production creation, which can be shared with other processors.
 3. Land-based sources of pollution and development of costal habitats for conch are a significant challenge to the conch fishery across Grenada. Land-based runoff due to deforestation particularly in Petite Martinique and Carriacou present challenges to costal water conditions. Further
- costal development for tourism purposes and marine-based pollution from ship repair services also present a challenge to fishery ecology.
4. Conducting a stock assessment to produce a Non-Detriment Finding report is critical to the environmental and economic survival of the fishery. Meeting the Legal Acquisition Findings⁴⁸ (LAF) and Non-Detriment Findings⁴⁹ (NDF) requirements under CITES is necessary to be able to legally trade internationally, including between neighbouring countries in the region.
 5. The Fisheries Division of Grenada is not currently a CITES focal point; further internal coordination is needed to enable export access.
 6. Grenada is currently doing a comprehensive review of fish market infrastructure. Coupling these efforts with this project to ensure infrastructure upgrades are reflective of market access needs could prepare Grenada for eventual conch export.
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6. SAINT VINCENT AND THE GRENADINES STAKEHOLDER MAPPING

6.1. Overview

Saint Vincent and the Grenadines is multi-island state comprised of the mainland (Saint Vincent) and seven inhabited Islands of the Grenadines, Bequia, Mustique, Union Island, Canouan, Petit Saint Vincent, Mayreau (see Figure 12). Saint Vincent and the Grenadines has a population of 110,000 persons (United Nations, 2019). Of the countries in this study, Saint Vincent and the Grenadines is the largest producer and exporter of queen conch, and the 4th largest producer in the CRFM region in 2017 (CRFM, 2020). The queen conch fishery is currently one of the most important fisheries in Saint Vincent and the Grenadines accounting for 62.7 per cent of total fisheries exports in 2020 bringing in over EC\$8,988,932⁵⁰ (\$326,285.05) and with approximately 130 active fishers (Saint Vincent and Grenadines Fisheries Division).

Conch landings and export have increased significantly in the past four years in Saint Vincent and the Grenadines increasing 206 per cent from 470,000 lbs in 2017 to 971,849 lbs in 2020 (Saint Vincent and Grenadines Fisheries Division) (Hutchinson & Girvan, 2021). Exports proportions have also increased, with an average of 54 per cent of conch landed exported prior to 2017 and an average of 82 per cent being exported post-2017. Increases in export volumes can be attributed to a number of factors, including: 1) the upgrading and privatization of fisheries centres across the Grenadines through the signing of lease agreements between the government and private operators and fisherfolk cooperatives; 2) the completion of the Argyle international airport in 2017 giving direct connections to export markets such as the United States and Trinidad and Tobago; and 3) the expansion of tourism industry in Saint Vincent and tourism-related demand.

Upgrading of fisheries facilities was conducted through a \$4.6 million grant through the project for improvement of fishery equipment and machinery in Saint Vincent and the Grenadines funded by the Japan International Cooperation Agency signed in September 2014 (Embassy of Japan in Trinidad and Tobago, 2014).⁵¹ Upgrading included provision of refrigeration equipment, ice machines, reirrigated

Figure 12. Map of Saint Vincent and the Grenadines



Source: lesniewski – stock.adobe.com.

trucks and improvements of water storage.⁵² Notably, the fishery has produced an additional⁵³ \$8.3 million in production value when compared to pre- 2017 base line levels, well recouping the grant investment.

Conch is landed primarily at four fisheries centres: The Union Island Fisheries Centre operated by Union Island Seafoods; the Bequia fisheries Centre by the Bequia Seafood Company; on the Mainland at the Owia Fisheries Centre operated by the Ocean Marine Company; and at Canouan at the Friendship Bay Fishing Facility.

From December 2020 and peaking in April of 2021, volcanic activity and explosive eruptions from La Soufriere volcano resulted in the temporary

displacement of about 15 per cent of the population of the mainland of Saint Vincent. The environmental effects of the seismic activity and deposit of ash in the oceans surrounding Saint Vincent and the Grenadines are yet to be seen.

Operations of the main fisheries centre of the Saint Vincent Mainland in Owia were disrupted by this volcanic activity, and air transport to and from Saint Vincent were temporarily paused. The long-term economic effects of this disruption are yet to be seen.

6.2. Harvest

Conch harvesting in Saint Vincent and the Grenadines is spread across its islands, with approximately 120 fishers participating across the Islands of Union, Beqaa, Mustique, Canouan, and at Owia Port on Saint Vincent mainland. The queen conch stock is located along the Grenadine bank which is a shallow platform extending from Bequia to Grenada along the Atlantic side of the Grenadine islands with an approximate total area of 3000 km². In the past, an estimated 60-70 fishers participated in this fishery, however this has increased to approximately 130 fishers with younger fishers participating in response to the increased economic opportunities. Currently, approximately 35 vessels participate in the conch industry.

Saint Vincent and the Grenadines are notable for their local boat construction. In the conch fishery, boats from three to six meters (11-27ft) are used, powered with one or two outboard motors of 15-115 hp. As in other fisheries, the use of scuba gear is typical, however, due to the shallow waters of some of Saint Vincent and the Grenadines' fishing grounds, some freediving for conch occurs. Conch fishing is typically done by a three person crew with a diver using scuba gear gathering conch and placing them in a bag or metal basket attached to a rope, a 'floater' who monitors the diver in the water and manages the rope and assist in hoisting of the catch, and a captain or driver, who is in charge of boat navigation, supporting the hoisting of the catch and deshelling of conch on the boat into baskets or sacks. In Saint Vincent, harvested conch is also kept whole and alive in the shell and deshelled on land, deshelling, or discarding of shells on land is more typically in Saint Vincent than in other project countries, but due to the large agglomerations of shells near tourism sites, fishers are beginning to deshell conch at sea. Conch fishers generally prefer to fish conch more intensively during the closed season

for lobster during the months of May to August.

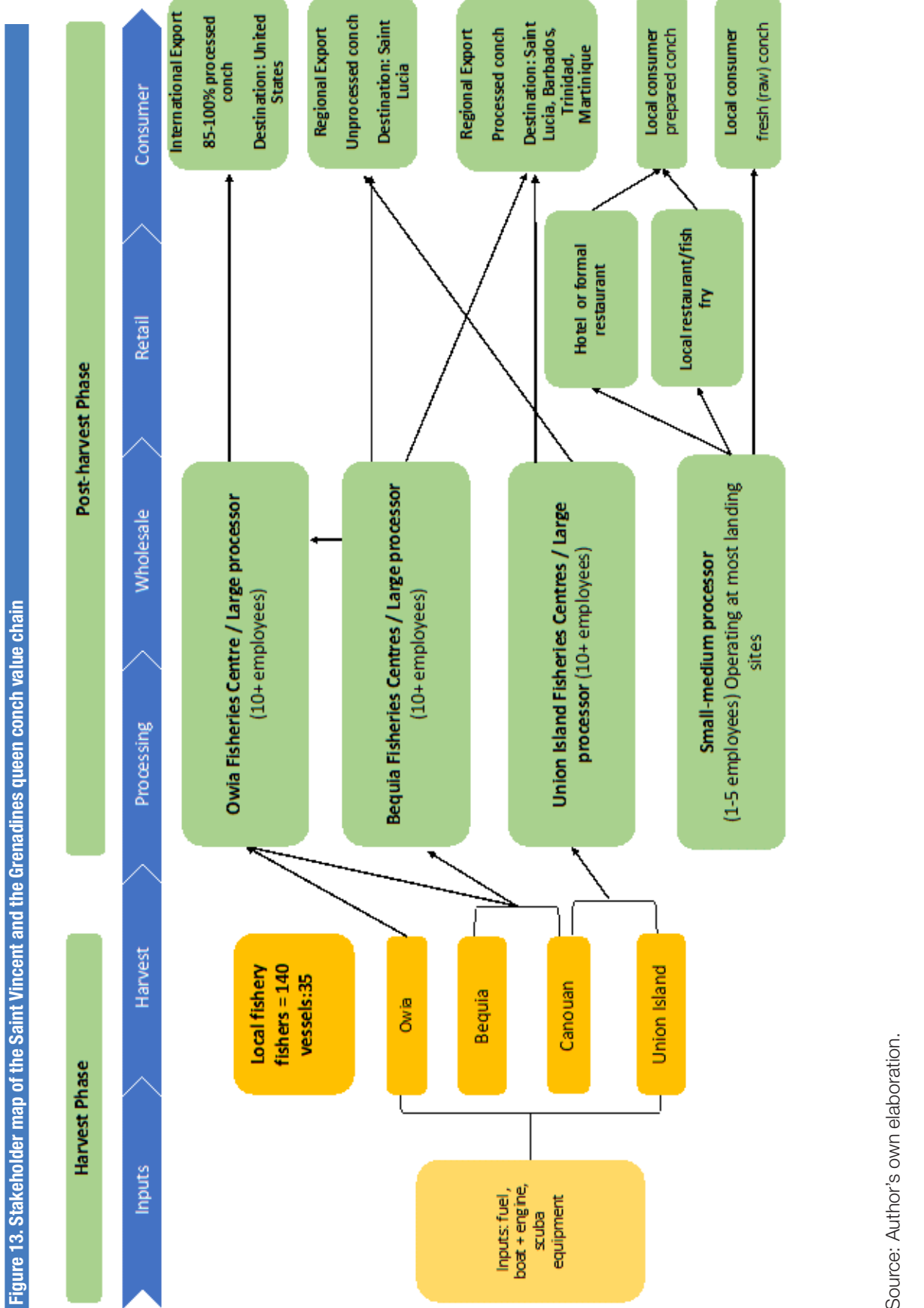
While the Grenadine bank provides relatively shallow fishing grounds, conch fishers report going deeper and deeper in response to economic demand. Accessing deeper waters represents an increase in fishing pressure that may initially result in increased landings but ultimately may result in declining stock levels. Further research is necessary to ensure increased pressure does not have long term effects on fishery sustainability.

Union, the southernmost of the Grenadine islands, is the important centre of conch fishing due to its proximity to nearby fishing grounds, and the presence of a fishing complex constructed in the 1990s by the Japanese cooperation. Union island is home to approximately 45-65 active conch fishers, who operate on a daily basis using crews of three and typically taking a four-hour trip. Fishers typically land whole conch which is brought to the fisheries centre in ice boxes for processing at the Union Island Fisheries Centre by Union Island Seafood. In more recent years and due to the accumulation of conch shells around landing sites at Union Island, deshelling of conch at sea sometimes occurs.

Every February, Union is also home to the Union Island Conch Festival,⁵⁴ a major tourism draw and one of the biggest annual events on Union, reflective of its economic and cultural importance on the island. Fishers on Island are called 'conchs men'.

Bequia is the second largest (seven square miles) and with a population of 5,000 the second most populated island in Saint Vincent and the Grenadines, and traditionally a centre of boat construction and fishing in the Grenadine region. The waters surrounding Bequia are much deeper than other Grenadine islands thus the approximately 40 fishers from Bequia serve fishing grounds around other islands (Canouan and Mustique), and the recipient of conch from fishers based in these islands. Fishing from Bequia is notable as they can have crews of up to five people.

Canouan is not home to many conch fishers (approximately 10-15) but participates actively in the conch market. The shallow nature of the water makes it favourable for conch diving, and thus many fishers from Bequia travel to the waters surrounding Canouan to fish. Some landed conch is used locally to supply the tourism market, but most landed conch is sent directly to Bequia, for processing. In some cases, conch is sent to Union or Owia to be combined with



Source: Author's own elaboration.

landings there, depending on needs for large export orders.

Owia Fisheries Centre was constructed by the Japanese Government and completed in 2009 (TOA Cooperation, 2010). Located at the north-eastern tip of the Saint Vincent mainland. This facility features a modern jetty and break water, slipway, ice making machine, cold and chill storage facilities and a fuel station.⁵⁵ In 2018, this facility was leased to the Ocean Marine shipping Agency Limited. Some conch processed in this facility is primarily from the Grenadine Islands of Bequia, Canouan and Union Island. This fishery complex primarily serves the American export market, but its operations were disrupted in April and May of 2021 due to the eruption of the La Soufriere volcano.

6.3. Post-harvest phase

Once landed, conch is either sold directly to a fisheries centre or processed locally by an artisanal processor if destined for domestic consumption. As is typical across the other two value chains, if detained for domestic consumption, it is processed by artisanal processors at the landing site to the 50 per cent level bagged and sold directly to vendors who then sell to consumers or restaurants. The hotel restaurant market for conch meat has grown significantly with the expansion of the Saint Vincent and the Grenadines tourism industry in the past five years.

Conch landed and sold at the various fisheries centres are aggregated or processed depending on end markets. The majority of exported conch (47 per cent) is destined for the United States and are primarily aggregated at the Owia Fisheries Centre and the Bequia Fisheries Centre and are processed at these centres to 75 per cent or 100 per cent clean if destined for the United States by air.

For regional export markets, both the Bequia Fisheries Centre and the Union Island Fisheries Centre operated by Union Island Seafoods service the Saint Lucia market, supplying aggregated raw 'dirty' conch meat, or partially processed (50 per cent) conch meat, depending on final consumer demands. The Saint Lucia market is primarily served by marine transportation.

All fisheries centres serve other regional export markets such as Dominica, Trinidad and Tobago. Conch is also exported to the British Virgin Islands, Saint Maarten, Curacao and the United States Virgin

Islands depending on product availability. Since the 2000s, Saint Vincent and the Grenadines has not actively traded with conch directly with Martinique.

The fisheries centres act as the primary purchasers of conch, have significant economic power in the conch value chain. This will be explored further in the upcoming country case study.

Conch pearls in Saint Vincent and the Grenadines are primarily marketed towards the United States, yet limited information exists on this. Based on current harvest volumes, and typical occurrence rates for pearls (one per 10,000–15,00 shells,⁵⁶ one in 100,000 considered gem worthy) pearls are likely being found and traded in this value chain privately. Pricing conch pearls appropriately requires specialised knowledge, that is largely absent in the region, and thus, local actors may not get full market value for pearls traded. Further research on conch pearls is required, to understand to what extent it occurs and to determine if additional value could be extracted. This should be approached with caution as focusing on pearls as a primary target (as opposed to a by-product) would not be sustainable.

Saint Vincent and the Grenadines is the only country of this project to export conch operculum or the 'foot' from Union Island Fisheries Centre to Dubai, United Arab Emirates (Hutchinson & Girvan, 2021). This practice should be studied further to see the commercial opportunities related to the sale of the operculum, as this by-product of conch harvesting is typically discarded.

Strong interest in using conch shells for the construction of Gabion baskets for erosion control was also expressed by the Fisheries Division of Saint Vincent and the Grenadines. Conch shells have already been used in construction of the iconic Happy Island; an artificial cay built in the early 2000s by someone seeking to resolve the issue of conch shell pollution on Union Island. Conch shells were piled on a nearby sandbar to establish a platform that was paved and now serves as an important bar, restaurant, and tourism attraction.

6.4. Institutional actors and national regulations

The conch fishery is managed by the Fisheries Division within the Ministry of Agriculture, Forestry, Fisheries, Rural Transformation, Industry, and Labour.

The Fisheries Division has officers collecting data at most major landing sites across the islands of Saint Vincent and the Grenadines. If conch is destined for exportation, the Fisheries Division is the focal point for the issuance of CITES permits. This requires a signature by the Chief Fisheries officer. Even for smaller quantities a CITES expert permit is issued.

Conch is managed by the Saint Vincent and the Grenadines art.18, part VI of the Fisheries Legislation of 1987.⁵⁷ This Act is also based on the FAO-OECS model fisheries legislation. and has similar features to other project countries. These include provision which enables the minister in charge of fisheries to enact a closed season through announcement and specific provisions also banning the possession, sale, or purchase of immature conch (with the definition of any conch smaller than seven inches, without a flared lip or under 8oz in weight when removed from shell). Currently, no closed season exists for conch, yet fishers and government officials express an interest in instituting a closed season based on a stock assessment. A draft conch fisheries management plan was written in October 2008 based on FAO guidelines, but is yet to be completed and updated. To increase the participation of fishers in the governance of fisheries resources, the Fishers' Fisheries Advisory Committee was established in 2021. This committee has several fishers as members and is intended to increase coordination and collaboration between fishers and the government.

Limited information is available on the current stock of conch in Saint Vincent and the Grenadines. Stock assessment was planned for 2020 but was disrupted by the COVID-19 pandemic and recent volcanic eruption. The Fisheries Division of Saint Vincent and the Grenadines remains committed to completing this stock assessment. This stock assessment is essential considering the expiation of fishing effort and harvests since 2017.

6.5. Opportunities and challenges

1. The use of conch trimmings is limited in this value chain, despite the large generation of this by-product through processing. Drawing from the experience of other countries like Grenada, Saint Vincent and the Grenadines can maximise the value of conch trimmings by processing them into value added products such as burgers and sausages.
2. Access to United Kingdom overseas territories and European Union overseas region markets would greatly increase value received by fishery. Conch fishers serving the United States export market receive \$2.5-4 per lb while prices as high as \$8.5 per lb are paid in Martinique.
3. Due to its central location amongst project countries and large amounts of suitable habitats, the possible establishment of a conch nursery in Saint Vincent and the Grenadines should be further investigated.
4. The recent eruption of the La Soufriere volcano in Saint Vincent caused the temporary displacement of 15 per cent of the mainland population, put one of its main processing facilities (Owia Fisheries Centre) in the evacuated red zone of the island, disrupted air transportation and could have negative effect on conch ecology. The long-term effects of the eruption of the La Soufriere volcano are yet to be determined.
5. The stockpiling of conch shells across Saint Vincent and the Grenadines presents both a challenge and an opportunity, as large volumes of shells may have eventual value for climate change ecosystem-based adaptation projects in coastal areas. Large volumes of discarded conch shells can be marketed use as a natural construction material for coastal engineering.
6. Across the project countries, human-driven pollution from land-based sources is a significant threat to the ecology of conch habitats. Coastal development, water pollution, release of untreated sewage and siltation of coastal waterways due to run off, combined with increasing intensity and frequency of extreme events all place pressure on the conch resource of Saint Vincent and the Grenadines.
7. Increased pressure on the fisheries resource due to the opening of fisheries centres should be closely monitored with stock assessments to ensure fisheries pressure is not unsustainable.

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Endnotes

- 1 UNCTAD BioTrade aims to contribute to the conservation and sustainable use of biodiversity through the promotion of trade and investment in BioTrade products and services. BioTrade is understood as activities related to the collection or production, transformation, and commercialization of goods and services derived from biodiversity (genetic resources, species, and ecosystems) under environmental, social and economic sustainability criteria called, 'BioTrade Principles and Criteria'. See UNCTAD BioTrade Principles and Criteria (2020).
- 2 The BioTrade Principles and Criteria (P&C) have been the core foundation that guide the implementation of activities of the UNCTAD BioTrade Initiative, the BioTrade programmes and other related activities since their inception in 2007. In 2020, the P&C were revised complementing the evolving legal and policy framework of BioTrade. See UNCTAD BioTrade Principles and Criteria (2020).
- 3 Operculum—hard, sickle-shaped structure at the tip of the foot used for locomotion. Also known as 'claw' and 'foot' (Stoner, 2013).
- 4 'A Management Authority of the State of export is satisfied that the specimen was not obtained in contravention of the laws of that State for the protection of fauna and flora'.
- 5 'A Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of that species.
- 6 *Supra* note 2.
- 7 Includes the whole, live or dead conch (per art.7 Interpretation of the Appendices). CITES list Appendix-II specimens includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival. See Interpretation of Appendices I, II, III (valid from 22 June 2021) for more details.
- 8 See Blue BioTrade: Promoting sustainable livelihoods and conservation of marine biodiversity in the Caribbean region.
- 9 See BioTrade Principles and Criteria for terrestrial, marine and other aquatic biodiversity-based products and services.
- 10 See Guidelines for a Methodology to Support Value Chains for BioTrade Products: From the Selection of Products to the Development of Sector Strategies.
- 11 For further information see Regional stakeholder webinar on Blue BioTrade and BioTrade Principles and Criteria including CITES requirements, 22-23 March 2021.
- 12 Source CITES Trade database. These figures were for the year 2018, when most recent data was available, see <https://trade.cites.org/>.
- 13 See 'How To Buy a Conch Pearl' (17 June 2019), accessed on 7 July 2021.
- 14 See 'Conch pearls: what are they and why are they so rare?' (26 February 2018), accessed on 7 July 2021.
- 15 See '5 Things to Know About ... Conch Pearls' (20 February 2018), accessed on 7 July 2021.
- 16 Data provided by Saint Lucia Fisheries Division.
- 17 Facts and analysis in this section are based on the author's interviews with stakeholders in Saint Lucia between 4 May and 1 June 2021.
- 18 \$1=EC\$2.7 as at June 10 2021 (xe.com).
- 19 For more information, see <https://massystoresslu.com>.
- 20 See for example, <https://tinyurl.com/6bkpxf8e>.
- 21 Stakeholder interviews between 4 May and 1 June 2021.
- 22 \$14,803=EC\$40,000; \$ 1=EC\$2.7 as at June 10 2021 (xe.com).
- 23 Stakeholder interviews between 4 May and 1 June 2021.
- 24 For more information, see <https://www.facebook.com/LucianBlueOceanSeafoods/>.
- 25 For more information, see <https://www.facebook.com/superiorfishandseafood/>.
- 26 For more information, see <https://www.instagram.com/francisfishseafoodltd/?hl=en>.
- 27 \$1=EC\$2.7 as at June 10 2021 (xe.com).
- 28 \$1=€0.84 as at July 13 2021 (xe.com).
- 29 This is a revised edition of the law as at 31 December 2001 and contains a consolidation of the following

- laws: (a) Fisheries Act (Act 10 of 1984); (b) Fisheries Regulations; and (c) Fisheries (Snorkelling Licence) Regulations. See Saint Lucia Fisheries Act (Cap 7.15), accessed on 7 July 2021.
- 30 See Fisheries Regulations - Section 39 (Statutory Instrument 9/1994) as consolidated under the revised edition of Chapter 7.15 Fisheries Act of 31 December 2001.
- 31 See Saint Lucia's Sectoral Adaptation Strategy and Action Plan for the Fisheries Sector (Fisheries SASAP) 2018-2028.
- 32 According to a stakeholder interview conducted between 4 May and 1 June 2021, private sector producers reported that sale prices of above 45-65 per cent of costs were needed to justify export activity.
- 33 *Supra* note 4.
- 34 *Supra* note 5.
- 35 Under Review of Significant Trade in Queen Conch (*Strombus gigas*) 2003-2005 (Phase V), short and long-term actions for Range states in categories [including Category (ii) for Grenada] were outlined, see: https://cites.org/eng/cites.org/eng/prog/queen_conch/Review_of_Significant_Trade_in_Queen_Conch/2003_2005_phase_v.
- 36 For more details, see Regional stakeholder webinar on Blue BioTrade and BioTrade Principles and Criteria including CITES requirements presentation by Moran Mitchell, Chief Fisheries Officer, Fisheries Division, Ministry of Sport, Culture and the Arts, Fisheries and Cooperatives, St. George's Grenada on 23 March 2021.
- 37 See for example an aerial view of the conch shell restoration site at Woburn, St. George's, Grenada - which is part of the Woburn/Calivigny Marine-Protected Area.
- 38 For more details, see Techno-economic performance of fish landing sites and fishing ports in Grenada: Assessment of the current situation and opportunities for responsible investments.
- 39 See for example, "A look at the Country Marine Ecosystem in Carriacou, Grenada video by Marvin Boatswain."
- 40 Some consumers report buying conch in bagged not by weight but by 5 conch units at EC\$25/bag.
- 41 For further information, see <https://www.sifhgroup.com/fish-house>.
- 42 For further information, see <https://www.facebook.com/Vineyard-LTD-728750000567594/>.
- 43 or further information, see <https://gov.gd/mocr/about-fisheries>.
- 44 See Grenada Fisheries Act, 1986 (Cap. 108) for full text.
- 45 See Report prepared for the Governments of the Organization of Eastern Caribbean States (OECS) on the Implementation of Harmonized Fisheries Legislation in the OECS Region.
- 46 See Fisheries (Amendment) Regulations No. 24 of 1996.
- 47 *Supra* notes 4 and 5.
- 48 *Supra* note 4.
- 49 *Supra* note 5.
- 50 \$1 = EC\$2.7 as at June 10 2021 (xe.com).
- 51 See, 'Signing Ceremonies for the Project for Improvement of Fishery Equipment and Machinery and Japan's Grant Aid for Provision of Industrial Products in Saint Vincent and the Grenadines', 2 September 2014.
- 52 See, 'The Preparatory Survey for the Project for Improvement of Fishery Equipment and Machinery in Saint Vincent and the Grenadines'.
- 53 Author's own calculations: sum of post-2017 production level - average pre-2017 production level.
- 54 For more details, see festival homepage at <https://www.facebook.com/unionislandconchfestival/>.
- 55 Starlight, "Owia village lands first class fisheries centre", web article, 17 April 2009.
- 56 The Jewellery Editor, "Conch pearls: what are they and why are they so rare?", blog post, 26 February 2018.
- 57 See Saint Vincent and the Grenadines Fisheries Legislation of 1987 for full text.
-