



Food and Agriculture
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FISH4ACP

Unlocking the potential
of sustainable fisheries and aquaculture
in Africa, the Caribbean and the Pacific

SUMMARY REPORT

The seabob value chain in Guyana

January 2023



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Contents

Acknowledgements	v
Disclaimer	v
Acronyms and abbreviations	vi
1. Introduction	1
2. Functional analysis	2
3. Sustainability and resilience analysis	9
4. Upgrading strategy	15
5. Implementation plan for the upgrading strategy	26
6. References	37
7. Bibliography	37

FIGURES

Figure 1. Total seabob catch in Guyana 2011–2020 (tonnes)	2
Figure 2. The seabob value chain map in Guyana 2015–2020	3
Figure 3. Seabob industrial trawlers and nets	4
Figure 4. Schematic diagram of a Chinese seine stand	5
Figure 5. Chinese seine net with pens	5
Figure 6. Dried seabob in Guyana	6
Figure 7. A seabob market vendor	7
Figure 8. Economic sustainability performance diagram of the value chain	9
Figure 9. Social sustainability performance diagram of the value chain	10
Figure 10. Environmental sustainability performance diagram of the value chain	11
Figure 11. SWOT analysis of the value chain	16
Figure 12. Theory of change – Guyana seabob value chain	19

TABLES

Table 1. Sustainability heat map of the value chain	12
Table 2. Key economic, social and environmental performance indicators (on an annual basis) under current and upgraded situations (aggregated at value chain level)	23
Table 3. Summary of upgrading activities and investments (USD)	26
Table 4. Value chain upgrading investment table (USD)	33
Table 5. Risks associated with the upgrading strategy	33

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Acronyms and abbreviations

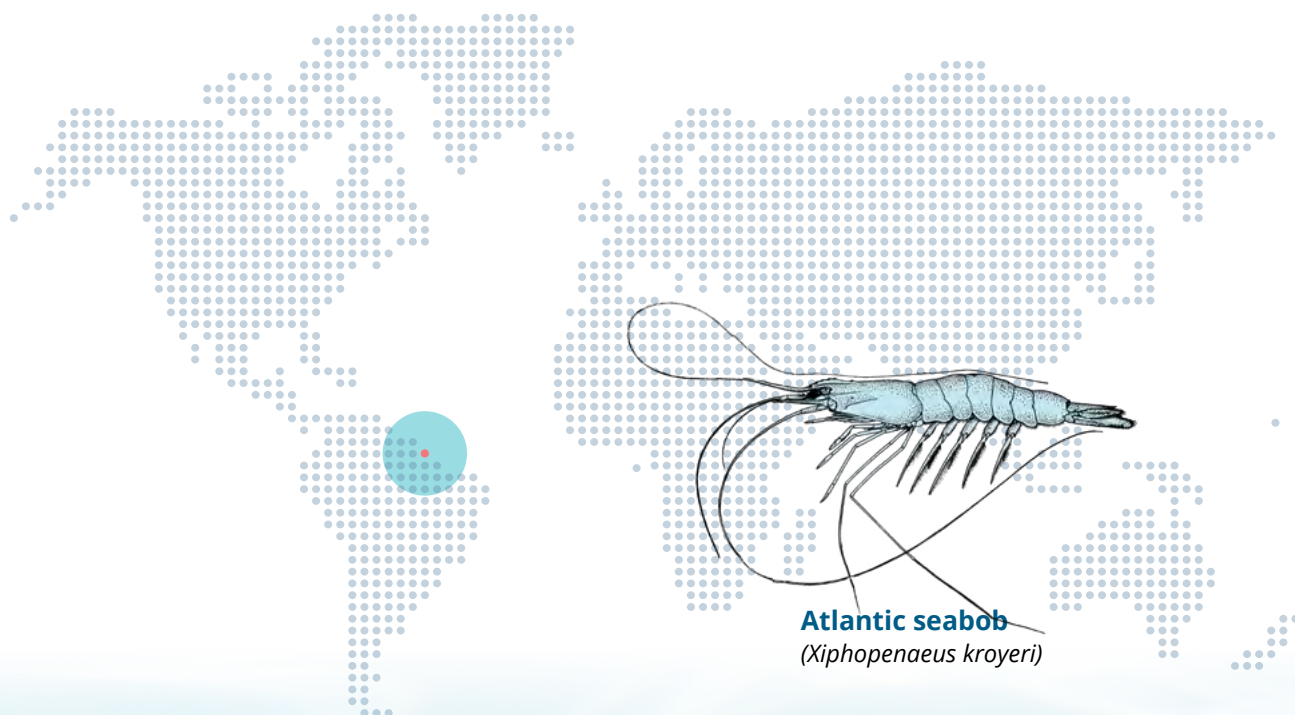
AFAC	Artisanal Fisheries Advisory Committee
BDS	business development services
BRD	bycatch reduction devices
CPUE	catch per unit effort
CRFM	Caribbean Regional Fisheries Mechanism
ETP	endangered, threatened and protected (species)
FAO	Food and Agriculture Organization of the United Nations
FD	Fisheries Department
FTE	Full Time Employment
GII	Gopie Investments Inc.
GNFO	Guyana National Fisherfolk Organisation
HCR	harvest control rules
MSC	Marine Stewardship Council
NHS	Noble House Seafoods
PSI	Pritipaul Singh Investments
SWG	Seabob Working Group
tbd	to be determined
TED	turtle excluder devices
ToR	terms of reference
TRP	target reference point
VC	value chain

1. Introduction

FISH4ACP is an initiative of the Organization of African, Caribbean and Pacific States (OACPS) to support sustainable fisheries and aquaculture development. The five-year value chain (VC) development programme (2020 to 2025) is implemented by the Food and Agriculture Organization of the United Nations (FAO) with funding from the European Union and the German Federal Ministry for Economic Cooperation and Development.

The seabob shrimp value chain in Guyana is one of 12 value chains competitively selected from over 70 proposals worldwide for support from the FISH4ACP programme. This summary report presents the outputs of design work completed during 2021 and early 2022 to conclude a functional analysis of the VC, assess its sustainability and resilience, develop an upgrading strategy to which the FISH4ACP programme will contribute, and plan for full implementation from mid-2022.¹

The **FISH4ACP methodology** used to carry out this study is an approach based on FAO's Sustainable Food Value Chain and Agrinatura's Value Chain Analysis for Development methodologies. It has four main components: functional analysis; sustainability assessment; upgrading strategy development; and implementation planning (actions and investments). The approach is highly participatory, involving VC stakeholders from the public and private sector from the outset in order to ensure national ownership of all four components, thereby increasing the likelihood of success of the project interventions.



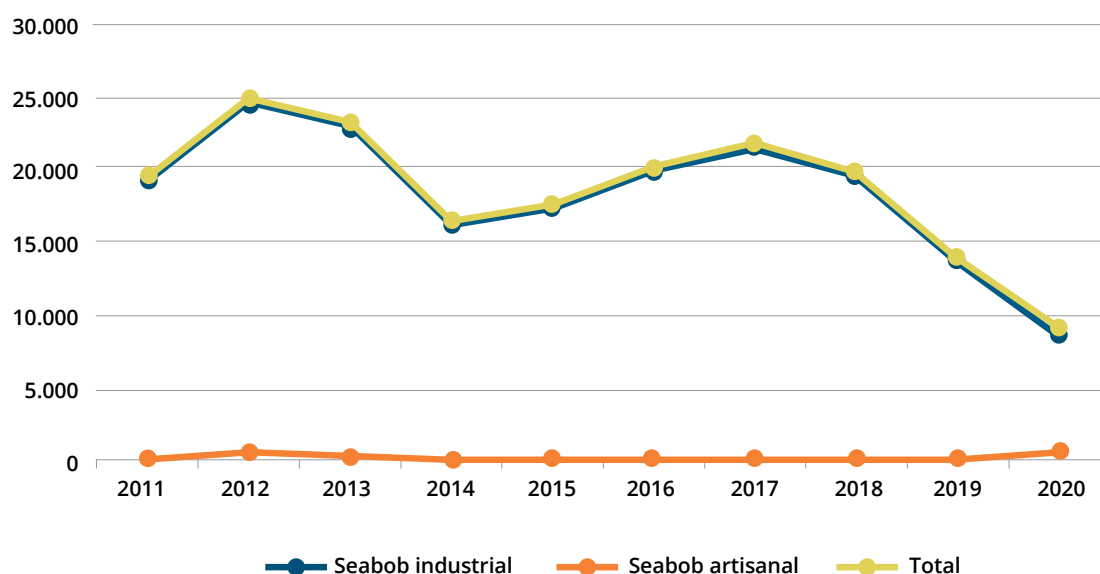
¹ This summary report is based on a supporting and more detailed analysis and design document, not officially published by FAO but available on request: Duong, G., Rankin, M., Ahmed, G., Rice, J., Nguyen, H., Esnard, T. & McFee, D. 2023. *The Seabob value chain in Guyana: Analysis and design report*. Rome, FAO. The more detailed document provides additional information on methodology, supporting analytical tables and detailed calculations, and background and supporting data.

2. Functional analysis

The **functional analysis** enabled the preparation of the VC map presented in Figure 2. There are two channels in the VC: the export-oriented industrial channel and the artisanal channel. The industrial channel accounts for almost all (99 percent) the total seabob catch in Guyana and is the larger of the two channels. During 2015 to 2020, three industrial seabob firms in Guyana produced around 7 600 tonnes of peeled seabob per year (17 000 tonnes fresh, whole weight equivalent), of which about 93 percent was exported to markets in the United States of America and the European Union, and 7 percent was sold to local supermarkets, hotels and restaurants. The artisanal channel accounts for a mere 1 percent of total seabob catch (or around 180 tonnes per year, in fresh, whole weight equivalent) and focuses on supplying the domestic market with fresh unpeeled seabob, fresh peeled seabob and dried seabob.

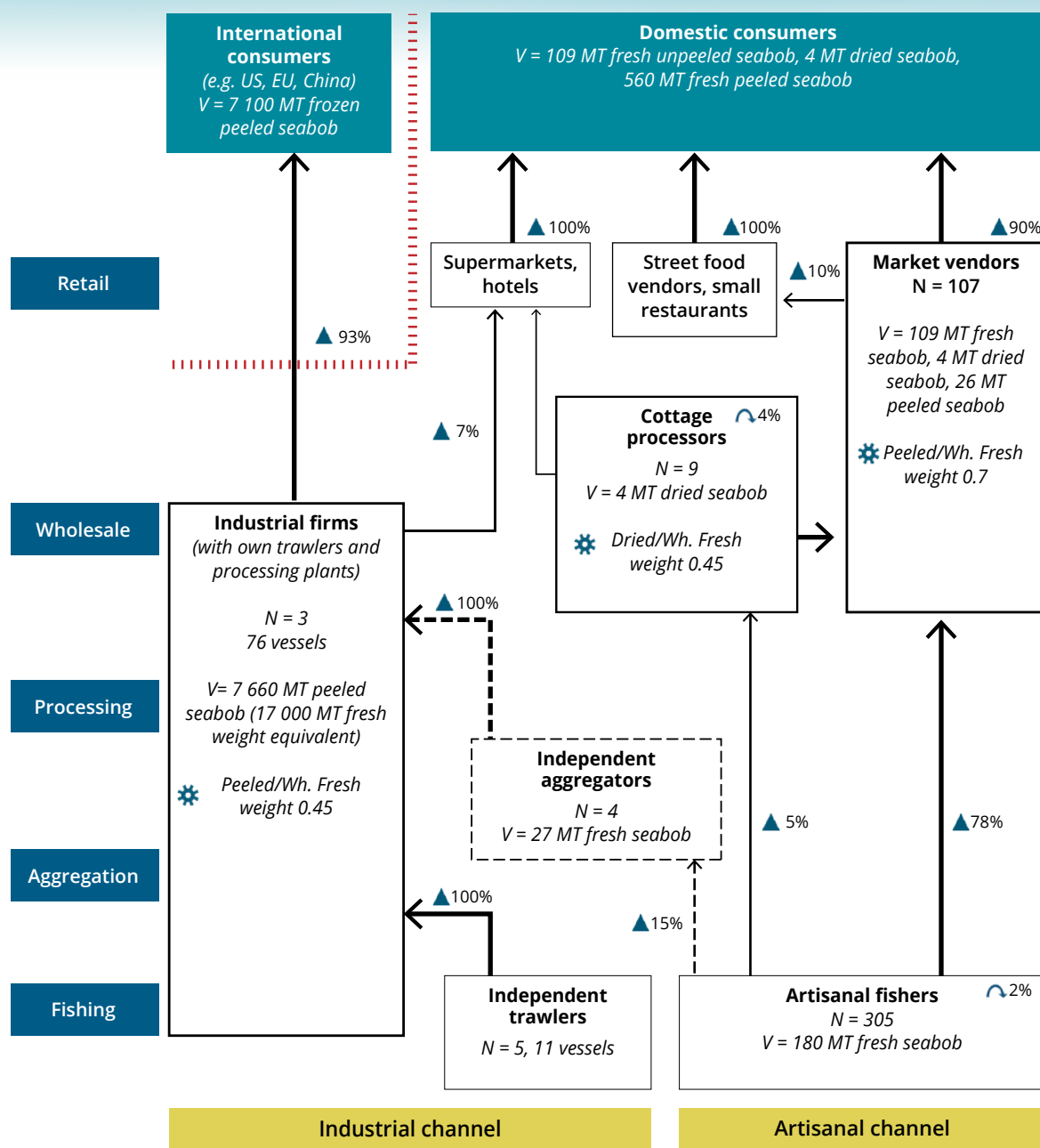
Total seabob catch has decreased since 2017, driven by a decline of the industrial catch. The industrial firms attribute this drop in catch to a reduction in fishing effort as a result of an increase in sargassum and an inability to find and capture seabob, possibly due to a declining stock. Challenges to fishing effort were further exacerbated by the COVID-19 pandemic. The reasons for fluctuating and declining catch are not well-studied, implying a critical need to conduct studies to investigate the problem, identify the root causes and take proper actions to ensure the sustainability of the seabob stock.

Figure 1. Total seabob catch in Guyana 2011 to 2020 (tonnes)



Source: Department of Fisheries. 2021. Seabob exports from Guyana. Georgetown, Government of the Cooperative Republic of Guyana.

Figure 2. The seabob value chain map in Guyana (2015–2020)



Legend

Ratios and percentages:

- ▲ Sold (%)
- * Loss (%)
- ⤷ Self-consumed (%)
- * Conversion ratio

Overlays:

- N Number of actors
- V Volume in Metric Tons (t)
- * Leverage point

Flows and interactions:

- Service relationship
- Sale
- National border

Abbreviations:

- wh. whole

Notes:

1. Production figures are based on average capture data from 2015 to 2020 from the Fisheries Department (FD). Averages provide a picture of volume flows, address the severe fluctuations in catch and the exceptional onset of COVID-19 in 2020 which restricted fishing activities for the industrial fishers.

2. Independent aggregators are put in a dashed box because after 2019, when the fishery obtained Marine Stewardship Council (MSC) certification, they were no longer part of the value chain.

Source: Duong, G., Rankin, M., Ahmed, G., Rice, J., Nguyen, H., Esnard, T. & McFee, D. 2023. *The Seabob value chain in Guyana: Analysis and design report*. Rome, FAO.

In the **industrial channel**, the **industrial firms** and **independent trawlers** are organized under the Guyana Association of Trawler Owners and Seafood Processors (GATOSP). Pritipaul Singh Investments (PSI), Noble House Seafoods (NHS), and Gopie Investments Inc. (GII) are the three lead firms in the chain. Their operations are vertically integrated and include wild shrimp and fish capture, primary processing and exports of frozen peeled shrimp. The three firms own a total of 76 trawlers and private docks and landing sites. NHS and GII contract an additional 11 vessels from five independent trawler owners and all vessels – their own and contracted vessels – primarily target seabob shrimp. In contrast, PSI's operations also target tuna and other fish species. The industrial seabob fleet uses steel hulled trawlers (20 m in length with a gross tonnage of approximately 100 tonnes) with twin otter nets (10 m to 16 m long). All nets are fitted with turtle excluder devices (TED) and bycatch reduction devices (BRD) in compliance with the MSC certification.

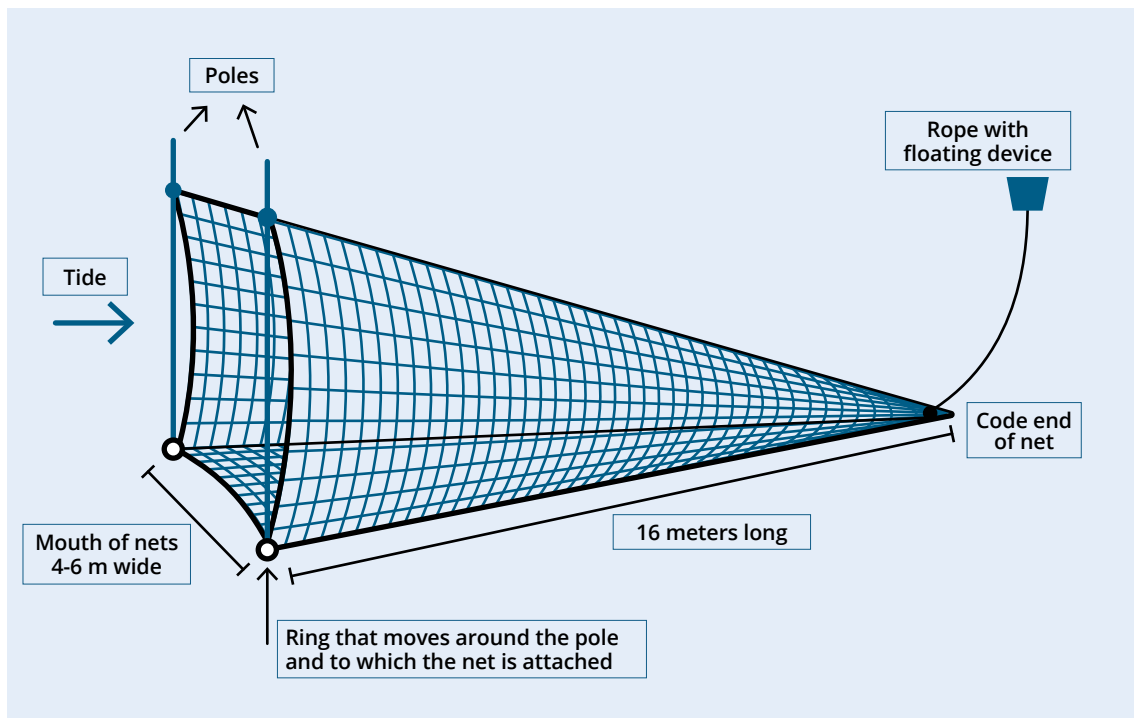
Figure 3. Seabob industrial trawlers and nets



The **artisanal channel** is composed of three actor types: (i) 305 Chinese seine fishers who capture and sell fresh seabob; (ii) approximately nine cottage processors who dry shrimp; and (iii) approximately 107 market vendors who sell fresh (peeled and unpeeled) and dried seabob to end consumers, street food vendors and small restaurants.

The **artisanal fishers** are predominantly men who use various gear types to target multiple species such as whitebelly shrimp, finfish and prawns. The Chinese seine, used by around 300 vessels, is the only gear type used by artisanal fishers to catch seabob (WWF, 2019; Kalicharan and Oxenford, 2020). Being a passive, fixed gear, the operation of Chinese seines is heavily dependent upon tidal flow in the river mouths and estuaries. The vessels engaged in Chinese seine fishing are wooden flat-bottomed boats powered by paddle, sail or a small outboard engine.

Figure 4. Schematic diagram of a Chinese seine stand



Source: Ministry of Agriculture. 2022. Draft Guyana marine fisheries management plan 2022–2027. Part A. Strategic Plan, Figure 33, p.70. Georgetown, Government of the Cooperative Republic of Guyana.

Figure 5. Chinese seine net with pens



Prior to 2019, there were about four **aggregators** who bought approximately 15 percent of the seabob catch, estimated at 27 tonnes per year, from artisanal fishers to sell to the industrial processing firms. Since MSC certification in 2019, independent aggregators are no longer allowed to supply seabob to industrial companies due to traceability issues.

Almost 9 tonnes/year, or five percent of the artisanal catch of seabob is bought by about nine **cottage processors**. These are mostly small, female-owned businesses that dry seabob to sell locally to market vendors, street food vendors, and small restaurants. The major inputs they use

Figure 6. Dried seabob in Guyana



are salt, wood and coconut shells. The cottage processors hire part-time female workers who clean seabob and then spread it on the floor to dry.

Nearly 80 percent of artisanal seabob catch, or 150 tonnes of seabob in fresh equivalent weight, is sold in the local market by around 107 **market vendors**. Market vendors sell different seabob products – including unpeeled fresh seabob, peeled fresh seabob, and dried seabob – to consumers and other buyers, such as street food vendors and restaurants. They source fresh seabob from fishers and dried seabob from cottage processors. The majority (>70 percent) of the fresh seabob procured by market vendors is sold unpeeled, while around 25 percent is further processed (cleaned and peeled) before being sold. Most vendors are female business owners who work year-round and employ other family members and hired workers to help with the transport, cleaning and peeling of seabob. Most vendors do not have cold storage facilities which forces them to procure the shrimp in small quantities to avoid spoilage.

Figure 7. A seabob market vendor



Considering the large number and central role of artisanal Chinese seine fishers and market vendors in the artisanal channel, they are the core actors with the most potential as a leverage point, especially for improving the sustainability of fishing practices, improving product quality and enhancing women's participation in the VC. In the industrial channel, the three industrial firms are the leverage point for VC improvement interventions.

In terms of **end markets**, two different marketing strategies are envisioned for the industrial and artisanal channels. Given that the United States of America and the European Union are currently the two most important export markets for Guyanese seabob – and demand remains strong – they will continue to be the main **export target markets for the Guyanese seabob industry**

in the future. However, stringent market requirements, such as MSC certification, and the small amount of seabob captured by artisanal fishers imply that these export markets are not the target markets for the artisanal channel, at least in the near future (next ten to 15 years). For the **artisanal channel, the domestic market offers considerable potential**. Consumer surveys suggest that there is untapped demand for seabob in Guyana, as consumers sometimes cannot find seabob products on the market when looking for them. Although seabob unavailability, or unreliability of supply, is largely due to the declining catch (as mentioned above), various value adding opportunities exist for artisanal actors (including fishers, processors and market vendors) to better tap into the unmet domestic demand. Potential options include increasing and improving the quality of cleaning, peeling and storing seabob to provide consumers with higher-quality and thus, higher-value products, and to enter higher-value markets such as supermarkets and the hospitality industry (hotels, restaurants). **For both export and domestic markets**, more in-depth market studies are necessary to validate the market potential and opportunities identified in this VC report, and to discover the opportunities that this report may have overlooked due to the unavailability of data, and resource and time constraints.

While **physical inputs and support services** are fully integrated into the operation of industrial firms (e.g. the firms that directly source fuel from foreign suppliers and have wells that supply the water used in processing and preserving seabob), artisanal actors buy inputs from local suppliers that are often the fisher cooperative societies managing wharfs. However, the provision of inputs by local suppliers is both insufficient and inefficient. Financial and non-financial support services (e.g. extension, boat repair and maintenance) are rarely used by VC actors due to high costs and/or unavailability.

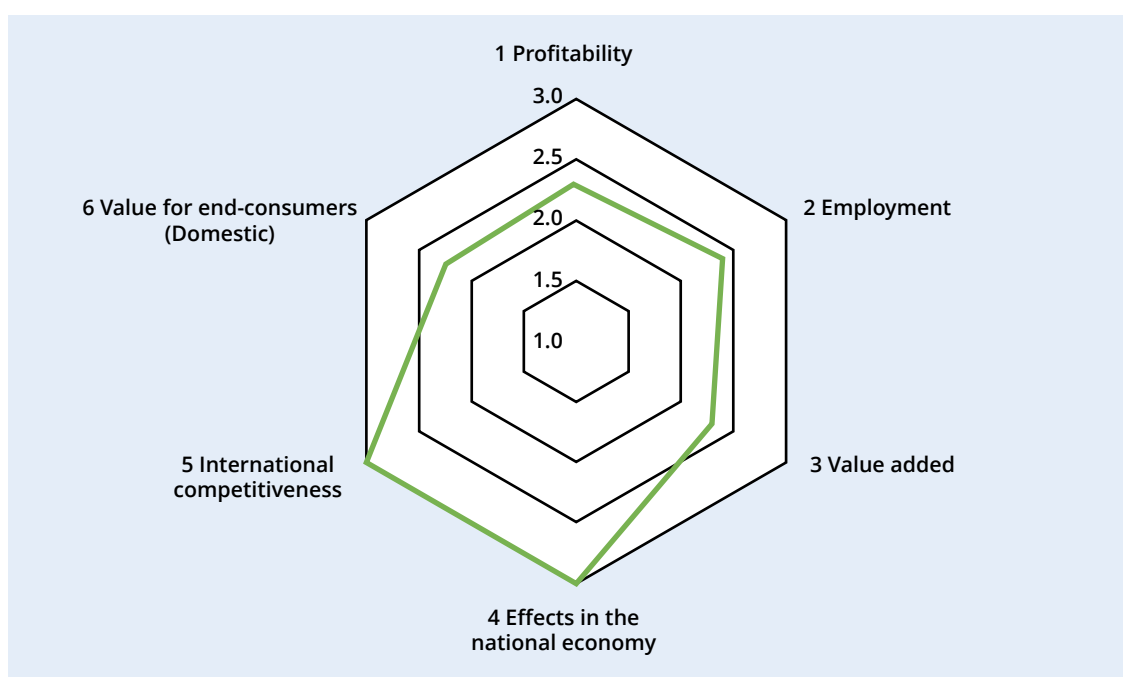
The seabob VC actors operate in an **enabling environment** consisting of various societal elements (i.e. institutional, organizational, socio-cultural and infrastructural elements) and natural elements. While relevant **fisheries management policies and management plans** already exist, their implementation is weak. This is largely due to: the lack of staff/offices and technical and financial capacity of the FD; limited incentives; limited capacity of VC actors (particularly the artisanal ones) to comply with regulations; and the dysfunction of **organizations** that are essential to support effective compliance and stakeholder engagement (e.g. fishers' cooperatives and the Artisanal Fisheries Advisory Committee [AFAC]). The dysfunction of fishers' cooperatives and AFAC, in turn, is mainly attributed to **poor management and governance** of the cooperatives, which undermine members' trust in them. The **natural environment** is generally supportive of the VC operations. However, the increase of sargassum seaweed since 2011 is reported to have changed the availability and distribution of fisheries resources and caused difficulties for fishers to access seabob resources. Additionally, climate change, mainly characterized by changing rainfall, may affect the abundance and recruitment of seabob, which in turn affects fishing operations, particularly artisanal Chinese seine fishers who rely on tides to capture seabob. More research is needed to understand the impacts of these natural elements on seabob resources in particular, and the broader ecosystems in general.

3. Sustainability and resilience analysis

An **assessment of the economic performance of the VC** revealed that all VC actors are making a profit (with positive returns on sales) but revenues have declined compared to previous years due to declining catch. Artisanal actors, particularly cottage processors and market vendors, have significantly lower profitability levels (three time less) than industrial firms. Industrial firms, artisanal fishers and market vendors generate most of the employment in the VC, but the wages for market vending workers and cottage processing workers are below the national minimum wage. The share of total value added in total outputs (revenues) is beyond sustainable levels, but indirect value added is very low, particularly in the artisanal channel, and thus concerning because this reflects the underdeveloped situation of input and service provision in the VC. The effects on the national economy are positive because taxes and fees paid by VC actors to the government are more than the government's expenditure on the VC. However, the size of the VC is small compared to the size of the wider agriculture sector and the national economy, so contributions to GDP are insignificant. Domestic consumer evaluation of seabob is positive when compared to other shrimp products, but seabob (and shrimp in general) is less preferred than meat and fish.

A summary of the economic sustainability assessment across different domains considered within the FISH4ACP methodology is presented in Figure 8.

Figure 8. Economic sustainability performance diagram of the value chain



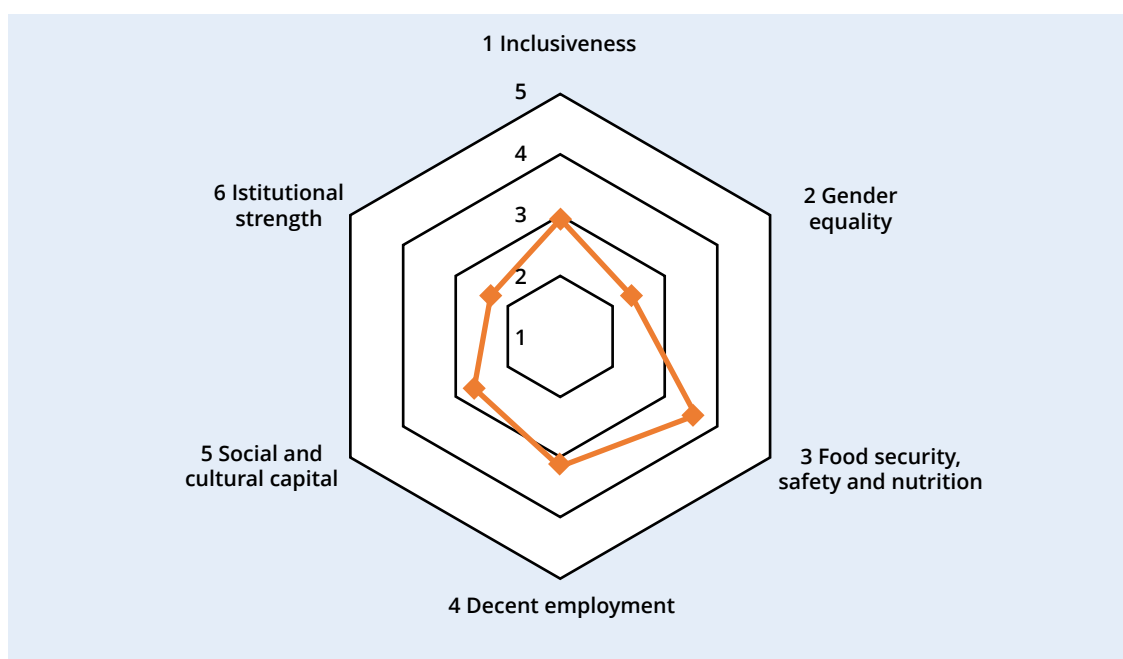
Note: The figure shows the scores of six economic domains, which are the averages of the scores of the subdomains under each domain. The scores range from 1 (highly concerning) to 3 (not concerning).

Source: Duong, G., Rankin, M., Ahmed, G., Rice, J., Nguyen, H., Esnard, T. & McFee, D. 2023. *The Seabob value chain in Guyana: Analysis and design report*. Rome, FAO.

Analysis of the social performance of the VC showed unequal income among VC actors and workers, especially between men and women. There was also an unequal division of roles between men and women, a limited number of women holding decision-making positions and women had limited access to assets (such as land and houses) and fishing licenses. As for workers, the absence of formal (written) contracts, combined with temporary employment and low wages (especially in the artisanal channel) place workers in a vulnerable situation due to a lack of respect for labour rights and job security. Additionally, there is a lack of formality in the artisanal channel (from licensing and logbook completion and reporting by fishers, to monitoring of landings and retail markets), which poses significant challenges to the effective collection and management of data on catch and bycatch, and fisheries management in general. Access to financial services by both male and female actors was limited in the artisanal channel of the VC.

A summary of the social sustainability assessment across different domains considered within the FISH4ACP methodology is presented in Figure 9.

Figure 9. Social sustainability performance diagram of the value chain



Note: The figure shows the scores of six social domains, which are the averages of the scores of the subdomains under each domain. The scores range from 1 (highly concerning) to 5 (not concerning).

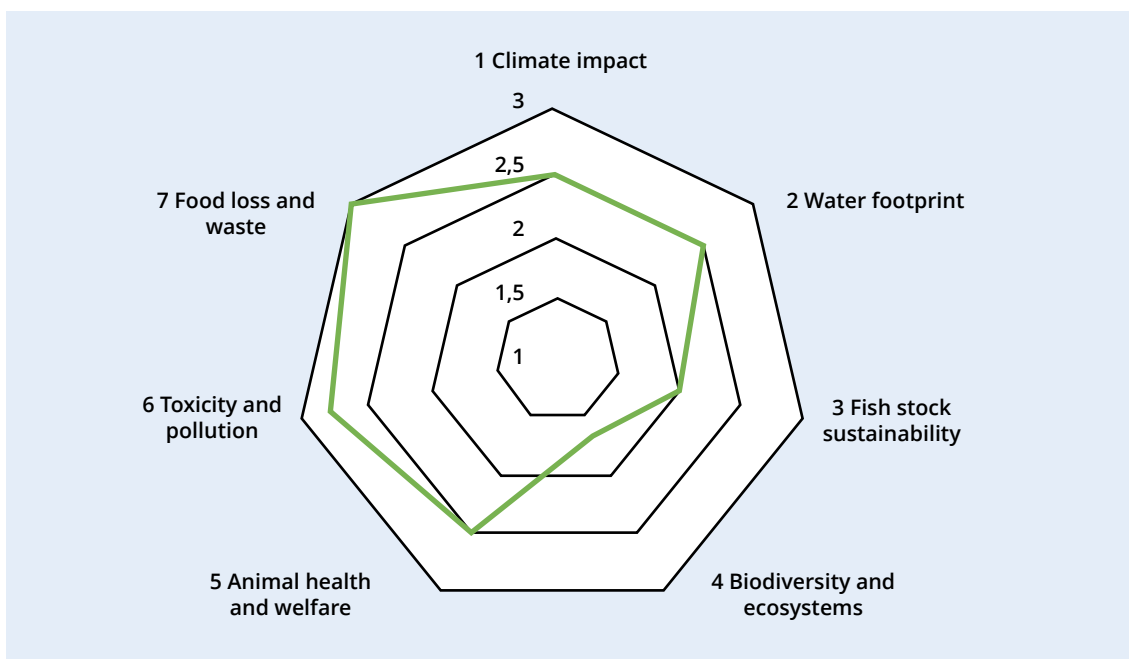
Source: Duong, G., Rankin, M., Ahmed, G., Rice, J., Nguyen, H., Esnard, T. & McFee, D. 2023. *The Seabob value chain in Guyana: Analysis and design report*. Rome, FAO.

In assessing the environmental sustainability of the VC, it was found that the seabob fishery is at risk of overfishing, as suggested by declining catches in recent years, despite generally unchanged fishing effort. Bycatch from both the artisanal and industrial fishery may be having an adverse impact on vulnerable species and the wider ecosystem. Data on seabob catch and bycatch landings are incomplete, especially for the artisanal channel. This implies the need for additional capacity building for the FD and industrial and artisanal fishers on data collection and processing.

This would help to generate a better understanding of the reasons for the declining seabob catch and the impacts of fishing on bycatch species and the ecosystem. Such understanding could inform policy and decision-making. The carbon footprint in the VC is mainly due to emissions from fuel used to run fishing vessels or generate the electricity that powers the industrial processing plants. No form of renewable energy is used in the VC. Water usage is particularly extensive in processing activities, but there is no concern regarding wastewater treatment. Animal health and welfare, toxicity/pollution and food loss and waste are also rated as not concerning.

A summary of the environmental sustainability assessment across different domains considered within the FISH4ACP methodology is presented in Figure 10.

Figure 10. Environmental sustainability performance diagram of the value chain



Note: The figure shows the scores of seven environmental domains, which are the averages of the scores of the subdomains under each domain. The scores range from 1 (highly concerning) to 3 (not concerning).

Source: Duong, G., Rankin, M., Ahmed, G., Rice, J., Nguyen, H., Esnard, T. & McFee, D. 2023. *The Seabob value chain in Guyana: Analysis and design report*. Rome, FAO.

When considering **resilience**, the VC performs extremely poorly. The lack of resilience in the VC is mainly due to the lack of technical and financial resources of all the VC actors in the artisanal channel, coupled with their lack of trust in cooperatives and other forms of groups and collaboration, as well as the unfavourable conditions in the provision of support services (e.g. lack of ice supply) and the enabling environment (e.g. degraded wharfs due to poor management). There is a heavy reliance on a single species (seabob) and a few end-markets (United States of America and the European Union) in the industrial channel. These factors contribute to and/or result in the absence of any stocks/inventories of VC products (and thus, low redundancy), a low level of diversity in terms of markets and products, limited connectivity with input and output markets, and limited capabilities by VC actors to improve their practices/processes or to prepare for future shocks.

A **sustainability heat map** provides a synthesis of the economic, social and environmental sustainability assessments, and the resilience analysis. The main conclusions to be drawn from the heat map are that: (i) the overall sustainability performance of the VC is medium, with an overall sustainability score of 57 percent, and (ii) there is mixed performance across all three sustainability dimensions and resilience. Economic sustainability and environmental sustainability are the areas where the VC demonstrates the best performance, while resilience is the weakest area. There are 17 hotspots (red or highly concerning areas) in terms of the VC's sustainability performance and resilience.

Table 1. Sustainability heat map of the value chain

Economic sustainability	Social sustainability	Environmental sustainability
Net income	Wage & employment distribution	Electricity use
Trend in net income	Value added distribution	Fuel consumption
Return on sales	Poverty and vulnerability	Carbon footprint
Return on investment	Discrimination	Renewable clean energy use
No. of full-time equivalent (FTE)	Women's economic involvement	Water and ice consumption
No. of full-time jobs	Gendered division of labour	Water pollution & wastewater treatment
No. of wage labour jobs	Gendered access to productive resources	Stock status and stock dynamics
Average wage for hired workers	Women's decision-making and leadership	Fishing pressure
Total value of net wages	Availability of food	Impact on associated species
Direct value added at VC level	Accessibility of food	Status of vulnerable ecosystems
Indirect value added at VC level	Utilization of food	Status of endangered, threatened and protected (ETP) species
Total value added	Stability of food	Application of biosecurity measures
Contribution to trade balance	Respect for labour rights	Appropriate animal husbandry and handling
Rate of integration	Child and forced labour	Responsible use of drugs and chemicals
Public finances impact	Job safety and security	Air pollution
International competitiveness	Job attractiveness	Inorganic solid waste pollution
Food safety	Collective action	Organic solid waste pollution
Consumer evaluation	Coordination of transactions	Food loss
Consumer preference	Social cohesion	Food waste

(cont.)

Economic sustainability	Social sustainability	Environmental sustainability
	Cultural traditions	
	Policy, regulations and standards	
	Access to finance	
	Access to natural resources	
	Access to information	
Resilience		
Redundancy	Diversity	Connectivity
Collaboration and governance	Learning and adaptation	Participation and inclusion

■ Not concerning	■ Concerning	■ Highly concerning
---	--	--

Economic sustainability score:² 74%
Social sustainability score: 42%
Environmental sustainability score: 71%
Resilience score: 17%
Overall sustainability score: 57%
Number of highly concerning hotspots (red): 17

Source: Duong, G., Rankin, M., Ahmed, G., Rice, J., Nguyen, H., Esnard, T. & McFee, D. 2023. *The Seabob value chain in Guyana: Analysis and design report*. Rome, FAO.

² According to the FISH4ACP methodology, “the (sustainability scores) indexes are calculated by adding up across subdomains (1 for green, 0.5 for yellow, 0 for red) and dividing this by the number of subdomains, expressed as a percentage”.



4. Upgrading strategy

Considering the VC and shifting from analytical complexity to strategic simplicity, an analysis of the **strengths, weaknesses, opportunities and threats (SWOT) of the VC to inform the upgrading strategy** is provided below.

Strengths: The strengths of **the industrial channel** for seabob lie in the vertically integrated nature of the three industrial firms operating from capture to export, which allows for a coordinated approach toward fulfilling MSC requirements. The industrial channel accounts for 99 percent of the total average annual seabob catch (2015 to 2020), of which 93 percent is exported, primarily to the market of the United States of America (>70 percent share), where demand remains strong. In 2019, the Guyana seabob fishery achieved MSC certification on a conditional basis. In order to maintain certification, the three leading industrial companies that account for 87 percent, (76) of the total licensed trawlers, plus the 11 independently-owned trawlers that are contracted by them, have demonstrated commitment towards improving the sustainability of fishing practices by implementing requirements put forward by the MSC and enforced by the FD (e.g. an inshore no trawl zone, requirements for BRDs and TEDs for all industrial trawl nets, vessel monitoring systems (VMS), including the adoption of onboard electronic monitoring by closed circuit television, and compliance with harvest control rules (HCRs) that limit the allowable number of days at sea to 225 per year).

According to a recent review of the Seabob Fisheries Management Plan 2015–2020 (Fisheries Department, 2020), industrial players' compliance with fisheries management measures has been high (100 percent; no systematic non-compliance). Industrial players are also well represented through membership of the GATOSP and through their participation in the Seabob Working Group, a public–private partnership (PPP) coordinating mechanism for the industry, chaired by the FD of the Ministry of Agriculture. While the **artisanal channel** accounted for a mere 1 percent of total seabob catch between 2015 and 2020, its strengths lie in the contribution that these 300+ Chinese seine fishing vessels make to food security, both in terms of seabob landings and other saleable species, as well as employment created in fishing and downstream in processing and retailing of seabob for the domestic market.

Weaknesses: Some of the weaknesses of the **industrial sector** include the lack of long-term vision and market orientation beyond MSC certification. The industry does not have any coordinated targets for the export market, nor strategic research plans to comprehensively address priority issues related to the decline of seabob stock levels since 2017. Although industrial firms generate employment for nearly 800 people, a lack of attention to labour conditions and gender equality have also given rise to weaknesses in terms of wage gaps for women workers for industrial processing jobs (when compared to male workers for industrial fishing and other operations) and a lack of formalized long-term employment contracts for some staff. For the **artisanal channel**, the weaknesses identified are common across the entire artisanal channel (not just the subset of Chinese seine seabob fishers). Key weaknesses that prevent the adoption of more sustainable fishing practices include no data collection on catch and bycatch levels, low levels of education of fishers which inhibits data collection and reporting, poor access to services including training and finance, a lack of willingness to formally register vessels for licensing, and degraded infrastructure at landing sites and wharfs which poses risks to food safety and security of workers. Input costs are also high (e.g. fuel accounts for an estimated 30 percent of total operating costs of fishers) and value addition by artisanal fishers, processors and market vendors is low (just over 1 percent

Figure 11. SWOT analysis of the value chain

Strengths (internal)

Industrial channel

- Well organized and regulated export sector led by three vertically integrated companies which have demonstrated commitment to sustainable practices through MSC certification
- Good representation through GATOSP and Seabob Working Group
- Leading global exporter of seabob shrimp
- Highly efficient processes (20 minutes from catch to freezing)
- Employment creation for nearly 800 people (hired jobs) per year on average, of which nearly 40 percent are women hired for processing work; salary above minimum wage; low staff turnover (almost 50 percent of workers employed for more than ten years)
- Sufficient pool of skilled and unskilled labour for future expansion

Artisanal channel

- Contributes to national food security
- Creates employment for 840 people (jobs) per year on average, including family labour and hired workers. Fishing makes up nearly 60 percent of the jobs.

Cross-cutting

- FD committed to improve fisheries management policies (e.g. implementation review of Guyana Fisheries Management Plan 2013–2020 and Guyana Seabob Management Plan 2015–2020; new plans for both under development; collaboration with WWF to develop Artisanal Fisheries Management Plan 2019–2024)

Weaknesses (internal)

Industrial channel

- No collective strategy/vision for industry to grow exports in next five to ten years
- No research activities to assess stock decline
- Captains lack skills and incentives in data collection and reporting
- No gender-targeted efforts and wage gaps for women workers
- Concerns regarding labour conditions (lack of formalized long-term contracts, long working hours)

Artisanal channel

- Fishery is open and no monitoring of bycatch
- Sustainability concerns regarding use of Chinese seine nets (high bycatch discards, including juveniles)
- Concerns regarding labour conditions (lack of formalized contracts)
- Weak horizontal coordination with low participation and trust in cooperatives
- Poor infrastructure for landing, processing and marketing fish, exacerbated by poor wharf management, compromises food safety and quality and wharf security
- Input costs are high (high cost for ice; limited electricity access)
- Inadequate extension services and finance service provision (only 8 percent of artisanal fishers receive training)
- Education levels are low which impacts on data collection (65 percent of artisanal fishers having primary education only)
- Limited engagement in policy-making
- Low levels of licensing (approximately 50 percent of total artisanal vessels, including both Chinese seine [which catch seabob] and non-Chinese seine vessels)
- Low adoption of improved technologies/practices leading to low levels of value addition, limited product safety and quality, and low profitability especially for processors and vendors
- Low access nationwide to technology (mobile phones and internet) and high cost
- Gender norms limit women's participation

Cross-cutting

- Low levels of coordination across two channels potentially hampers fishery management efforts
- Inadequate data management systems make the monitoring of catch and bycatch challenging
- FD does not have sufficient representation (offices, tools and staff) to adequately monitor activities and capture data

Opportunities (external)

Industrial channel

- Demand for seabob shrimp in the United States of America and the European Union as Guyana's first and second largest export markets remains strong (no perceived limits to growth)
- Potential to strengthen sustainability brand

Artisanal channel

- Strong domestic demand: Guyana has one of the highest levels of domestic seafood consumption in Caribbean Community and Commons Market countries; consumer survey found that three-quarters of the surveyed households consume seabob, with average family consumption of 5.4 kg/year
- Demand for safe, clean, fresh finfish and shrimp (including seabob) increasing with retail outlets changing (supermarkets and restaurants); tourism and oil and gas sector developing

Threats (external)

Industrial channel

- Declining catch trend, which implies declining stock abundance, threatens long-term profitability
- Increased competition from India in the United States of America market; India, China and Belize in regional markets
- Cheaper imports available for farmed shrimp compared to wild catch
- MSC certification potentially under threat longer-term if pressure on stock continues, and impacts on ETP species are not adequately monitored
- Reports that new MSC standard under development will cover social issues – companies are under-prepared to respond

Artisanal channel

- No data on associated species and undocumented bycatch threatens the sustainability of the fishery

Cross-cutting

- Impacts from climate change and offshore drilling on fish stock are unclear
- Causes of increased sargassam seaweed blooms unknown

Source: Duong, G., Rankin, M., Ahmed, G., Rice, J., Nguyen, H., Esnard, T. & McFee, D. 2023. *The Seabob value chain in Guyana: Analysis and design report*. Rome, FAO.

of total direct value added from the seabob value chain comes from the artisanal channel). Across both channels, long-term sustainability is hampered by inadequate data collection and management systems within the FD, which make catch and stock monitoring more challenging.

Opportunities: Key opportunities include strong demand from the United States of America and the European Union for increased volumes of higher-value seabob if stock issues can be addressed and bigger shrimp can be caught; and strong domestic demand for fresh, minimally processed (i.e. peeled) seabob that meets food safety and quality requirements and can be sold into restaurants and supermarkets to meet projected demand by the tourism and oil and gas sector.³

Threats: The main threat to the value chain is the sustainability of seabob stocks which have reported a declining catch trend since 2017, according to data from the FD. Seabob stock assessments were conducted in 2012 and most recently in 2019. The seabob HCR, which has been in place since 2013, sets limits on the fishing effort based on the observed annual catch per unit of effort (CPUE) in the prior management period. For the first time, in 2019 the observed CPUE fell below the trigger level CPUE, leading to reduced allowable fishing effort in 2020 and closer monitoring of the HCR indicator. As a result, management measures were introduced in 2019, including an extension to the closed period from six to eight weeks. This closed season was extended for another two weeks to ten weeks in total in 2020, due to low CPUE in 2019 (CRFM, 2020a, 2020b). While the factors contributing to this decline are yet to be confirmed by scientific evidence, climate change impacts, as well as offshore drilling and an increase in sargassum seaweed blooms are thought to be contributing factors and require urgent research. Another threat to maintaining MSC certification is inadequate data collection, monitoring and management of ETP species and efforts to reduce unwanted catches. To this end, although efforts to reduce bycatch have already begun in the industrial channel (e.g. adoption of BRDs, TEDs and VMS), more improvements in data collection and monitoring are needed. Moreover, there is no baseline established for stock levels of species targeted by the artisanal channel and currently no ability to monitor the stock levels of these species, determine bycatch levels and reduce unintended catch associated with artisanal fishing gear, including turtles.

Key **strategic options** emerge from the SWOT and revolve around the listed opportunities and threats as follows:

- Supporting sustainable fisheries management across both channels to address issues of declining catch (threat), by building on the existing commitment of vertically integrated companies to stabilize stock and reduce bycatch (strength) and improving stock and bycatch assessments in the artisanal channel, and data collection and monitoring of catch across both channels (weaknesses).
- Increasing export value for industrial actors through increased sales of larger-sized shrimp to the markets of the United States of America and the European Union (opportunity) by complying with changes in fishing regulations implemented in response to MSC conditions (strength) and proactively adopting additional sustainable fishing practices (e.g. longer periods without fishing) to reduce pressure on stock (threat) as recommended by findings from scientific research studies on factors affecting stock decline.
- Improving the food safety and quality of seabob caught by artisanal fishers and traded from strategic landing sites (weakness to be addressed) combined with facilitating market linkages and developing business models to enable higher-value products to reach potential higher-

³ According to the Guyana National Budget 2022, the oil and gas subsector is projected to grow by 96.7 percent in 2022 (PwC, 2022)

- value domestic markets, such as supermarkets and the hospitality industry (opportunity).
- Recognizing the key role that women play as workers in processing factories in the industrial channel and as processors and vendors in the artisanal channel (strength), improving the conditions for women workers in the industrial channel (weakness) and increasing the share of value added for women business owners (as processors and vendors) and women workers in the artisanal channel (weakness) by improving the representation of women and access to higher-value markets (opportunity).

Informed by the SWOT analysis, the sustainability assessments, the VC map and stakeholder interests as reflected during consultations, an overall objective for the upgrading strategy was developed with stakeholders in the form of **a vision statement** as follows:

“In 2032, Guyana will have strengthened its position as a leading exporter of seabob shrimp globally by ensuring a sustainable and resilient value chain for seabob across the industrial and artisanal channels, that is well-regulated and supported by data, with improved infrastructure for artisanal fishers and empowerment of women across both channels.”

Specific and measurable targets associated with the vision (by 2032) are:

Environmental:

- Industrial CPUE does not fall below the trigger level CPUE in any quarter (monitored monthly with changes to HCRs made quarterly by FD if required);
- Reduction of bycatch discard levels of Chinese seine fishers;⁴ and
- Maintaining 100 percent adoption of BRDs and TEDs by all industrial vessels.

Economic:

- Total export value increased to USD 15.5 million by 2025 and USD 16.9 million by 2032 (10 percent and 20 percent increase, respectively, compared to baseline 2015–2020);
- Number of FTE jobs in core VC increased to 1 425 by 2025 and 2032 (1.5 percent increase compared to baseline 2015–2020); and
- Direct value added by core VC increased to USD 39 million by 2025 and USD 43 million by 2032 (12 percent and 24 percent increase respectively compared to baseline 2015–2020).

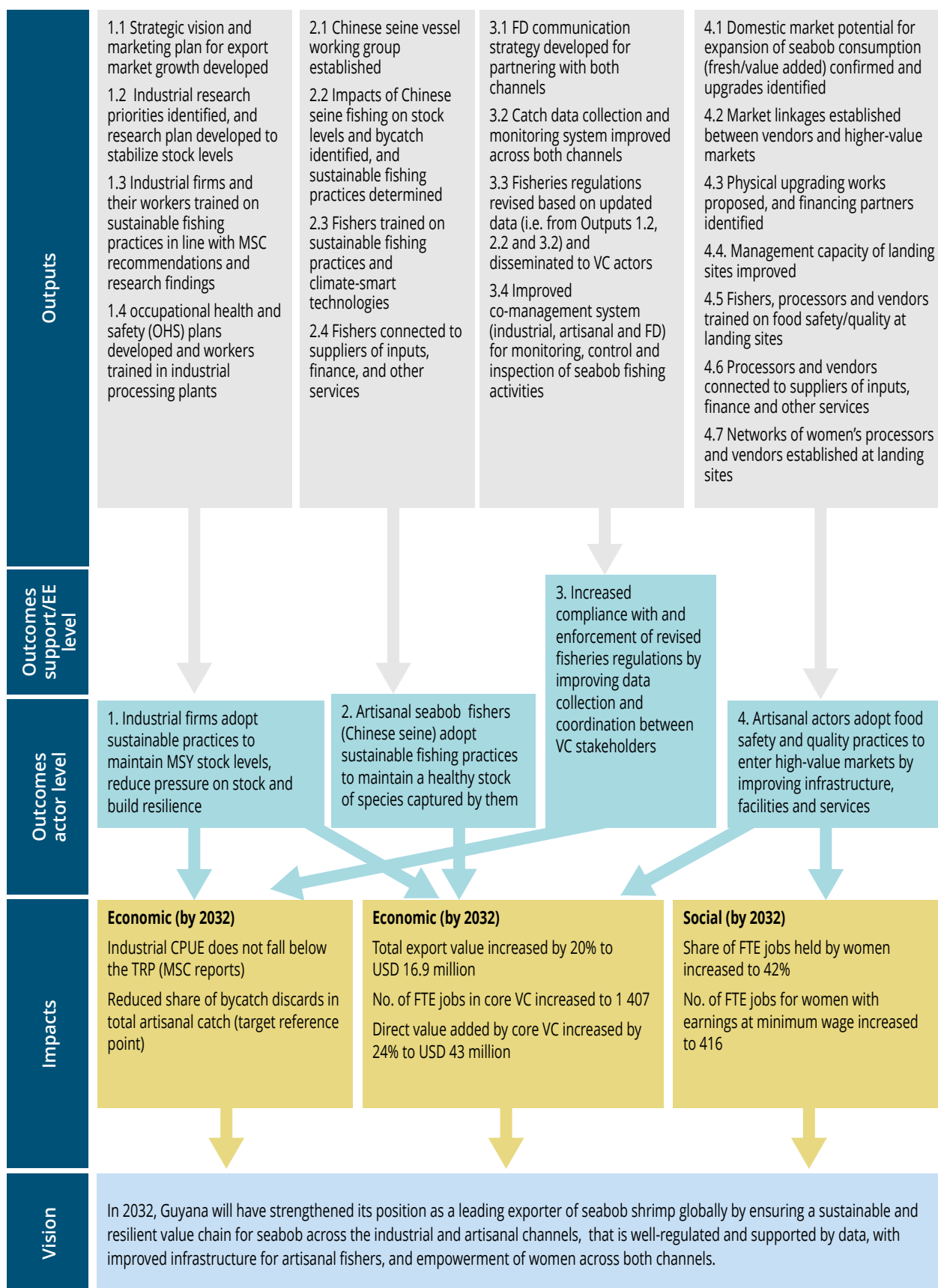
Social:

- Share of FTE jobs for women increased to 43 percent by 2025 and 2032 (3 percent increase compared to baseline 2015–2020); and
- Number of FTE jobs for women with earnings not below national minimum wage increased to over 420 by 2025 and 2032 (29 percent increase compared to baseline 2015–2020).

The vision and upgrading strategy to achieve the vision are summarized in the **theory of change** (ToC) diagram below. The ToC covers the whole upgrading strategy (the implementation of which may go beyond the scope of FISH4ACP project) rather than being specific to the FISH4ACP project.

⁴ Reduction level to be determined following a study on the impact of Chinese seine fishing on stock levels and bycatch.

Figure 12. Theory of change – Guyana seabob value chain



Source: Duong, G., Rankin, M., Ahmed, G., Rice, J., Nguyen, H., Esnard, T. & McFee, D. 2023. *The Seabob value chain in Guyana: Analysis and design report*. Rome, FAO.

The **theory of change** to achieve the above vision is based on an integrated approach to working with the industrial and artisanal channels to increase the adoption of sustainable fishing practices, while at the same time building the capacity of the FD to revise policies and regulations based on sound scientific evidence, data collection and improved coordination with and provision of services (e.g. training, extension) to VC actors. This, in turn, will increase compliance with, and enforcement of these regulations. The upgrading strategy proposed would have no impact on, or incentives to increase seabob catches, and as such no increase in average annual total catch volume or additional pressure on seabob stock levels is envisaged. Indeed, pressure on stock levels should decrease through the adoption of sustainable fishing practices across both channels (e.g. reduced number of days at sea, reduced bycatch discards, improved monitoring of ETP species, etc.).

Artisanal fishers will also be supported to adopt climate-smart technologies to increase their resilience (learning and adaptation) while reducing their carbon emissions and dependency on non-renewable energy. Changes to the business model of the downstream (processing and market vendor) segment of the artisanal value chain will be incentivized through training on improved seabob handling practices (e.g. processing and storage) and food safety and quality, coupled with infrastructure upgrades at strategic wharfs and landing sites and facilitating linkages to emerging higher-value retail outlets such as supermarkets, hotels and restaurants. Women dominate the market vendor (retailing) and processing segments of the VC, where profitability levels are the lowest of all actors. Upgrades to the business model of market vendors and processors will generate sufficient additional income to increase the number of FTE employment opportunities for women and increase wages paid to female employees.

The proposed upgrading strategy consists of **four key elements (outcomes)**, which aim to holistically improve the (economic, social and environmental) sustainability performance of the seabob VC.

- **Industrial firms adopt sustainable practices to maintain MSY stock levels, reduce pressure on the ecosystem and build resilience**

This outcome draws on the strengths and willingness of the industrial channel to **maintain MSC certification** over the next ten years, but encourages actors to look beyond certification alone, and **adopt changes in fishing practices as recommended by research studies** (including regular stock assessments) to investigate the root causes associated with stock decline. The aim is to stabilize stock levels by not increasing total catch over the next ten years, while at the same time increasing export market value for the industrial channel as a whole, by developing a strategic vision for the export industry and associated marketing plan targeting the United States of America and European Union markets as the main outlets for seabob exports (>70 percent annually to the United States of America in 2015–2020; 20 percent destined for the European Union in 2020). While the business model does not change, changes in fishing practices may involve potentially reducing the number of days spent fishing each year, while increasing CPUE, in order to allow for the increased catch of larger sized shrimp, which in turn will generate greater export value in the markets of the United States of America and the European Union based on higher prices paid for bigger sizes.

As a means to strengthen the behavioural resilience domains of participation and inclusion and learning and adaptation, industrial processing companies will take a proactive approach towards **preparing for the inclusion of social issues (e.g. labour conditions, gender equality)** that will likely become part of the revised MSC standard in the future. One way to initiate this process, will involve a comprehensive **review of occupational health and safety standards (OHS)**

currently in place in seabob processing firms, and the development of an industry-wide set of OHS standards that can be adopted and implemented by management across the three firms. These industry standards will also take into account gender-specific OHS needs, given that almost 40 percent of all employees working in processing factories are women. Issues related **to women's economic empowerment** will be considered, given that in industrial firms women workers are mainly engaged in processing and get paid considerably lower salaries (1.5 times less) than male workers who are hired for fishing and supervision/management roles.

To further increase the behavioural resilience domains of learning and adaptation through increasing adoption of innovative technologies and reducing reliance on non-renewable energy sources, the **feasibility of industrial firms investing in renewable energy sources (e.g. solar power)** and sourcing at least part of their energy requirements from renewable sources will be investigated. Adoption of renewable energy will be encouraged to the extent possible during the lifetime of the upgrading strategy.

- **Artisanal seabob fishers (Chinese seine) adopt sustainable fishing practices to maintain a healthy stock of species captured by them.**

Through **research, grants/loans and other supporting outputs (such as training, business plan development support, and linking to finance and other service providers), artisanal fishers will be incentivized to shift to more sustainable and resilient practices** for catching seabob and other finfish. A **Chinese seine vessel working group** (across different regions) **will be established** to improve coordination of artisanal seabob fishers and as a means for both the FISH4ACP project and the FD to better target this subset of artisanal fishers, improve two-way communication and better understand the specific challenges they face. Their adoption of climate-smart technologies will also be facilitated by **linking fishers to service providers and financing/matching grants for technologies that generate lower emissions** (e.g. fuel-efficient technologies such as the use of four-stroke engines, use of sails, etc.). The business case for changing engines/adopting fuel-efficient technologies will be evidenced through a decrease in the operating costs for artisanal fishers associated with fuel consumption of traditional two-stroke engines (currently 30 percent of total costs for artisanal fishers).

- **Increased compliance with and enforcement of revised fisheries regulations by improving data collection and coordination between VC stakeholders**

A declining seabob stock is a significant threat to the VC and could jeopardize MSC certification and artisanal fisher livelihoods in the longer term. One of the greatest challenges facing the FD is the inadequate data collection and monitoring system across both channels to assess stock levels, catch and bycatch data, and revise fisheries regulations in a timely manner based on the data collected. Environmental monitoring of ETP species also needs to be improved, based on MSC conditions (MSC 2019, 2020, 2021). By **developing a communication strategy for the FD**, the importance of providing regular feedback to VC actors on data collection and analysis will be addressed, as well as communicating the importance of/incentives for complying with licensing⁵ regulations for the artisanal channel, where around 85 percent of all Chinese seine vessels were licensed in 2021 (pers. comm, FD, April 2022). A functioning stakeholder grievance mechanism will

⁵ A key incentive for licensing and submission of accurate catch data that needs to be explained clearly to artisanal fishers is the requirement for vessels to be licensed in order to be considered under the disaster risk management plan for the oil and gas sector under preparation by the FD. Only those vessels that are licensed will be able to seek compensation proportionate to the scale of their fisheries operations in the event of a disaster such as an oil spill. As such, failure to comply with licensing regulations exposes vessel owners to additional risks.

also be established within the FD, to improve the responsiveness of the government to the needs of the actors, and provide artisanal fishers in particular, with an anonymous outlet to report their grievances.⁶

These measures are the first step toward building trust between the FD and VC actors (artisanal actors in particular) and creating the social capital required to effectively implement a participatory approach to data collection, monitoring and inspection. **A range of pilot approaches⁷ can be trialled to improve data collection and monitoring across both channels. Fisheries regulations will then be revised based on updated data** coming from stock assessments from both channels and improved catch and bycatch data collection, including the monitoring of ETP species. The revision of fisheries regulations will build on recommendations/conditions from MSC reports as well as broader/more effective consultations with VC stakeholders and/or their representative bodies. In turn, **compliance with fisheries regulations will be increased through improved service provision by the FD (e.g. transparent communication, regular feedback on data collected, training for fishers) and enhanced mutual commitment across channels to increase the sustainability of the seabob stock.** While service provision by the FD will be supported by capacity building, technical assistance and support for use of digital tools that can make the Department's operations more efficient, an enhanced commitment by industrial and artisanal actors will be stimulated through more effective communication with the FD and increased coordination between VC actors thanks to strengthening/revitalizing their representative bodies such as the Seabob Working Group (SWG) and the AFAC.

- **Artisanal actors adopt food safety and quality practices to enter high-value markets by improving infrastructure, facilities and services**

Market vendors and cottage processors are the least profitable segment of the value chain (returns on sales of 12 percent and 13 percent respectively) and these VC functions are largely carried out by women. Therefore, additional attention will be paid to gender constraints and opportunities, allowing the increased participation of women and increased share of direct value captured by women. To this end, **a study will first be conducted to verify the potential for expansion of domestic seabob consumption in higher-value outlets**, including supermarkets, hotels and restaurants as a result of the growth of the oil and gas and tourism sectors in Guyana. By providing **training on improved seabob handling practices (e.g. food safety and quality, improved drying and storing techniques), coupled with infrastructure upgrades at strategic wharfs and landing sites (mainly Meadowbank in Region 4 and Rosignol in Region 5)**, women processors and vendors will be linked to higher-value customers as well as necessary service providers (e.g. suppliers of solar dryers, ice and ice boxes) to increase their incomes from higher-value sales of fresh seabob. Their representation and voice in decision-making regarding the management of landing sites will also be improved by **forming a network of women vendors and processors**, subject to their interests.

Table 2 shows the **economic, social and environmental impacts that are expected from the upgrading strategy**. Direct value added of the VC would increase to USD 39 million by 2025 and USD 43 million by 2032 (a 12 percent and 24 percent increase, respectively, compared to baseline 2015–2020). The number of FTE jobs in the core VC increase to 1 425 by 2025 and 2032 (a 1.5

⁶ For example, this may involve reporting poor/corrupt management of cooperatives, damage to fishing gear caused by industrial trawlers, etc.

⁷ For example, hiring youth to collect data in the early mornings at landing sites, introducing artisanal fishers to VMS and digital data collection tools that can be used to improve real-time catch reporting, timely submission of data will be rewarded with incentives such as safety at sea training and support to purchase safety equipment or fuel-saving equipment, etc.

percent increase compared to baseline 2015–2020). In addition to economic improvements, the share of FTE jobs for women will also increase to 43 percent by 2025 and 2032 (3 percent increase in relative terms compared to baseline 2015–2020), and the number of FTE jobs for women with earnings above the national minimum wage will increase to 421 by 2025 and 2032 (29 percent increase compared to baseline 2015–2020). In terms of environmental aspects, it is expected that industrial CPUE will not fall below the trigger level CPUE in any quarter, the bycatch discard levels of Chinese seine fishers will be reduced, and all industrial vessels will maintain 100 percent adoption of BRDs and TEDs.

Table 2. Key economic, social and environmental performance indicators (on an annual basis) under current and upgraded situations (aggregated at value chain level)

Item	Baseline (2015–2020)	2025	2032
Economic indicators			
Total export value (USD/year)	14 049 594	15 454 554	16 859 513
Number of FTE jobs (including family labour)	1 406	1 425	1 425
Total value of net wages (USD/year)	3 398 464	3 426 598	3 426 598
Direct value added by core VC (USD/year)	34 720 786	38 937 003	43 158 271
Social indicators			
Share of FTE jobs captured by women	41.1%	42.5%	42.5%
Number of FTE jobs for women with earnings greater than the national minimum wage	327	421	421
Environmental indicators			
Industrial CPUE does not fall below the TRP level in any quarter	Yes	Yes	Yes
Number of artisanal fishers using environmentally friendly practices	0	30	60
Number of industrial firms using some form of renewable energy	0	1	1
Share of bycatch in total catch by artisanal fishers	A study will be conducted to establish baseline	To be determined (tbd) following baseline	Tbd following baseline

The upgrading strategy will also increase the resilience of the VC. Improved availability and quality of the inputs and services required for proper handling, processing and storage of fresh and dried seabob will enable processors and market vendors to maintain higher levels of stock of fresh and processed seabob, which will to some extent act as a buffer against shocks (such as floods or heavy rainfall) and fluctuations in supply (due to catch variations). By adopting improved techniques (i.e. food safety and quality practices and increased cold storage), market vendors will

be able to ensure better quality of fresh seabob. This will open access to higher-value domestic markets (supermarkets, the hospitality industry and the oil and gas catering sector), which will in turn lead to increased market diversification and less dependence on local markets/buyers. For the industrial channel, opportunities to diversify product offerings (e.g. frozen cooked seabob in addition to fresh) as well as increased trade to regional markets will be investigated under the marketing plan to be developed for GATOSP as a means to reduce risk and diversify market opportunities. Additionally, various upgrading activities related to institutional strengthening, advocacy and co-management, and support to groups/cooperatives of fishers and female artisanal actors will bring about stronger social linkages and networks between VC stakeholders, and thus will improve the connectivity and collaboration within the VC.



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5. Implementation plan for the upgrading strategy

Achieving these performance improvements and realization of the upgrading strategy will require many activities to be funded and implemented. **FISH4ACP, the government, the private sector and other donors/partners will all have a role to play in funding and implementing activities.**

The table below provides a summary **list of activities** in support of the different outputs. Some costs included in the table will need to be revised based on studies examining in more detail the feasibility and need for investments, and refinement of the cost estimates. The activity and investment plans are **for the whole upgrading strategy, rather than being FISH4ACP-specific.**

Table 3. Summary of upgrading activities and investments (USD)

Outcome 1 - Industrial firms adopt sustainable practices to maintain MSY stock levels, reduce pressure on ecosystem and build resilience		Funding source (lead/support)	Total costs (USD)	Type of cost	Timing (start-finish)
Outputs	Activities				
1.1. Strategic vision and marketing plan for export developed	1.1.1 Facilitate guided strategic planning sessions with GATOSP members to develop mission and vision statement for GATOSP for next ten years	FISH4ACP	7 000 x 2 sessions = 14 000	Facilitation	Jul-Oct 2022
	1.1.2 Complete a study on seabob import demand potential (volumes, product attributes [e.g. sizes]), options for value added products, consumer demands regarding sustainability standards/certifications) in markets in the United States of America and the European Union	FISH4ACP	25 000	Studies/technical assistance	Jul-Dec 2022
	1.1.3 Facilitate the development of the industry-level export marketing plan (2023-2033) with GATOSP members	FISH4ACP, GATOSP	24 000	Facilitation	Jan-Jun 2023
	1.1.4 Implement the actions outlined in the export marketing plan	SWG, GATOSP/FD, FISH4ACP	n/a	Facilitation	Jul 2023-ongoing
1.2. Industrial research priorities identified and research plan developed to stabilize stock levels	1.2.1 Review SWG research plan with GATOSP and FD to identify research gaps/consolidate industry research priorities	FISH4ACP	12 000	Studies/technical assistance	Oct-Dec 2022
	1.2.2 Facilitate the development of the updated SWG research plan, with research partners and potential funding sources identified	FISH4ACP, SWG, GATOSP, FD/Caribbean Regional Fisheries Mechanism (CRFM)	12 000	Facilitation	Jan-Apr 2023
	1.2.3 Implement the actions outlined in the revised seabob research plan	SWG, FD, GATOSP/FISH4ACP	n/a	Facilitation	Apr 2023-ongoing

1.3. Industrial firms and their workers trained on sustainable fishing practices in line with MSC recommendations and research findings	1.3.1 Identify business development service (BDS) providers to provide training-of-trainer services to FD on sustainable fishing practices for industrial fishers	FISH4ACP	2 500	Facilitation	Jun-Jul 2023
	1.3.2 Develop training materials for industrial fishers on sustainable fishing practices with FD and BDS providers	FISH4ACP	20 000	Studies/technical assistance	Sep- Dec 2023
	1.3.3 Integrate training of industrial fishers (boat captains, boat staff) on sustainable fishing practices with MSC training programme and other FD's extension programmes	FISH4ACP, FD/BDS providers	20 000	Training	Jan 2024-ongoing
1.4. OHS plan developed and workers trained in industrial processing plants	1.4.1 Conduct a study to assess the existing OHS conditions and plans across the three firms	FISH4ACP	15 000	Studies/technical assistance	Jul-Dec 2022
	1.4.2 Facilitate the development of a draft national OHS plan for the seabob industry	FISH4ACP, GATOSP, FD, Ministry of Labour and Social Security	15 000	Facilitation	Jan-Jun 2023
	1.4.3 Implementation of the draft OHS plan	GATOSP, FD, Ministry of Labour and Social Security/ FISH4ACP	n/a	Facilitation	Jun-Dec 2023
	1.4.4 Revision and finalization of the OHS plan based on implementation experience	FISH4ACP, GATOSP, FD, Ministry of Labour and Social Security	10 000	Facilitation	Jan-Jun 2024

Outcome 2 - Artisanal seabob fishers (Chinese seine) adopt sustainable fishing practices to maintain a healthy stock of species captured by them

Outputs	Activities				
2.1. Chinese seine vessel working group established	2.1.1 Identify Chinese seine fishers in regions 2, 3, 4, 5 and 6 who wish to participate in the working group	FISH4ACP, FD, Guyana National Fisherfolk Organisation (GNFO)	1 000 x 5 regions = 5 000	Facilitation	Jul-Oct 2022
	2.1.2. Facilitate the establishment of the Chinese seine working group	FISH4ACP, FD, GNFO	5 000	Facilitation	Oct-Dec 2022
	2.1.3 Develop an inventory (database) of Chinese seine vessel characteristics to keep a record of engine types and fishing practices	FISH4ACP, FD, GNFO	10 000	Studies/technical assistance	Nov 2022-Apr 2023

(cont.)

2.2. Impact of Chinese seine fishing on stock levels and bycatch identified, and sustainable fishing practices determined	2.2.1. Design and conduct a baseline study on Chinese seine fishing's impacts on the seabob stock and bycatch species to identify improved fishing practices needed	FISH4ACP, FD, GNFO, WWF, and other partners (e.g. University of Guyana)	30 000	Studies/ technical assistance	Aug 2022–Feb 2023
2.3. Fishers trained on sustainable fishing practices and climate-smart technologies	2.3.1 Identify BDS providers to provide training-of-trainer services to FD on sustainable fishing practices for artisanal fishers	FISH4ACP	2 500	Facilitation	Feb–Apr 2023
	2.3.2 Develop training materials for artisanal fishers on sustainable fishing practices with FD and BDS providers	FISH4ACP, BDS, FD	25 000	Studies/ technical assistance	Apr–Oct 2023
	2.3.3. Integrate training for fishers on sustainable fishing practices into FD's extension programmes	FD, FISH4ACP/ BDS providers	20 000	Training	Nov 2023–ongoing
2.4 Fishers connected to suppliers of inputs, finance and other services	2.4.1 Identify suppliers of sustainable (e.g. climate-smart) technologies/equipment and finance for fishers	FISH4ACP, FD, GNFO	3 000	Facilitation	Feb–Apr 2023
	2.4.2 Facilitate linkages between artisanal fishers and input suppliers/financers (e.g. through match-making forums, business plan development support)	FISH4ACP, input suppliers, financers, BDS providers	35 000 (for 5 regions)	Facilitation	May 2023–May 2024
	2.4.3. Purchase of equipment/ inputs required for sustainable fishing practices	Fishers/ FISH4ACP	440 000	Equipment	Jul 2023–ongoing

Outcome 3 - Increased compliance with and enforcement of revised fisheries regulations by improving data collection and coordination between VC stakeholders

Outputs	Activities				
3.1. Fisheries Department communication strategy developed for partnering with both channels	3.1.1 Develop a draft communication strategy with FD staff and artisanal and industrial representatives	FISH4ACP, FD, SWG, GNFO	15 000	Studies/ technical assistance	Dec 2022–Apr 2023
	3.1.2 Implement the draft communication strategy	FD, GATOSP, SWG, GNFO, FISH4ACP	n/a	Facilitation	Apr–Sep 2023
	3.1.3. Revise and finalize FD's communication strategy based on implementation experience	FISH4ACP, FD	5 000	Studies/ technical assistance	Oct–Dec 2023

(cont.)

3.2. Catch data collection and monitoring system improved across both channels	3.2.1. Develop the draft design of an improved system for catch data collection and monitoring with FD	FISH4ACP, FD/CRFM	25 000	Studies/technical assistance	Jun–Dec 2022
	3.2.2. Purchase equipment required for piloting the draft improved system in one region	FISH4ACP	10 000 (one region)	Equipment	Jan–Apr 2023
	3.2.3. Train FD staff, industrial captains and second mates, and Chinese seine fishers to pilot the draft improved system	FISH4ACP	10 000 (one region, one firm)	Training	Apr–May 2023
	3.2.4. Pilot the draft improved system in one region	FISH4ACP, FD/CRFM	15 000	Facilitation	May–Sep 2023
	3.2.5. Revise and finalize the improved system for catch data collection and monitoring based on pilot experience	FISH4ACP, FD/CRFM	10 000	Studies/technical assistance	Oct–Dec 2023
	3.2.6. Engage partners, draft and agree on a mechanism to collaborate on the funding and implementation of the improved system	FISH4ACP, FD, CRFM, other donors	15 000	Facilitation	Dec 2023–May 2024
	3.2.7. Purchase equipment and set up digital systems required for implementing the improved data collection/monitoring system	FD, other donors	100 000	Equipment	Jun 2024–ongoing
	3.2.8. Train FD staff, industrial captains and second mates and Chinese seine fishers on the revised, improved system	FISH4ACP/CRFM	25 000	Training	Apr 2024–Feb 2025
	3.2.9. Conduct data collection and monitoring using improved system	FD	n/a	Facilitation	Aug 2024–ongoing
3.3. Revised fisheries regulations drafted based on updated data (i.e. from outputs 1.2, 2.2, and 3.2)	3.3.1 Review and propose drafts of revised fisheries regulations	FISH4ACP, FD	25 000	Studies/technical assistance	Jan–Jun 2024
	3.3.2. Facilitate the government's adoption of the draft revised regulations	FISH4ACP, FD	10 000	Facilitation	Jun 2024–Feb 2025

(cont.)

3.4. Improved co-management system (industrial, artisanal and FD) for monitoring, control, surveillance and inspection of seabob fishing activities	3.4.1. Support FD staff in regional offices with purchase of improved equipment/tools for monitoring, control, surveillance and inspection (e.g. software, drones)	FISH4ACP	6 000 each x 5 FD offices = 30 000	Equipment	May 2023–Jan 2024
	3.4.2. Train FD staff in regional offices on the use of improved equipment/tools	FISH4ACP, suppliers of equipment/ tools	3 000 x 5 FD offices = 15 000	Training	Feb–May 2024
	3.4.3. Draft the revised terms of reference (ToRs) and propose the expanded membership base of the AFAC	FISH4ACP, FD, GNFO	12 000	Studies/ technical assistance	Jul–Nov 2022
	3.4.4. Facilitate the endorsement of the draft revised ToRs and membership base of the AFAC	FISH4ACP	12 000	Facilitation	Dec 2022–Mar 2023
	3.4.5. Draft the revised ToRs and propose the expanded membership base of the SWG	FISH4ACP, FD, GATOSP	12 000	Studies/ technical assistance	Jul– Nov 2022
	3.4.6. Facilitate the endorsement of the draft revised ToRs and membership base of the SWG.	FISH4ACP	12 000	Facilitation	Dec 2022–Mar 2023

Outcome 4 - Artisanal actors adopt improved seabob handling practices (including food safety and quality) to enter high-value markets by improving infrastructure, facilities and services

Outputs	Activities				
4.1 Domestic market potential for expansion of seabob consumption (fresh/value added) confirmed and upgrades identified	4.1.1. Conduct a study on domestic market potential for seabob to identify required upgrades	FISH4ACP	30 000	Studies/ technical assistance	Jun–Dec 2022
4.2 Market linkages facilitated between vendors and higher-value markets	4.2.1. Identify potential buyers on higher-value markets	FISH4ACP	2 000	Facilitation	Jan–Mar 2023
	4.2.2. Facilitate matchmaking forums to connect vendors and buyers	FISH4ACP	20 000 (for 5 regions)	Facilitation	Apr 2023–Apr 2024





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4.3 Physical upgrading works proposed, and financing partners identified	4.3.1. Conduct a feasibility study to identify/design infrastructural upgrades required in strategic wharfs/ landing sites	FISH4ACP	32 000 (for 5 wharfs/ landing sites)	Studies/ technical Assistance	Jan–Jun 2023
	4.3.2. Conduct a gender-specific study to identify the upgrades specifically required by women in wharfs/landing sites	FISH4ACP	5 000 x 2 wharfs = 10 000	Studies/ technical Assistance	Mar–Jun 2023
	4.3.3. Engage partners, draft and agree on a mechanism to collaborate on the funding and implementation of the infrastructural upgrading plan (including gender-specific infrastructural upgrades)	FISH4ACP, FD, Ministry of Public Infrastructure, other donors	15 000 (for 2 wharfs)	Facilitation	Jun–Dec 2023
	4.3.4. Implement the infrastructural upgrading plan	FD, Ministry of Public Infrastructure, other donors/ FISH4ACP	1 300 000 for 2 wharfs	Infrastructure	Jan 2024–ongoing
4.4 Management capacity of landing sites improved	4.4.1. Develop best management/operational model for wharfs/landing sites (e.g. direct management by cooperatives, PPP, women's groups, or hired managers) and assess management/operational capacity gaps	FISH4ACP	30 000 (for 2 wharfs)	Studies/ technical assistance	Mar–Oct 2023
	4.4.2. Prepare and deliver programme on capacity building/ business management training for wharf/landing site managers and wharf users	FISH4ACP, FD, BDS providers	27 000 (for 2 wharfs)	Training	Nov 2023–Feb 2025
4.5 Fishers, processors and vendors at wharfs/ landing sites trained on improved seabob-handling practices to increase food safety and quality	4.5.1. Identify fishers, processors and vendors who want to adopt improved seabob handling practices to increase food safety and quality	FISH4ACP, FD	800 x 5 regions = 4 000	Facilitation	Jan–Mar 2023
	4.5.2 Identify BDS providers to provide training-of-trainer services to FD on improved seabob handling practices	FISH4ACP, FD, Ministry of Health	3 000	Facilitation	Jan–Mar 2023
	4.5.3 Develop training materials on improved seabob handling practices with FD and BDS providers	FISH4ACP, BDS providers, FD, Ministry of Health	30 000	Studies/ technical assistance	Mar– Sep 2023
	4.5.4 Integrate training for fishers, processors and vendors on improved seabob-handling practices into FD's extension programmes	FD, Ministry of Health, FISH4ACP	20 000	Training	Oct 2023–ongoing

(cont.)

4.6 Processors and vendors connected to suppliers of inputs, finance, and other services	4.6.1 Identify suppliers of improved seabob handling technologies/equipment and finance for processors and vendors	FISH4ACP, FD, GNFO	2 000	Facilitation	Jan–Mar 2023
	4.6.2 Facilitate linkages between processors/vendors and input suppliers/financers (e.g. through matchmaking forums, business plan development support)	FISH4ACP, BDS providers	30 000 (for 5 regions)	Facilitation	Apr 2023–Apr 2024
	4.6.3. Purchase of equipment/ inputs required for improved technologies	Processors, vendors/ FISH4ACP	10 000	Equipment	Sep 2023–ongoing
4.7 Networks of women processors and vendors established at wharfs/ landing sites	4.7.1. Identify female processors and vendors who want to form into groups/networks	FISH4ACP, FD, GNFO	800 x 5 regions = 4 000	Facilitation	Jan–Mar 2023
	4.7.2. Train women on organization/collective action and how to form and manage groups	FISH4ACP, FD, GNFO, BDS providers	5 000 x 5 regions = 25 000	Training	Mar–Dec 2023
	4.7.3. Train women on women’s rights, leadership, business and management	FISH4ACP, FD, GNFO, BDS providers	4 000 x 5 regions = 20 000	Training	Jan 2024–Feb 2025

Source: Duong, G., Rankin, M., Ahmed, G., Rice, J., Nguyen, H., Esnard, T. & McFee, D. 2023. *The Seabob value chain in Guyana: Analysis and design report*. Rome, FAO.

Activities to be funded by					
	FISH4ACP		Private sector		Governments/donors
	Blended sources (FISH4ACP and other stakeholders)				

Drawing on the information provided above, Table 4 provides an overview of the investments needed to realize the vision and how these investments are expected to be financed.

Table 4. Value chain upgrading investment table (USD)

In USD	Financing sources			Total
Type of investments	FISH4ACP	Government/ donors	Private sector	Totals by type of investments
Equipment	104 000	100 000	386 000	590 000
Facilitation	260 000		12 000	272 000
Infrastructure	70 000	1 230 000		1 300 000
Studies/technical assistance	373 000			373 000
Training	192 000			192 000
Totals by funding source	999 000	1 330 000	398 000	2 727 000

A total **investment cost of USD 2.7 million is estimated** for a variety of equipment, facilitation, infrastructure, studies/technical assistance and training. This cost is allocated between four outcomes of the upgrading strategy as follows:

- Outcome 1: USD 169 500, or 6 percent of total costs
- Outcome 2: USD 575 500, or 21 percent of total costs
- Outcome 3: USD 358 000, or 13 percent of total costs
- Outcome 4: USD 1 624 000, or 59 percent of total costs

Of the total costs, FISH4ACP's contribution can potentially reach **USD 999 000 (37 percent)**, mostly in the form of studies/technical assistance, facilitation and training.

A number of **risks to successful implementation of the upgrading strategy** have been identified and assessed for their likelihood and potential impact. Mitigating strategies have been defined but risks cannot be completely avoided, as indicated in Table 5.

Table 5. Risks associated with the upgrading strategy

Risk name	Risk nature	Risk likelihood (1-5)	Risk impact (1-5)	Overall risk level (1-25)	Mitigating options
The improved system for data collection and monitoring is not effectively used and/or maintained over time	Improved data collection and monitoring is key to sustainable fisheries management. However, it is now uncertain whether the FD can secure the financial and human resources required to conduct regular data collection/monitoring over time.	4	4	16	FISH4ACP works closely with FD to seek reliable sources of funding for data collection/monitoring activities.

(cont.)

Risk name	Risk nature	Risk likelihood (1-5)	Risk impact (1-5)	Overall risk level (1-25)	Mitigating options
Decline of seabob biomass	It takes time to see the impacts of improved management measures and fishing practices on the seabob stock. In the meantime, the seabob stock can decline due to weak management, persistent overexploitation, the impact of climate change and pollution (e.g. oil spill). The value chain will be negatively affected by any stock decline.	4	4	16	FISH4ACP facilitates the effective implementation of the Guyana Fisheries Management Plan, Artisanal Fisheries Management Plan, and various recommendations from MSC reports. This will be accompanied by training, financial and livelihood support for VC actors to comply with regulations (e.g. longer closed season).
Upgrading of landing sites/ wharfs is not implemented or is delayed	The upgrading activities related to support to cottage processors and market vendors (mostly women) use landing sites/wharfs as focal areas for interacting with and supporting VC actors through improved provision of services. However, it is now uncertain how to finance the high costs associated with these upgrades.	4	4	16	FISH4ACP works closely with FD and Ministry of Public Infrastructure to seek funding for the upgrades.
The provision of extension services to VC actors and their workers remains inadequate	Training and extension are necessary to build the capacity of VC actors to effectively adopt improved techniques and to maintain and scale-up adoption over time. However, it is now uncertain whether the FD will be able to secure the financial and human resources required for training and extension.	3	4	12	FISH4ACP seeks to build capacity for FD through collaboration with BDS providers and other partners (e.g. University of Guyana, CRFM), who can continue supporting/ collaborating with FD on providing extension services to VC actors after project ends.

(cont.)

Risk name	Risk nature	Risk likelihood (1-5)	Risk impact (1-5)	Overall risk level (1-25)	Mitigating options
Wharf management capacity remains weak even after training/support	The management of wharfs/landing sites may be affected by factors that are difficult to change (e.g. political influences that favour certain groups/ individuals, or the low level of literacy of wharf users that prevent them from effectively defending their rights)	3	4	12	FISH4ACP provides management and business capacity building for wharf managers and users. The design of best wharf management model will be openly discussed with wharf users and managers to ensure transparency and buy-in.
Banks do not provide loans or loans are not taken up by artisanal fishers, processors or vendors	The upgrading strategy is reliant on the adoption of improved practices/ techniques. Most of the artisanal actors have low income and may not be able to satisfy borrowing requirements.	3	4	12	FISH4ACP seeks other funding models such as matching grants or loan guarantees with banks/donors.
Still insufficient incentives for artisanal fishers to properly report data	Effective data collection is largely attributed to timely and precise reporting by fishers. However, fishers may be deterred from reporting when they do not see sufficient benefits of doing so.	3	3	9	FISH4ACP works with FD to design and offer incentives for fishers to report data, as well as improve the communication between the FD and fishers about the need for data collection and how data are used.
VC actors are not willing to participate in groups	Many upgrading activities rely on artisanal actors' forming into groups. However, actors may not be interested in/ willing to do so due to past experience with non-functional groups or cooperatives.	2	4	8	FISH4ACP provides training on the benefits of forming into groups and how to manage groups to ensure representation and transparency. The design of group formation will be discussed with artisanal actors to ensure their buy-in.

(cont.)

Risk name	Risk nature	Risk likelihood (1-5)	Risk impact (1-5)	Overall risk level (1-25)	Mitigating options
The inputs/equipment required for improved practices are unavailable or unaffordable for artisanal actors	The upgrading strategy is reliant on the adoption of improved practices/ techniques, many of which require inputs/equipment that are currently unavailable or available at high cost in Guyana.	2	3	6	FISH4ACP seeks to connect VC actors with suppliers of inputs/equipment and through training and pilots, builds up the demand for these inputs/equipment to be strong enough to stimulate supply.

Note: Overall risk calculated by multiplying risk likelihood with risk impact.

Source: Duong, G., Rankin, M., Ahmed, G., Rice, J., Nguyen, H., Esnard, T. & McFee, D. 2023. The Seabob value chain in Guyana: Analysis and design report. Rome, FAO.

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This report presents the results of the value chain analysis of the seabob value chain in Guyana conducted from 2021-2022 by the value chain development programme FISH4ACP. This report contains a functional analysis of the value chain, assesses its sustainability and resilience, develops an upgrading strategy and an implementation plan to which FISH4ACP will contribute.

FISH4ACP is an initiative of the Organisation of African, Caribbean and Pacific States (OACPS) aimed at making fisheries and aquaculture value chains in twelve OACPS member countries more sustainable. It contributes to food and nutrition security, economic prosperity and job creation by ensuring the economic, social and environmental sustainability of fisheries and aquaculture in Africa, the Caribbean and the Pacific.

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