Food and Agriculture Organization of the United Nations

FISH4ACP

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

SUMMARY REPORT

The coastal pelagics value chain in Sao Tome and Principe

October 2023

german cooperation

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FISH4ACP is an initiative of the Organisation of African, Caribbean and Pacific States (OACPS) contributing to food and nutrition security, economic prosperity and job creation by ensuring the economic, social and environmental sustainability of fisheries and aquaculture value chains in Africa, the Caribbean and the Pacific. FISH4ACP is implemented by the Food and Agriculture Organization of the United Nations (FAO) and partners with funding from the European Union and the German Federal Ministry for Economic Cooperation and Development (BMZ). FISH4ACP seeks to enhance the productivity and competitiveness of twelve fisheries and aquaculture value chains in twelve OACPS member countries, making sure that economic improvements go hand in hand with environmental sustainability and social inclusiveness. It pays special attention to small and medium-sized businesses, because of their potential to deliver economic and social benefits, particularly for women and the youth.

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Exchange rate
USD 1: STN 23.29 (December 2022)

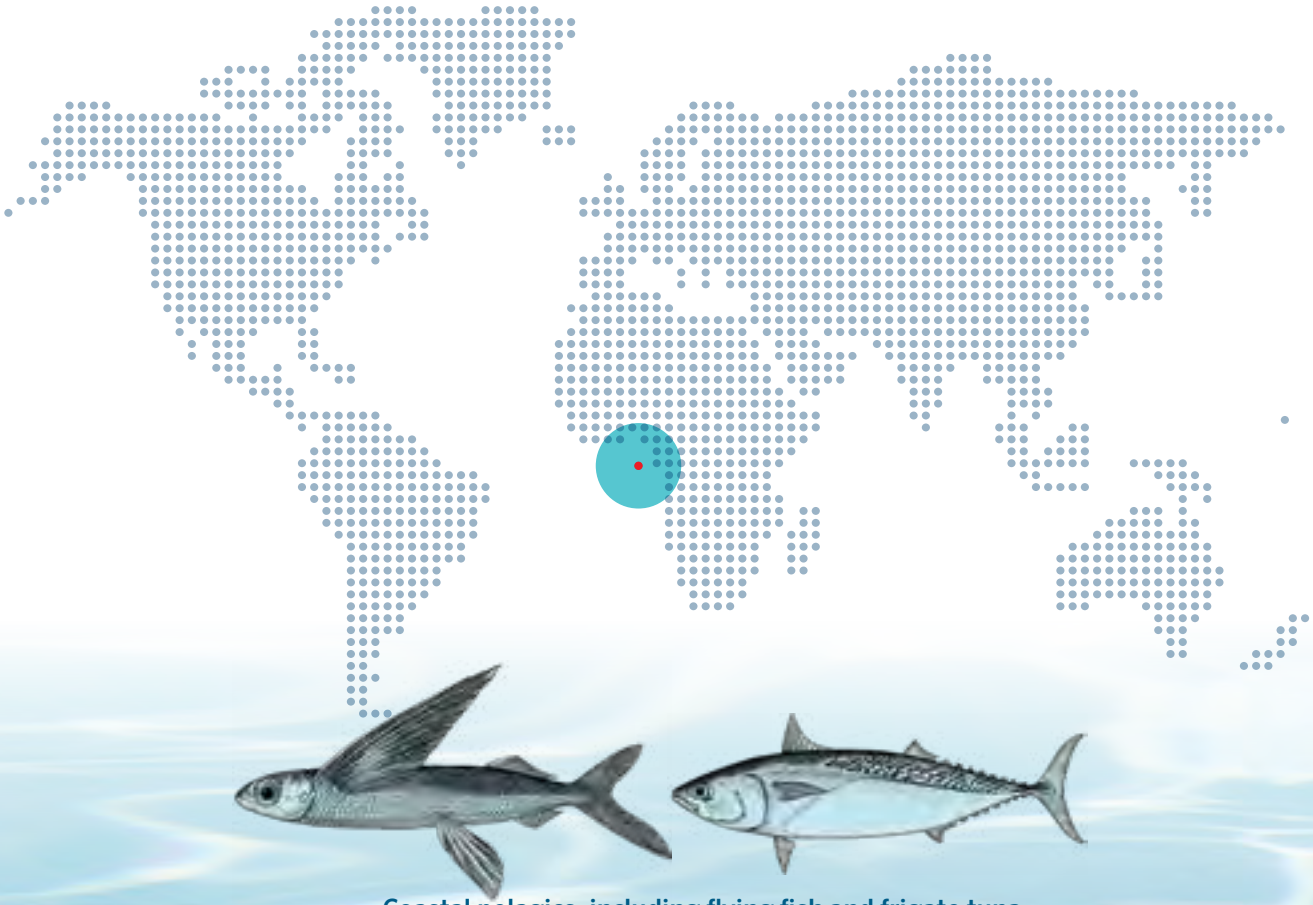
Acronyms

ACP	Africa, the Caribbean and the Pacific
AfDB	African Development Bank
BMZ	Federal Ministry for Economic Cooperation and Development (of Germany)
ETP	endangered, threatened or protected
FAO	Food and Agriculture Organization of the United Nations
FSN	Food Security and Nutrition
FTE	full-time equivalent
GDP	gross domestic product
IFAD	International Fund for Agricultural Development
IUCN	International Union for Conservation of Nature
Kg	kilogrammes
MCS	monitoring control and surveillance
NGO	non-governmental organization
OACPS	Organization of African, Caribbean and Pacific States
PNASE	National School Feeding and Health Programme (PNASE, in Portuguese)
PMU	Project Management Unit
REINA	Business Incubators and Accelerators Network of Sao Tome and Principe (RENA, in Portuguese)
ROI	return on investment
STN	Sao Tomean Dobra
USD	United States dollar
VA	value added
VC	value chain
VCA	value chain analysis
WB	World Bank

1. Introduction

FISH4ACP is an initiative of the Organisation 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 (BMZ).

The coastal pelagics value chain in Sao Tome and Principe is one of 12 VCs competitively selected from over 70 proposals worldwide for support from the FISH4ACP programme. This report presents the outputs of analysis and design work completed between 2021 and 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 March 2023.[1]



Coastal pelagics, including flying fish and frigate tuna
*(Exocoetidae spp. e Auxis thazard)**

[1] This summary document is based on a supporting and more detailed analysis and design document, officially published by FAO: De Labra, G., Vilela López, B., Prieto Porriños, G., Blanc, P.P., Vasta, A. & Anibal, O. 2023. *The coastal pelagics value chain in Sao Tome and Principe: Summary report.* Rome, FAO. The more detailed document provides additional information on methodology, supporting analytical tables and detailed calculations, and background and supporting data.

In Sao Tome and Principe, the coastal pelagic fisheries VC targeted by the FISH4ACP programme is composed of the following eight species: flying fishes (*Exocoetidae sp*), little tunny (*Euthynnus alletteratus*), frigate tuna (*Auxis thazard*), bigeye scad (*Selar crumenophthalmus*), *Decapterus nei*, blue runner (*Caranx crysos*), balao halfbeak (*Hemiramphus balao*) and skipjack tuna (*Katsuwonus pelamis*). The two tuna-like species, little tunny and frigate tuna, are normally identified as a single species in Sao Tome and Principe and are called locally fulu fulu tuna. This is the name used in the report to refer to both species.

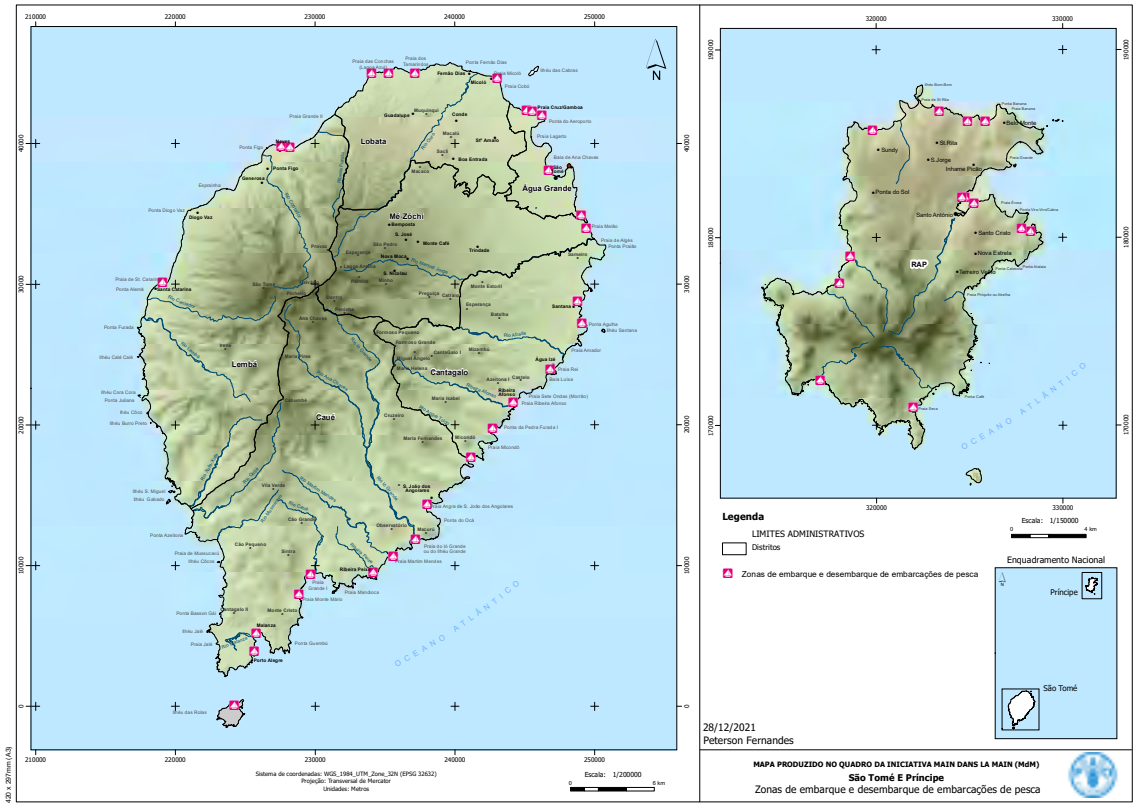
The standard FISH4ACP **methodology** was applied in a slightly adapted manner, **with some modifications to the standardized questionnaire templates** to fit the specific contexts of the VC and the local situation. Secondary research (desk research) was first undertaken, followed by intensive primary data collection efforts conducted in Sao Tome and Principe islands. A wide range of primary data collection tools were utilized: actor interviews focusing on issues related to functional aspects; sustainability (economic, social and environmental) and resilience analysis of the VC; key informant interviews (e.g. with input and service providers, ministry officials, experts, NGOs and associations); focus group discussions; expert group discussions; and surveys with VC actors and consumers. The primary data collection was carried out by the project's national partner (a consortium of three local NGOs: Oikos – Cooperação e Desenvolvimento, Fundação Principe and Programa Tato), in close consultation and coordination with FAO (the VCA team and Project Management Unit [PMU]). A national professional officer, based in Sao Tome and Principe, supported the work throughout the analysis and design phase.

2. Functional analysis

The fisheries sector is one of the growth drivers in Sao Tome and Principe. The catches of the fishing sector are mainly artisanal, with a minor part coming from a small fleet of semi-industrial vessels. It exploits coastal and highly migratory resources. Domestic catches have fluctuated between 11 700 and 9 730 tonnes from 2015 to 2018,[2] and almost all catches supply the domestic market with very limited exports. The artisanal fleet has developed over the past few years trying to shift from subsistence to a more commercial approach, which has led to increased landings. However, the sector remains characterized by basic production methods and poor marketing capacities.

The artisanal fishing sector is, after cocoa, the most important source of income for low-income families. It provides principal or supplementary employment to about 30 000 people, including fishers and traders (mostly women). Fish plays a key role in the country's food and nutrition security, with more than **50 percent of the protein consumption of** Sao Tome and Principe's population coming from fish[3] and an **average per capita consumption of 29.3 kg per year.**[4]

Figure 1. Sao Tome and Principe map, with artisanal fishing landing sites



Source: FAO, 2021

[2] FAO, 2020
[3] Serkovic & Million, 2019
[4] FAO, 2019

Key findings from the functional analysis are:

The coastal pelagics VC is composed of around 7 300 small-scale actors (approximately 42 percent of them women), which is typical for an artisanal-based sector. Fishing and processing technologies are basic. There is a general lack of conditions for a functional cold chain, which affects the overall conservation and quality of the products.

Around 4 100 artisanal fishers are involved in the coastal pelagic fisheries, using **2 240 boats**, and capturing an estimated **8 480 tonnes of coastal pelagic fish**[5,6], with a sales value of STN 97 million (USD 4.16 million). Table 1 below shows coastal pelagic fish captured by different types of gear.

Table 1. Artisanal fleet total yearly average catches per species (data from 2020-2021)

Catches (tonnes/ year)	Blue runner	Bigeye scad	Scads nei	Fulu fulu tunas	Balao halfbeak	Skipjack tuna	Flying fishes	Other fish	Total catch	Total catch coastal pelagics
Hook & line	1 587	460	46	554	0	17	18	5 011	7 693	2 682
Surface gillnet	23	16	0	1	0	0	1 608	50	1 698	1 648
Scoop net	0	0	0	24	0	3	1 000	396	1 423	1 026
Seine net	41	31	151	1 701	1 192	0	3	842	3 961	3 120
Total	1 651	507	198	2 279	1 192	20	2 630	6 300	14 776	8 476

Source: De Labra, G., Vilela López, B., Prieto Porriños, G., Blanc, P.P., Vasta, A. & Anibal, O. 2023. The coastal pelagics value chain in Sao Tome and Principe: Summary report. Rome, FAO.

Artisanal fishers use a variety of gear and vessel types: 1) hook & line, surface gillnet and scoop net mainly onboard **small wooden dugout or outrigger canoes** (around 2 130 vessels, 90 percent of the artisanal fleet, capturing 63 percent of total catches, with one to two fishers per boat [see Figure 2]), and 2) purse seine net onboard **larger motorized vessels, normally built from fibreglass** (around 110 vessels capturing 37 percent of total catches with up to 12 fishers per boat).

[5] Most of the fish (including coastal pelagic) is caught by artisanal fishers, with a minor proportion (3 percent of total fish catches) captured by a small obsolete fleet of semi-industrial boats (nine operative boats in 2022), capturing mainly demersal fish and hence not considered as VC actors for the purpose this analysis.

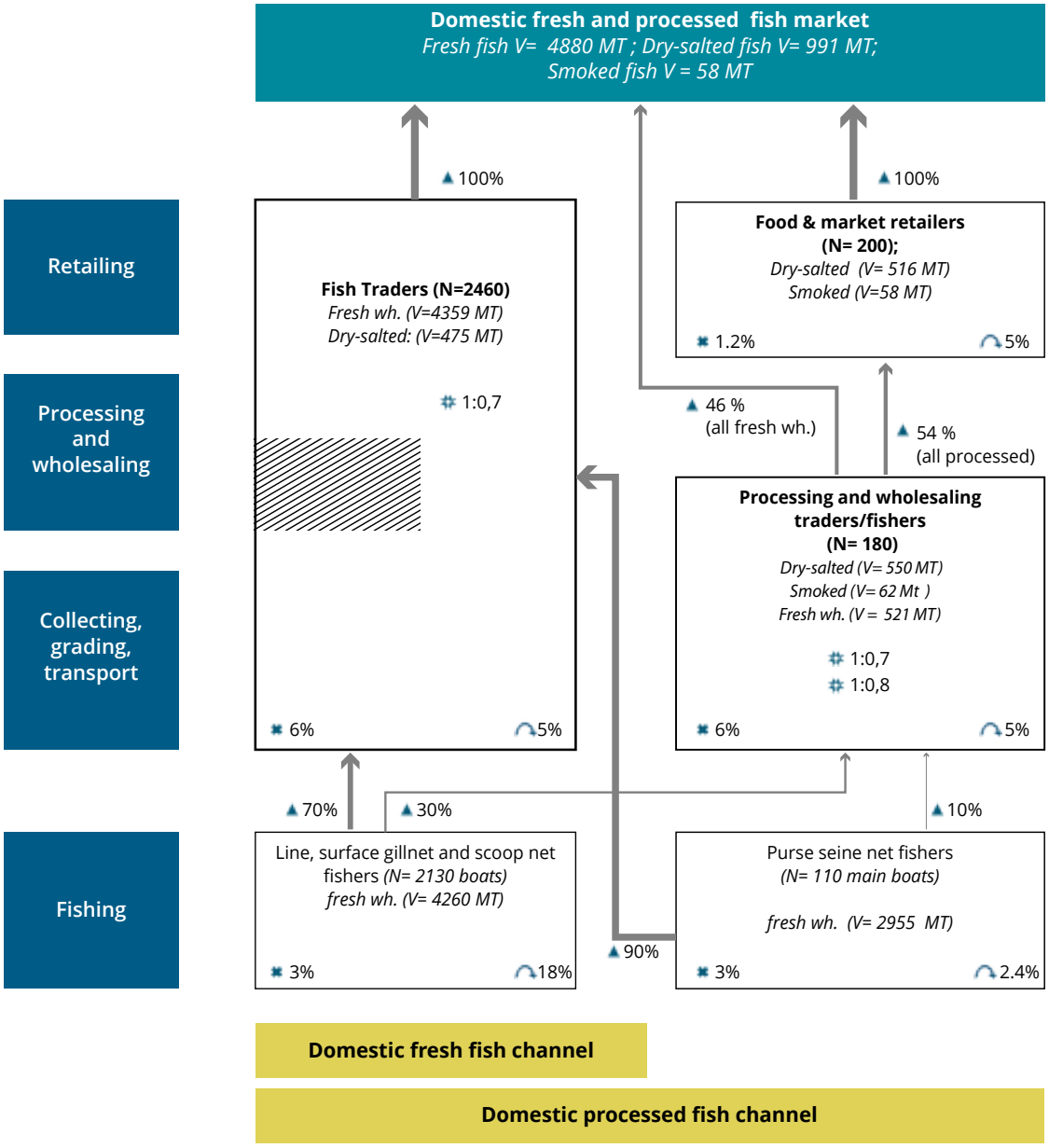
[6] FISH4ACP calculations using previously unpublished catch and effort data gathered by Guillermo Porriños under the auspices of the Eurasia Programme of Fauna & Flora International (FFI), working with Fundação Príncipe, Oikos and Marapa with funding from FFI, the Blue Action Fund and Arcadia (a charitable fund of Lisbet Rausing and Peter Baldwin). It is important to note that these estimations were calculated using a different data source and methodological approach than the ones calculated by the Directorate of Fisheries, which estimated total fish landings of the same eight species of coastal pelagics to be around 2 600 tonnes for 2020

The VC involves few products, with fresh fish being by far the dominant form of product sold (4 880 tonnes), which accounts for around 82 percent of the total fish sold in both islands, with just 17 percent salt-dried and a smaller number, one percent, smoked. Retail sales take place in various locations with urban markets (mainly in Sao Tome city where about 70 percent of the fish is sold,[7] particularly in Bobo Forro market) playing a prevalent role.

Figure 2. dugout canoe

[7] Serkovic & Million, 2019; Sy & Soares Diogo, 2019

Figure 3. Sao Tome and Principe artisanal fleet coastal pelagic value chain (2022)



Legend

Ratios and percentages:
- Sold (%)
- Loss (%)
- Self-consumed (%)
- Conversion ratio

Overlays:
- **N** Number of actors
- **V** Volume in Metric Tons (MT)

Flows and interactions:
- → Sale
- No function

Abbreviations:
wh. whole

Adapted from Ardjosoediro and Neven. 2008. *The Kenya Capture Fisheries Value Chain: An AMAP-FSKG Value Chain Finance Case Study*

Source: De Labra, G., Vilela López, B., Prieto Porriños, G., Blanc, P.P., Vasta, A. & Anibal, O. 2023. *The coastal pelagics value chain in Sao Tome and Principe: Summary report*. Rome, FAO. Note: volumes included in the boxes refer to fish volume after self-consumption, loss and processing.

There are around 2 460 female fish traders that buy fish from the fishers at the landing sites. They transport it, using public transport, to retail the product themselves or, less frequently, to sell it to processors and wholesalers. If they don't sell the fresh fish within the day, they try to conserve it overnight in cold storage facilities to sell it the following day, or salt-dry it to preserve it.

Around 180 actors, including fishers from Principe, **process fish and act as wholesalers**. Drying is usually done using salt and exposing the fish to sunlight on a drying rack, or directly on the floor on a mat of palm leaves or a rocky surface. Fish can also be smoked, but this is done for small quantities of fish, seasonally and often upon request. The equipment and processing techniques are often inappropriate, negatively affecting the quality of the product and leading to post-harvest losses. Wholesalers mainly sell to market retailers at Bobo Forro or food retailers.

There are approximately an additional **200 retailers** that sell dried and smoked fish in the markets or as food vendors. The retail sector sells a total of 516 tonnes of salted coastal pelagics and 58 tonnes of smoked coastal pelagics.

The VC is a domestic one and involves no formal imports or exports, responding to a strong increase in demand for fish due to the demographic growth of the country,[8] whose population almost tripled in size over the last decades, growing from approximately 60 000 in 1960 to 210 000 inhabitants in 2018.[9]

Despite the importance of the tourism industry for the country (representing 14 percent of the national GDP in 2016),[10] **coastal pelagic products are not yet of great interest to the hospitality sector**. Their clients find them difficult to eat due to their numerous bones, preferring demersal or large pelagic fish.

Sixty per cent of the consumers surveyed indicated coastal pelagics as the most popular commodity and a significant one for nutritional security, followed by demersal fish, large pelagics, pork meat and chicken legs. This popularity may be due to their availability and relatively low price compared with large pelagics, pork and chicken meat. Indeed, 75 percent of households buy coastal pelagics at least twice per week.

Prices in the market differ according to species, location, season and product form. Table 2 below shows the approximative average prices of the coastal pelagic VC species.

Table 2. local retail estimated prices in STN per Kg of coastal pelagics

	Lean season price (STN/Kg)	High season price (STN/Kg)	Regular price
Flying fishes	50	30	10/Unit or 40/Kg
Balao halfbeak	40	20	3/Unit or 30/Kg
Big eyed scad	70	50	65

(cont.)

[8] Le Douguet, 2018
[9] The World Bank, 2020
[10] Direção Geral do Turismo e Hotelaria, 2018

	Lean season price (STN/Kg)	High season price (STN/Kg)	Regular price
Blue runner	80	60	70
Mackarel scad	60	40	50
Fulu fulu tuna	70	50	60
Skipjack tuna	75	55	65

Source: De Labra, G., Vilela López, B., Prieto Porriños, G., Blanc, P.P., Vasta, A. & Anibal, O. 2023. The coastal pelagics value chain in Sao Tome and Principe: Summary report. Rome, FAO.

Fishing: Onboard handling and conservation are poor due to the vessel design (more than 90 percent of the artisanal fleet are dugout canoes). What's more, fishers have poor access to equipment and ice. Almost none of the fishers surveyed as part of this study use ice onboard, few use cool boxes, and the majority do not use anything to conserve their catches. Catches are sold at landing sites, sometimes directly on the ground or on top of a plastic tarp. Despite their lack of suitable boats and equipment, the fishing efforts of the artisanal fishers have resulted in a decline in coastal fishery resources. Many fishers report that fish was more abundant five years ago and that they now have to fish farther from shore.

The use of different fishing strategies **is a source of conflict among fishers in Sao Tomé Island**, since purse-seiners (bigger boats with more men per boat) fish in fishing grounds normally used by fishers in dugout canoes who feel that they are being driven away from their traditional fishing grounds.[11]

Fresh fish trade: Fish traders normally buy fish at the landing sites from the fishers. They pay in cash upon purchase or, if the quantities are large, pay the fisher once they have sold the product. After purchasing the fish, they put it in buckets or baskets, conserve it with some ice (if available), and then protect it with a cloth. They use public transport (minibus or motorbikes) or walk to the points of sale to retail it, mainly to urban markets (mostly Bobo Forro, the main market of Sao Tomé), rural markets or directly to the local communities.

Fish traders first try to sell the fish fresh, whole and unprocessed. If, by the end of the day, they still have unsold fish, they try to preserve it so they can sell it the following day. They use fridges (their own or those of others) or the cold storage facilities available at some markets. Other fish traders may salt-dry the fish to preserve it. Two of their main challenges are: 1) the absence of a consolidated cold chain, either due to a shortage or lack of power and ice, or due to a poor availability of cold storage facilities; and 2) transportation due to its cost and/or frequency. On the other hand, besides cold chain equipment, the few and low-cost items required to work in the VC are readily available in the local market, such as buckets, baskets, knives and salt.

[11] Le Douguet, 2018; Santos *et al.*, 2017

Figure 4. Main drying techniques

Processing and wholesaling. The coastal pelagic species more widely used for dry-salting is flying fish, and to a minor extent blue runner, halfbeak and fulu fulu tunas. There are three common methods for dry-salting fish[12]: quialo, solar-dryer and ground-drying (see Figure 4 , above, from left to right). The quialo method allows large quantities to be dried simultaneously and in a shorter time, if the weather conditions are favourable. If it rains, however, the fish needs to be quickly removed and protected. The solar dryer is more convenient when it comes to protecting fish from adverse weather, animals and theft, but the current model is not too efficient. The main market destination for dried fish in the whole country is Bobo Forro market in Sao Tomé.

[12] Porriños, 2020

Figure 5. Bobo Forro market

Dedicated retailing: Of the 200 dedicated retailers of processed fish, around 85 retail dried and smoked fish in the urban markets, mainly in Bobo Forro market. The market provides them with concrete tables, and they use basic material to conduct their sales: scales, plastic trays, baskets made with palm leaves, cloths to cover the fish and knives. The remaining 115 are food retailers, women working in the urban and peri urban areas of the country cooking and selling food to consumers.

Support services in the extended value chain are few, and do not always operate at their full capacity, having to import practically all the material used. Boat manufactures do not always have material available in the market to build fibreglass or outrigger canoes. There are few shops specialized in selling fishing gear or engines, and fishers complain about their cost and quality. The cold storage facilities and ice factories at the markets and some landing sites are not always operative due to the absence of maintenance specialists familiar with cooling systems, the lack of a continuous energy supply and a poor management of the facilities. Neither is there refrigerated transport. The Fisheries Directorate and one local NGO, Marapa, are the main players providing training and technical assistance to the VC actors. However, the lack of continuous funds limits the consistency and reach of these programmes.

Government periodically supports the purchase of fishing gear or vessels (outrigger canoes or fibreglass vessels), subsidizing up to 25 percent of the total price and providing advantageous conditions for the fishers to pay the remaining costs back to the government.

In terms of the enabling environment:

- **Legislation governing the sector is recent (2022) and generally appropriate**, but with limited enforcement. There are no fishery resources management plans, with the fisheries sector considered as being open access.
- **Commercial banks, micro-finance institutions and insurance companies are not used by most of the VC actors**. Only 11 percent of fishers and almost none of the fish traders have a bank account, while none use banking services. Coastal pelagic value chain actors are more amenable to using traditional community-based lending and savings arrangements ('Chiquila' and, to a lesser extent, through some sectorial associations), which gives them access to revolving loans based on amounts in their savings.
- The **infrastructure** supporting the VC is **weak**. There is generally no infrastructure at the country's 48 landing sites, which are normally the beaches themselves. Access to and from the landing sites, mainly in Principe, is typically only possible using unpaved tracks, while the main roads in Sao Tome are not properly maintained, particularly far from the capital. Energy supply is insufficient, unreliable and expensive, hampering the development of a well-functioning cold chain. The country has a network of newly built urban markets, but their cold storage facilities do not always work properly due to poor maintenance and management, and some are underused. A good example is Bobo Forro market, where most of the fish traders prefer to sell their fish right outside the market building rather than inside where they would be able to take advantage of the facilities (tables, water, shelter, etc.).
- A number of **donors**, for example IFAD, World Bank (WB), African Development Bank (AfDB) and the Blue Action Fund, are active in supporting the VC and the marine ecosystem on which it depends.
- **Organization of some VC actors** began in the 1990s, when around 29 associations of mixed fishers and fish traders were established, with the support of an IFAD funded project, as a precondition for receiving support at community level and accessing credit. These associations still exist today, although they have limited membership and activities, and are poorly managed. The fisheries sector in general is quite individualistic with few work arrangements among the VC actors, which negatively affects the sector's efficiency and profitability. For example, 77 percent of the fishers surveyed stated they did not belong to any association.

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3. Sustainability and resilience assessment

An assessment of the **economic performance of the VC** shows that the profitability[13] of the five actor groups (purse-seiner boat owners; hook & line, gillnet and scoop net fishers; fresh fish traders; processors & wholesalers; and dedicated retailers) varies, with purse-seiner boat owners having the higher yearly net income (STN 28 881), followed by hook & line, gillnet and scoop net fishers (STN 16 457), fresh fish traders (STN 10 323), dedicated retailers (STN 9 180) and processors & wholesalers (STN 6 106). Return on investment (ROI) is low, with hook & line, gillnet and scoop net fishers having the highest at 21 percent, due to them having the lowest investment and costs. At 2 percent, the processors & wholesalers have the lowest return on investment. In terms of employment[14], the number of full-time equivalent (FTE) jobs created is 7 293, of which 2 206 are "hired", with purse seine fishing generating the most (1 190 jobs) while fresh fish traders generate none. Some 5 087 are self-employed, with fresh fish traders (2 460) and hook & line, gillnet and scoop net fishers (2 137) generating the most. Sao Tome and Principe's minimum wage is STN 13 200 per year.[15] All actors, except purse-seiner boat owners, have earnings that are below this level, but when accounting for their total catches in addition to coastal pelagic they would rise above this.

Most of the direct value added (VA) (STN 97 million per year) generated by the VC is from the hook & line, gillnet and scoop net fishers (almost 50 percent) and the fresh fish traders (around 26 percent). This is due to the high number of actors involved in these two actor groups. However, if the direct value added is analysed per individual actors, the purse-seiner boat owners contribute the most individually. Government charges are limited to small amounts paid as market duties to district government councils and market authorities, with no fishing licence or access fees charged to fishers. The indirect VA is worth STN 102 million per year, with hook & line, gillnet and scoop net fishers contributing the most with 77 percent and the fish traders with the least, less than one percent. The total VA is almost STN 199 million (8.53 million USD).

In terms of effects in the national economy, the annual coastal pelagics VC total value added of USD 8.53 million represents 1.8 percent of national GDP (USD 472.9 million16 in 2020), and 26.4 percent when compared with the fisheries GDP. The operations that stem from the value chain of costal pelagics provides an important livelihood for coastal communities. Impacts on the balance of trade are estimated to be negative, as there are no exports but there are imported consumables. The VC has very little impact on public funds (estimated at 2 percent) with very few and small payments to government from actors (see previous paragraph).

[13] For fishers this analysis considers their share of catch volume of coastal pelagics, which amounts to 78.8 percent for purse seine and 49.5 percent for hook & line and gillnets. In their operations they also catch other species, which would show an increase in revenues compared with just coastal pelagics.
[14] FTE calculations consider figures for the artisanal fisheries sector as a whole, not only information with regards to capture/process/retail coastal pelagics.
[15] USDS, 2017
[16] RTP Noticias, 2022

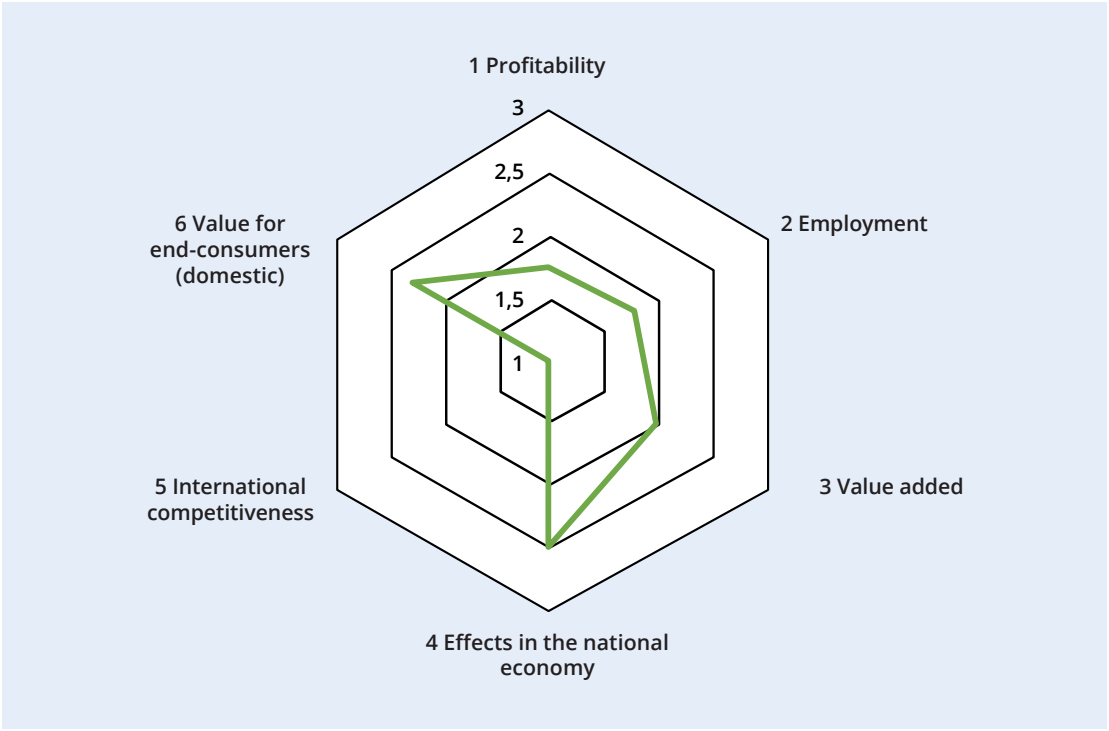
Coastal pelagics are not exported from Sao Tome and Principe but they do represent an important food and nutrition source for the country.

Average prices for the eight species are relatively cheap (see Table 2) compared to direct substitutes. Furthermore, self-consumption among VC actors can be high, particularly for hook & line, gillnet and scoop net fishers (18 percent), with 3 percent for purse-seiners and 5 percent for the fish traders groups.

The ultimate beneficiaries of the value chain are the end-consumers who consume the coastal pelagics in the domestic market. The FISH4ACP consumer survey found that consumers generally have positive views about quality, price, convenience and nutrition of the coastal pelagics in the domestic market, with less favourable opinions about their taste.

A summary of the economic sustainability assessment across different domains is presented in Figure 6 below.

Figure 6. Economic sustainability performance scores for the value chain



Source: De Labra, G., Vilela López, B., Prieto Porriños, G., Blanc, P.P., Vasta, A. & Anibal, O. 2023. *The coastal pelagics value chain in Sao Tome and Principe: Summary report.* Rome, FAO. Note: The figure shows the scores of five economic domains, which are the averages of the scores of the subdomains under each domain. The scores range from 1 (highly concerning/unsustainable) to 3 (not concerning/sustainable).

An assessment of the **social performance of the VC** shows that there are issues regarding inclusiveness. The distribution of wages between workers is inequitable, with purse-seiner boat owners earning, on average, almost three times more than a fresh fish trader. Value-added distribution is inequitably distributed between VC actors. On the one hand, large

differences between large and small producers exist, with the total value added at aggregate level captured by purse seine fishers (STN 26 802 017 per year) comprising only 21 percent of the value captured by hook & line, gillnet and scoop net fishers (STN 126 361 175 per year), due to their larger number. Value added is retained mostly by VC actors with little paid labour and few payments to the government. Furthermore, the VC is relatively small in size, estimated at almost 7 300 actors, which constitutes 7.3 percent of the total jobs in the country. On the other hand, and of a positive nature is that the coastal pelagics VC appears to create equal-opportunity-jobs for everyone, with more than 40 percent of the actors being women. The national poverty line is established at STN 12 480 per year[17]. All the actors, except purse-seiner boat owners, are below this line, but when accounting for their total catches other than coastal pelagics they would rise above it. However, this changes at household level, with 65 percent of the surveyed fisher and fish trader households living below the national poverty line, and 43 percent of the households below the international extreme poverty level (USD 1.9 per day).[18]

Gender equality is considered concerning in the coastal pelagics VC. Even though more than 40 percent of the VC actors are women, their share of the total value added is 30 percent that of fishers. Women's access to assets is concerning with, for example, only a small proportion of women owning fishing vessels. Likewise, generally in the country there is evidence of occupational sex segregation,[19] economic empowerment, and gender-based violence (GBV with women tending to occupy less skilled and lower remunerated jobs. In this sense, capture activities are typically the exclusive domain of men who also carry out the first sale. From this stage onwards, women typically conduct all the subsequent steps (process, wholesale, retail). Women are still the only contributors to domestic work, and in most households (63 percent of those surveyed) the male head of the family decides how the money is spent. Women involvement in associations is slightly higher than that of fishers (33 percent vs 23 percent), but this might not be so relevant due to the lack of activity of most of the associations.

Food and nutrition security is assessed as being not concerning. The availability of coastal pelagics is consistent throughout the year in the coastal areas, while not always available to inland populations, possibly due to transport route and network factors. This is particularly true for salt-dried fish. Fresh coastal pelagic catches face conservation issues due to the lack of a consistent cold chain. The VC products were consumed in all the households surveyed in this study. The children of the households do, however, find them difficult to eat due to the bones, which could limit their nutritional value for them. In general, fish contributes to 50 percent of the animal protein consumed in the archipelago,[20] with the population consuming an average of 29.3 kg of fish per year,[21] which is significantly higher than the average of sub-Saharan African countries. Traditional cooking practices contribute to the food safety by raising temperature to a level that kills most pathogens, but the excessive use of salt can have some negative impacts (hypertension).

The picture with regards to decent employment in the coastal VC is generally concerning. No forced labour was witnessed, but family kids are frequently employed in the VC (37 percent of all fishers reported it), although it was unclear whether this was during school hours.

[17] INE, 2020
[18] Serkovic & Million, 2019
[19] Kirkwood, 2019
[20] Le Douguet, 2018; Sy & Soares Diogo, 2019
[21] FAO, 2019

Most of the VC actors are either self-employed or have been informally employed, having no formal contracts and normally working more than the legally established 8 hours per day and 40 hours per week. In addition, the local fleet is considered to be old, inadequate and unsafe, with few fishers using safety measures or navigation means. This results in regular casualties every year, with an average of 5 fishers in 2006–2011 and 4 in 2021. The latter is almost three times higher than the 2011 average reported by the International Labour Organization for fishing as an occupation. [22] Work-related injuries are also high (handling fish, hot materials, etc.). Most VC actors perceive a low turnover in the VC. However, this might be related to the lack of alternative sources of livelihood. Apart from the purse-seiner boat owner (STN 2406 per month), VC actors average earnings are below the threshold of the national poverty line (STN 1560 per month) and the national minimum salary (STN 1100 per month)[23], with the exception of hook & line, gillnet and scoop net fishers (STN 1370 per month) who earn slightly more than the minimum salary.

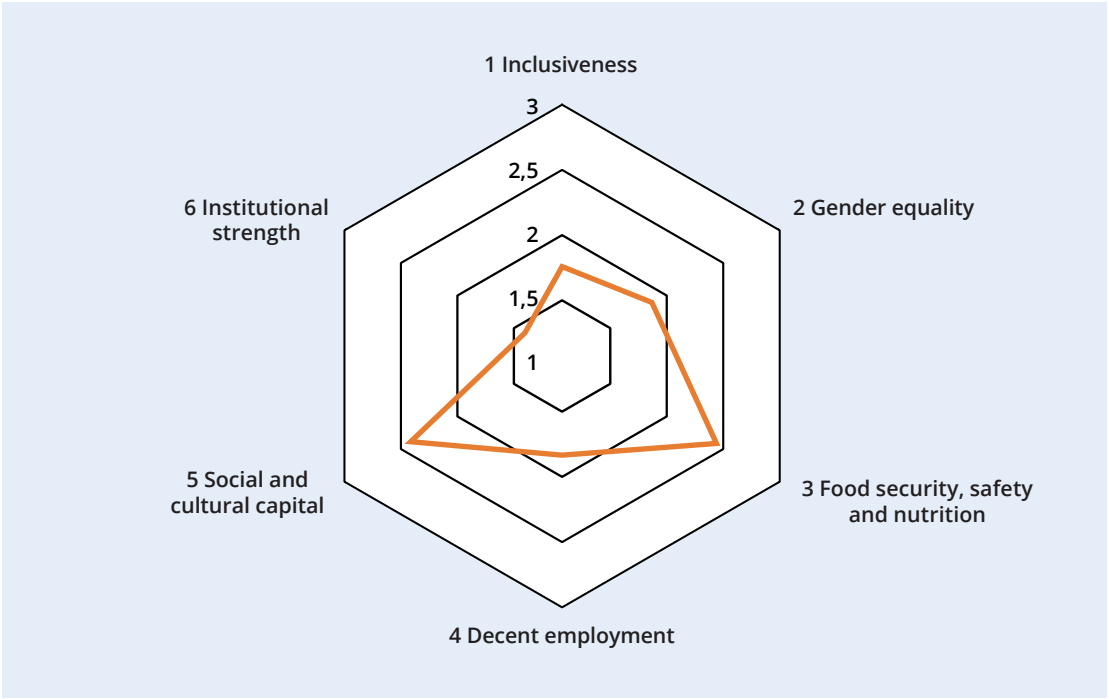
The coastal pelagics VC social and cultural capital domain is also mixed or not concerning in terms of performance. Collective action is not efficient. Despite there being 29 associations, they do not engage many actors and are not very active, apart from occasionally providing credit. The willingness to work together varies and is based on the type of activity; fishers have to work together in most cases (and agree on selling prices), with fish traders being more independent. Vertical linkages work well, with 80 percent of the actors reporting good and trustworthy relationships with service providers and clients. However, VC actors do not participate in fishery-related decision-making. The relationship with the public sector is ambiguous, with around 40 percent of actors claiming not to have any direct relationship, while others (37 percent) describe having trustworthy relationships. Finally, coastal pelagics play a predominant role in Santomean cuisine, being an essential part of some traditional dishes.

The coastal pelagics VC institutional strength domain is assessed as highly concerning. Laws and regulations exist, but there is little enforcement. There is no vision or priorities of intervention established for the fisheries sector, which can be considered an open access fishery (there is no legally required licence for artisanal fishers), with several persistent conflicts between fishers using purse seine and those using other gear types. Eighty percent of the vessels and 50 percent of the traders are formally registered; however, most of VC activities are not registered for tax purposes. Actors do not normally have bank accounts and their access to formal finance services is limited. Obtaining current and reliable statistical data remains one of the challenges the fisheries sector in Sao Tome and Principe faces, including for the coastal pelagics VC. This applies both to data needed to govern the sector effectively, and also to market data and information. Government institutions are constrained by resources, for example finance and human. There is a network of 12 enumerators gathering catch and effort data from different landing sites. However, the encoding of this information into the Directorate's database is not done regularly. This impedes the provision of timely and accurate data.

Based on the analytical assessment of social performance as discussed above, an overview of the social performance for the VC is provided in Figure 7.

[22] The World Bank, 2011
[23] USDS, 2017

Figure 7. Social sustainability performance scores for the value chain



Source: De Labra, G., Vilela López, B., Prieto Porriños, G., Blanc, P.P., Vasta, A. & Anibal, O. 2023. *The coastal pelagics value chain in Sao Tome and Principe: Summary report*. Rome, FAO. 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/unsustainable) to 3 (not concerning/sustainable).

An assessment of the **environmental performance of the VC** shows that in terms of impact on the climate, the coastal pelagics value chain in Sao Tome and Principe is found to be concerning. The country faces a problem of structural insufficiency of electricity supply, aggravated by its high cost. Electricity is, however, not used by fishers, and fish traders have a low consumption when it comes to fridges and freezers. The fossil fuel consumption of fishers (mainly petrol, gasoline and motor oil, especially by purse seine gear), as well as for transportation, is concerning. Processing activities (salt-drying) do not require any kind of combustible. The main contributor to the carbon footprint is the fuel consumed, particularly in the fishing activity (63 percent of the emissions). The total yearly equivalent greenhouse gas emission of the VC is not concerning. However, the cutting of trees for making the dugout canoes used by most fishers was not considered in the calculation and reduces the potential for carbon sequestration.

The water footprint of the coastal pelagics value chain is not too concerning. Water consumption is limited (average of 3 litres per kg of fish sold) and mainly used for cleaning purposes. Few fishers use ice, while its use is more widespread among fish traders but in low quantities (50 kg to 300 kg per month). Despite the absence of wastewater treatment, water pollution risks are not assessed as being that significant given the limited volume of water used in the VC.

Fish stock sustainability is considered, at the least, concerning. The stock status is largely unknown; however, some indicators (reduction of catch size and quantity, conflicts between fishers over fishing grounds, having to go further from the shore to fish, use of larger nets, etc.) suggest that stocks are either fully or overexploited, especially around Sao Tomé Island. There is a general lack of control over the number of fishers, boats and catch sizes, etc. The fishers and experts interviewed confirmed a significant increase in fishing pressure due to a rise in the number of boats (and use of engines) in the last years which could be a cause of the fish stocks situation.

Regarding its impacts on biodiversity and ecosystems, the coastal pelagics value chain is highly concerning. A particular fishing activity that has a considerable impact is the inappropriate use of purse seine gear. Due to their use of tight mesh sizes and fishing at low depths, in coral reefs and seagrass beds areas, they capture juveniles and have a negative effect on fish feeding and breeding areas[24] as well as vulnerable ecosystems. The capture of turtles, sharks and dolphins, including ETP (Endangered, Threatened or Protected) species registered on the red list of IUCN, by artisanal fishers is considered an important issue by all the environmental experts consulted. Measures to limit bycatch are weak due to a lack of enforcement. However, awareness campaigns targeting the release of turtles seem to have been successful, with most fishers reporting having released turtles.

Regarding the impact of the coastal pelagics value chain on animal health and welfare, there is no concern about aquatic animal diseases, although none of the fishers in the VC apply the appropriate slaughter techniques as defined by the World Organisation for Animal Health.

Although it is an issue that is difficult to quantify, toxicity and pollution related to the coastal pelagics value chain is of some concern. While feed and drugs are not used, chemicals such as the fuel and oil used for the engines of fishing vessels can be a source of pollution. There are two sources of air pollution caused by the VC activities: 1) combustion coming from fishing vessel engines and 2) fish smoking. However, neither of these activities are considered concerning. Plastic is widely used, mainly in the form of low-quality plastic bags to transport and pack ice, salt or fish, and to sell it, but also in drums, solar tents and fishing gear. Inorganic waste management is not implemented well, with burning the plastic or simply throwing it directly into the environment being normal practice. Organic waste is of moderate concern. Most of it comes from fish processing (viscera, gills, heads, etc.) and is thrown onto the beaches, buried or used as feed for domestic animals after cooking. Sao Tome and Principe has a legal framework to regulate the issues mentioned in this paragraph. It is not, however, being implemented.

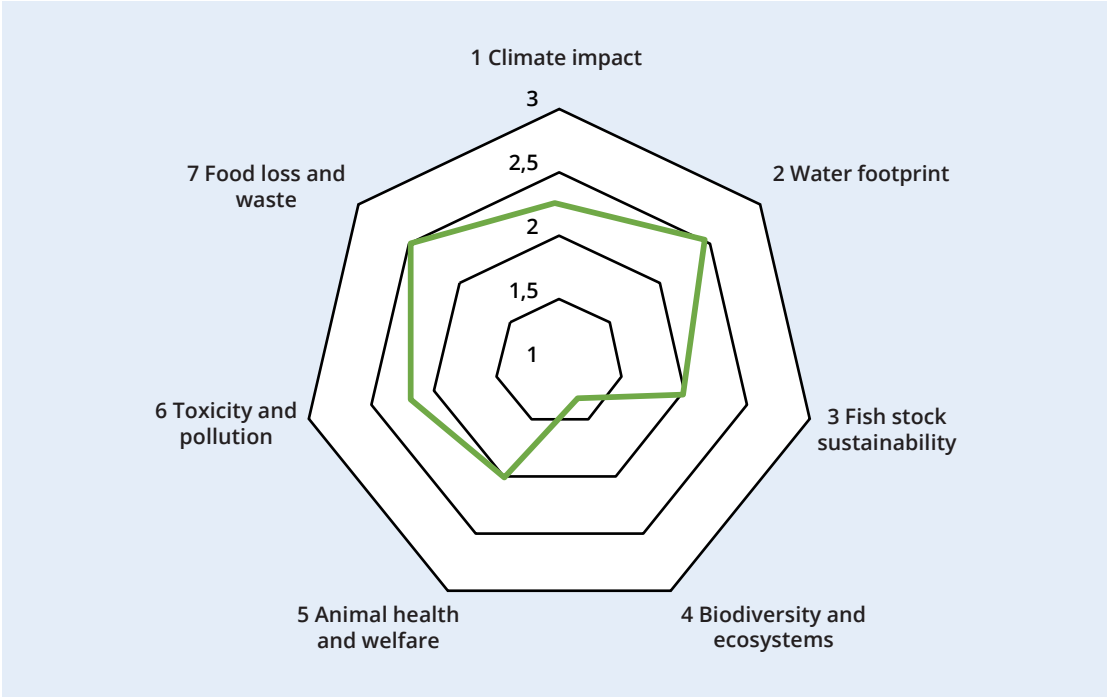
Food Loss and Waste. Food loss in the coastal pelagics value chain is concerning, whereas food waste is not. Food loss, mainly associated with loss of freshness and processing, is estimated to be around 3 percent for fishers and 6 percent for fish traders. A weak cold chain is the main cause of these losses, but poor handling and a lack of suitable transport also play a role. Physical, quality and post-harvest market losses are high across the entire VC. Quality loss is particularly important for fresh fish traders who salt-dry any unsold fresh fish, to avoid spoilage and to conserve it for the next sale opportunity. Finally, the

[24] Santos, 2017 and Le Douguet, 2018

only waste that may occur is by consumers throwing away any uneaten coastal pelagics, possibly due to a lack of reliable power supply for their fridge or having no fridge at all.

A summary of the analytical assessment of environmental performance is presented in Figure 8.

Figure 8. Environmental sustainability performance scores for the value chain



Source: De Labra, G., Vilela López, B., Prieto Porriños, G., Blanc, P.P., Vasta, A. & Anibal, O. 2023. *The coastal pelagics value chain in Sao Tome and Principe: Summary report*. Rome, FAO. 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/unsustainable) to 3 (not concerning/sustainable).

Resilience is a meta-dimension of sustainability that entails how economic, social and environmental sustainability aspects, which relate to performance under normal circumstances, are affected by shocks. Considering the likelihood of occurrence (re-occurrence) and the (potential) severity of impact, the following potential shocks are considered the most relevant to the coastal pelagics VC based on stakeholder consultations and secondary information:

- Climate change shock: changes in water temperature, current changes, and changes in fish reproduction and feeding areas.
- Environmental shock: Ecosystem pollution or irreversible degradation (e.g. due to oil spills from offshore petrol extraction).
- Socioeconomic shock: decline in fishery captures and incomes due to increased number of actors and subsequent fishing pressure due to the open access nature of the fishery.

- Health shock: i) such as COVID-19 pandemic resulting in declined markets, with fewer customers due to mobility restrictions and reduced purchasing power; ii) food safety issues, due to poor fish handling, conservation or processing resulting in negative consequences for consumers' health.

Redundancy resilience of a VC can be enhanced if the VC has excess capacity that enables the maintenance of the VC's core functionalities in the event of shocks. In the case of the coastal pelagics VC, **there is little excess capacity** and backup systems to maintain the essential functionality of the coastal pelagics chain in the event of shocks. This is due to various reasons, including: (i) the unpredictability of the quantity of fish caught; (ii) the nature of the VC products, fresh or processed, both easily perishable goods; (iii) limited equipment and technology (cold storage and ice but also fishing material and equipment) to support the VC; and (iv) limited financial resources and sources of finance to maintain some level of excess capacity.

Diversity. The more diverse a value chain is, the less likely it is that a shock will wreak havoc on the VC. The coastal pelagics VC is quite homogenous in terms of the technologies, functions, products and actors. There is little diversity in terms of end products (almost all fresh) or different forms of value addition (no branding of packaged products), or in marketing channels (with all fishery products sold in domestic markets, mainly in urban areas). There is an extreme lack of variety in the processing techniques and value-added options, with a reliance exclusively on traditional processing methods. The same applies for input and service suppliers, with few specialized businesses trading in fishery material and equipment and not many shops offering these products, leading to a complete dependence on imported goods. On top of this, there are very few mechanics, builders of quality vessels and few cold chain specialists in the country.

Connectivity. Good connections of various kinds between actors, other VC stakeholders and resources, and the extent to which they may hold up in case of a shock, impacts on the ability to quickly identify problems and needs, and attenuate the effects of these shocks. Connectivity in the coastal pelagics VC is relatively low. VC actors have established informal and formal connections among themselves and with stakeholders. Most of them are informal and based on trust, while others are more formal such as the ones established through the associations of fishers and fish traders. The former are based on long-established relationships which are expected to hold up in case of a shock; the latter are active when they are backed by external funds but offer limited services to their members. Their support in case of a shock will therefore largely depend on the availability of any external aid at that particular time. There is also a general lack of regular energy supply in the country that affects the ice availability and functioning of the cold chain. Roads, particularly in Principe, are underdeveloped with some landing sites only being accessible by motorbike. What's more, transport services are not always reliable. Maritime connectivity between the two islands is also irregular.

Collaboration and governance. Collaboration between actors and other VC stakeholders enhances resilience capacities since VC shareholders share the risks among themselves and, as a group, have a better picture of the risks and how to manage them. In the coastal pelagics VC most of the actors work individually, with highly informal and not well-coordinated connections. Furthermore, issues with clients' payments due to delays and, sometimes, lack of payment or thefts when storing the fish in public places is a recurrent complaint. The various attempts

to organize the sector into associations have not been very successful, with a low percentage of the actors belonging to associations that are not particularly active. Coordination between public authorities needs to improve (e.g. the vessels register [Port Captaincy] should be updated and shared with the Directorate of Fisheries which is responsible for fisheries management). The described collaborations can easily deteriorate in times of shock with a low potential to share and manage risks among stakeholders.

Learning and adaptation. Learning and adaptation refers to the levels of flexibility and innovation in the VC, which may serve to increase resilience. Throughout the VC there is a very low level of technology and innovation adoption by VC actors, with most actors using traditional methods and techniques in conducting their VC activities and with limited options for training. VC actors do, however, show a willingness to adopt better means and technologies, as is the case of fishers wanting to switch to better vessels, or fish traders requesting more training. However, the unavailability and high costs of modern equipment, inputs and alternatives for training, together with the limited financial capacities of VC actors, prevent them from benefiting from them.

Participation and inclusion. Participation refers to the empowerment and engagement of the full range of diverse VC stakeholders in forums and processes which can reduce the impact of shocks. There are no specific mechanisms or plans to help the VC actors deal with shocks, with VC actors not being connected to any shock recovery support mechanism either among themselves or provided by other stakeholders such as government organizations. Furthermore, sectoral associations are not always active, and most of the actors do not belong to one.

The **sustainability and resilience heat map** in Figure 9 provides a synthesis of the economic, social and environmental sustainability assessment and the resilience analysis. The main conclusions to be drawn from the heat map are that there is mixed performance across the sustainability dimensions and resilience. The VC economic sustainability has room for improvement, with several yellow/concerning indicators (12 of 22) and three highly concerning indicators (trend in net income, contribution to trade balance and international competitiveness). Social sustainability is poor, with this domain accounting for 7 of the 18 highly concerning red hotspots. These hotpots relate to a variety of 'access' issues (to finance, resources, policy and regulations), as well as to discrimination, labour rights, gender division of labour and the uneven levels of value added between individual actors. Environmental sustainability has some highly concerning indicators: the non-use of renewable energy, the status of ETP species and the vulnerable ecosystem. This is mainly due to the purse-seiners activity and the inorganic solid waste pollution through the unsustainable management of plastic. Stock status and fishing pressure are also concerning, especially considering the open access nature of the fishery. Given that social and economic benefits from the VC rely on a sustainably managed coastal pelagics stock, this suggests that the upgrading strategy will need to focus strongly on correcting these aspects of poor VC performance. When considering resilience, the assessment highlights most areas of considerable concern which could serve to reduce the ability of the VC actors to respond to shocks, notably the lack of an ability to hold stocks (due to a lack of cold storage facilities), the homogenous nature of VC activities and weak collaboration.

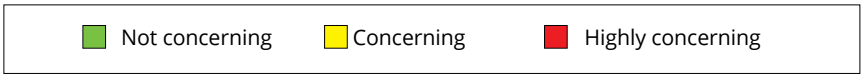
Figure 9. The Sao Tome and Principe coastal pelagics value chain sustainability and resilience heat map

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 jobs in FTE	Women's economic involvement	Water and ice consumption
No. of FT jobs	Gendered division of labour	Water pollution & wastewater treatment
No. of wage labour jobs	Gendered access to productive resources	Stock status and stock dynamics
No. of family/self-employed jobs	Women's decision-making and leadership	Fishing pressure
Average wage for hired workers	Availability of food	Impact on associated species
Average wage proxy family labour	Accessibility of food	Status of vulnerable ecosystems
Total value of net wages	Utilization of food	Status of ETP species
Direct VA at VC level	Stability of food	Application of biosecurity measures
Total VA	Respect of labour rights	Appropriate animal husbandry and handling
Contribution to trade balance	Child and forced labour	Responsible use of drugs and chemicals
Rate of integration	Job safety and security	Air pollution
Public finances impact	Job attractiveness	Inorganic solid waste pollution
Contribution to investment	Collective action	Organic solid waste pollution
International competitiveness	Coordination of transactions	Food loss

(cont.)

Food safety	Social cohesion	Food waste
Consumer evaluation	Cultural traditions	
Consumer preference	Policy, regulations and standards	
Price relative to substitutes	Access to finance	
	Access to natural resources	
	Access to information	
Resilience		
Redundancy	Diversity	Connectivity
Collaboration and governance	Learning and adaptation	Participation and inclusion

Source: De Labra, G., Vilela López, B., Prieto Porriños, G., Blanc, P.P., Vasta, A. & Anibal, O. 2023. *The coastal pelagics value chain in Sao Tome and Principe: Summary report*. Rome, FAO.



Economic sustainability score[25]: 59.1%
Social sustainability score: 43.7%
Environmental sustainability score: 55.3%
Resilience score: 8.3%
Overall sustainability score: 48.6%
Number of highly concerning hotspots (red): 19

[25] The sustainability scores are calculated by adding up across sub-domains (1 for green, 0.5 for yellow, 0 for red) and dividing this by the number of subdomains, expressed as a percentage.

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4. Upgrading Strategy

Based upon the functional and sustainability analyses carried out previously, an analysis of the strengths, weaknesses, opportunities and threats (SWOT) has been carried out as a first step towards identifying strategic options (See Figure 10).

Figure 10. SWOT analysis of the value chain

Strengths (internal)

- Coastal pelagics are a well-established and traditional product in the national market.
- Industry experience: existence of traditional know-how.
- Coastal pelagics are nutritious food and contribute to the country's food security and sovereignty.
- There are many active fishers and processors in the VC, which indicates little market dominance by a few actors and free competition in these VC segments.
- In Principe there is more surplus catch, due to the smaller population, with fish available for processing and supply to the São Tomé market.

Weaknesses (internal)

- Very informal nature of the value chain.
- An artisanal fleet composed mostly of dugout vessels, with safety risks and less fishing capacity.
- Lack of adequate physical infrastructure (roads, power grids, markets and landing sites).
- Limited cold chain for fish conservation.
- Lack of service providers (such as financial, training, repair and logistical) and quality inputs (completely dependent on imports).
- Limited financial resources of VC actors linked to lack of access to formal loans and other financial products.
- Lack of compliance with good product handling and hygiene practices in the VC.
- Low-performing sectoral associations, with little activity, providing few services to their members.
- Lack of state control, management and supervision of fishing activities, as well as formal assessments of coastal pelagics and associated species (bycatch and endangered, threatened and protected species [ETP]).
- Decline in fish availability and catches, forcing fishers to look for fish in more distant waters.

Opportunities (external)

- Gradual and consistent increase in the supply and use of solar-powered cooling equipment, including at the small user level.
- Increasing offer and capacities of vocational training, including entrepreneurship incubation mechanisms.
- National programmes such as PNASE (National scholar nutrition and health programme) are adopting more independent management procedures that will allow better efficiency and implementation.
- Demand for fish in Sao Tome and Principe, particularly from coastal pelagics, is high and is expected to continue, or increase, in the future due to population growth.
- Coastal pelagics are preferred by consumers over other fish or meat and are cheaper.

Threats (external)

- Climate change impacts negatively on fishery resource: changes in water temperature, currents and in fish breeding and feeding grounds.
- Increase in the number of fishers, with actors coming from other productive activities.
- Beginning of oil exploration and external pollution activities causes degradation of ecosystems and resources.

Source: De Labra, G., Vilela López, B., Prieto Porriños, G., Blanc, P.P., Vasta, A. & Anibal, O. 2023. *The coastal pelagics value chain in Sao Tome and Principe: Summary report.* Rome, FAO

Among the **strengths**, it is worth highlighting that coastal pelagic fish form a very important part of the diet of the majority of the population, especially those with lower incomes (two-thirds of the population live below the national poverty line), greatly contributing to the **country's food and nutritional security**. In addition, being a locally sourced product, its contribution **to the national food sovereignty** (requiring less dependence on imports and providing greater resilience facing global food crises), is also crucial. Furthermore, it relies on a significant number of fishers and fish traders who constitute a **large and solid labour force**, with noteworthy empirical and traditional knowledge.

The main **weakness** of the VC is the **informal nature of the value chain**, which results in a widespread disorganization, a general informality of commercial transactions and, in some cases, the use of malpractices involving fishing and handling. This informality has been encouraged by at least three key factors: 1) the low level of instruction of the majority of VC actors, both at elementary and technical levels; 2) the lack of suitable infrastructures, equipment and auxiliary services; and 3) the insufficient enforcement of existing regulations on fishing, food hygiene and handling.

For the first factor, even though slightly more than 50 percent of the fish traders and fishers said they had received some training, this training was generally sporadic and without any consistent follow-up. Besides, the low level of education and instruction of most of the VC actors prevents them from using elementary management or accounting procedures to carry out their productive activities efficiently. As most of the actors are self-employed, this restrains their economic profitability and hampers their access to micro-credit from conventional financial institutions.

Regarding the second factor, making the effort to follow a training course is generally not effectively rewarded, as the poor conditions of the infrastructures and services necessary for fishing, refrigeration, processing, selling, transport, etc. make it difficult to implement the good practices learned and to carry out the VC activities in satisfactory and appropriate conditions.

The third factor that promotes this informality in the VC is the **weak institutional capacity to enforce regulations** or to ensure good practices in both fishing and post-capture activities. This **institutional weakness** is also reflected in the limited ability to carry out more rigorous and efficient statistical follow-up of fish catches, in order **to assess the state and development of the fishery resources** and **to implement management** measures consistently.

These weaknesses in the value chain suggest that **many of the products marketed in the value chain do not meet sufficient hygiene and quality conditions** to be considered healthy and safe or, in the best case, suffer a deterioration in quality that significantly devalues the product. In addition, the use of inappropriate techniques and types of fishing gear jeopardizes the sustainability of the fishing resources.

Finally, it is also worth noting that the **inefficient organization** of **VC stakeholders** is considered a weakness when it comes to ensuring cohesion and the necessary representativeness to defend the interests of their members and to contribute to decision-making processes.

Among the **opportunities**, it should be noted that the country's energy policy tends towards **investment in and development of alternative energies**, which will make it possible to

consolidate supply through the general energy network, which is currently very deficient, highly polluting and experiences regular power cuts that hinder the constant production of ice and proper maintenance of the cold chain. The installation of solar panels for small businesses or individuals is becoming more readily available. This opens up demand for qualified technicians and professionals needed to ensure the operation and maintenance of the new facilities. This, in turn, would create new opportunities for developing and adopting different solar energy systems for private use, such as refrigerators, dryers, etc. This demand is stimulating both the development of training courses, as well as the capacity of existing vocational schools. In doing so, it provides specialized workers to those small enterprises gradually venturing into these areas. In addition, other initiatives such as the REINA programme (business incubators and accelerators network of Sao Tome and Principe, funded by PNUD) are stimulating entrepreneurship and facilitating mechanisms to create and nurture small micro-enterprises in different productive areas.

External **threats** include the general increase in temperature caused by climate change, which may lead to changes in the reproductive, feeding and migratory behaviour of certain species that are part of the VC. The capacity for action to deal with these threats is limited to improving the practices of resource management, capture, harvesting, processing and storage that can mitigate the impact of a future decline in resources.

In conclusion, the upgrading strategy should:

- Build on the above-mentioned **strengths**, namely: 1) the considerable and growing demand for VC products and their vital importance for the food and nutritional security of the population, and 2) the existence of a labour force consisting of around 7 300 actors working in the VC, mostly self-employed, that despite the difficulties and shortages mentioned, provides acknowledged empirical experience and a proven capacity for hard work.
- Assume that the main **weaknesses** to be addressed are the informality of fishing and marketing practices and the lack of efficient resource management, aggravated by the insufficient access to adequate infrastructure and equipment.
- Consider the **opportunities** represented by the development of new energy sources and technologies for alleviating some of the main problems in the post-harvest, such as the energy shortages in market cold storage facilities.
- Recognize that there is a real **threat** of a possible decline of coastal pelagic species due to a lack of ecosystem-based management, which is exacerbated by global warming. Consequently, ecosystem-based management measures for sustainable use of these resources, together with transforming and commercializing procedures for better product utilization and fish waste minimization, must be put in place.

The vision for the coastal pelagics value chain was developed together with VC actors and stakeholders. The agreed vision is stated as follows:

> ***"In the year 2032, the main actors of the coastal pelagics value chain, women and men, are sufficiently organized and qualified, and employ adequate means and infrastructures to carry out their work in satisfactory conditions, applying correct practices that guarantee their resilience, economic profitability and environmental sustainability, contributing decisively to national food security and sovereignty by providing the population with fish products in good quality and hygiene conditions."***

In this statement, the vision is based on the actual importance of the VC as an employment-generating activity which contributes decisively to the food sovereignty and nutritional security of the population, while assuming that improving the social and economic performance, together with the environmental sustainability, is necessary and desirable.

The proper functioning of the VC must guarantee the sufficient and continuous supply of food of high nutritional value, under hygienic and quality conditions in accordance with the practices defined and recommended by international standards, thereby ensuring the preservation and sustainable exploitation of resources. This should be done through fair trade rules that equitably distribute the generated value among the different actors in the chain.

Consequently, the main challenge of the upgrading strategy is **to promote the change from an informal, precarious and inefficient VC with a poorly valued structure to one that is well organized, professionalized, socially recognized and properly managed**, in order to achieve its key role in meeting the nutritional needs of the population.

Accordingly, the overall upgrading strategy aims to do the following:

1) Move from informality, marginality and precariousness to professionalism, formality and higher profitability. This **professionalization process** entails carrying out the necessary actions and procedures to **improve the status and build-up the competences of the VC actors** required to ensure the properness of their labour conditions and the quality of the services they provide. This will lead to the recognition of rights and obligations of the different VC actors, particularly the fish traders. To this end, the strategy foresees contributing also to the strengthening and improvement of the ancillary services, infrastructure and equipment necessary for the proper functioning of fishing and marketing activities, notably in terms of providing safer and more efficient vessels, improving the functioning of the cold chain for the preservation of fresh fish, and upgrading the actual fish transport services, both by road and boat. The strategy also envisages stimulating this process of professionalization by operating on the basis of adequately available financial services, so that they are adapted to the particularities and needs of duly trained professionals, and enable them to carry out their activity or business plans.
2) Implement the necessary **actions to ensure the sustainable and rational exploitation of fishing resources**, by formulating, adopting and enforcing suitable **management plans and control measures, while assuring the hygiene and sanitary quality of the VC products** positioned in the local market, in accordance with internationally accepted standards, such as the FAO Food Codex.
3) **Raise the institutional and social acknowledgment** of the **high importance of the VC products for the food and nutritional security**. The **valorization and recognition** of coastal pelagic products will help to **change the current paradigm** that coastal pelagics **provide meals preferably targeted at and consumed by the most economically disadvantaged of the population,** assuming that being a cheap food is not incompatible with being a quality product. Appropriate actions should be taken to assure all regular consumers that the VC products are hygienic and healthy.

The proposed improvement strategy focusses on achieving **specific and measurable targets** that, while complementing one another, contribute to decisively improving the sustainable performance of the VC in its economic, social and environmental aspects for attaining the vision.

These targets are:

1) By 2032, coastal pelagic fishing resources have well-defined **ecosystem approach management** plans, based on reliable collected and analysed statistical data (scientific evidence).
2) By 2032, 90 percent of the **artisanal fleet are registered and authorized**.
3) By 2032, 25 percent of **dugout canoes are replaced** by prao-type or fiberglass vessels.
4) By 2032, at least 75 percent of fish traders **carry out their respective occupations in a professional manner**, with appropriate technical capacities and the corresponding official accreditation status.
5) By 2032, 75 percent of fishers and 75 percent of fish traders working on the VC are members of a **professional functional and representative organization**.
6) By 2032, 75 percent of the fishers and 75 percent of the fish traders working on the VC have **access to appropriate cold storage facilities** so they can carry out their work efficiently and maintain food hygiene and safety.
7) By 2032, at least 75 percent of the products of the coastal pelagics CV are **processed and marketed in accordance with international standards of food hygiene practices.**

These objectives are aligned with national needs and policies[26] which aim to safeguard ecologically and economically sustainable fisheries that ensure food and nutrition security for the population. They are also supported by the recommendations of the FAO Voluntary Guidelines for Artisanal Fisheries[27], particularly concerning the training and support of small-scale fishing communities, the acknowledgement of the full range of activities along the small-scale fisheries value chain as economic and professional operations, and the promotion of professional and organizational development opportunities, in particular for more vulnerable groups of post-harvest fish workers and women in small-scale fisheries.

The vision is also aligned with the 2030 sustainable development goals and targets, namely SDG 2, 3, 4, 5, 8, 12 and 14.

The proposed upgrading strategy is articulated around **4 expected outcomes** that will engage the behavioural changes needed to achieve the vision. Those outcomes are outlined as follows:

1) Improved management of the coastal pelagic fishery resources for their sustainable exploitation
2) VC actors are organized and officially acknowledged as professionals
3) Service providers capacities strengthened to improve VC actors working conditions and products quality
4) New value added VC products available in the market through new channels

Those **outcomes should be the consequence of the corresponding outputs and their constituent activities.** The detailed description of the activities is presented in section 5 below, and they can generally be assembled into **4 complementary components or action lines**:

1. ***Improve the institutional capacity for fishery resources assessment and sustainable management***

[26] Assembleia Nacional, 2022
[27] FAO, 2015

This action line comprises activities aimed to increase, update and process the statistical information available on the state of coastal pelagics stocks, including the traditional and empirical knowledge of fishers, and to reinforce the technical and operational capacity of the fisheries administration in the formulation and implementation of appropriate fisheries management and control measures (both fisheries Monitoring, Control and Surveillance [MCS] and fishery products food safety), considering the interests and knowledge of the main actors involved.

2. ***Build-up and reinforcement of human capacities and functional organization of the value chain actors***

   This line comprises a variety of training activities, at different adapted levels, aimed at the **professionalization** of the VC actors. These should focus on training courses and validation procedures that ensure the knowledge necessary to develop the activity with the minimum of required skills.

3. ***Increase the availability of appropriate infrastructures, equipment and support services***

   This third line of action focuses on the improvement and availability of adequate and well-managed infrastructures, equipment and support services, so that the VC actors can carry out their activity and develop their skills in satisfactory conditions of profitability, safety and hygiene. This involves building safer boats, maintaining the cold chain equipment, improving transportation and facilitating access to finance.

   The philosophy that inspires the different activities conceived under this line of action is, whenever possible, to improve, reinforce and take advantage of the capacities already existing in the country, thereby generating business opportunities that ensure the sustainability of the services promoted.

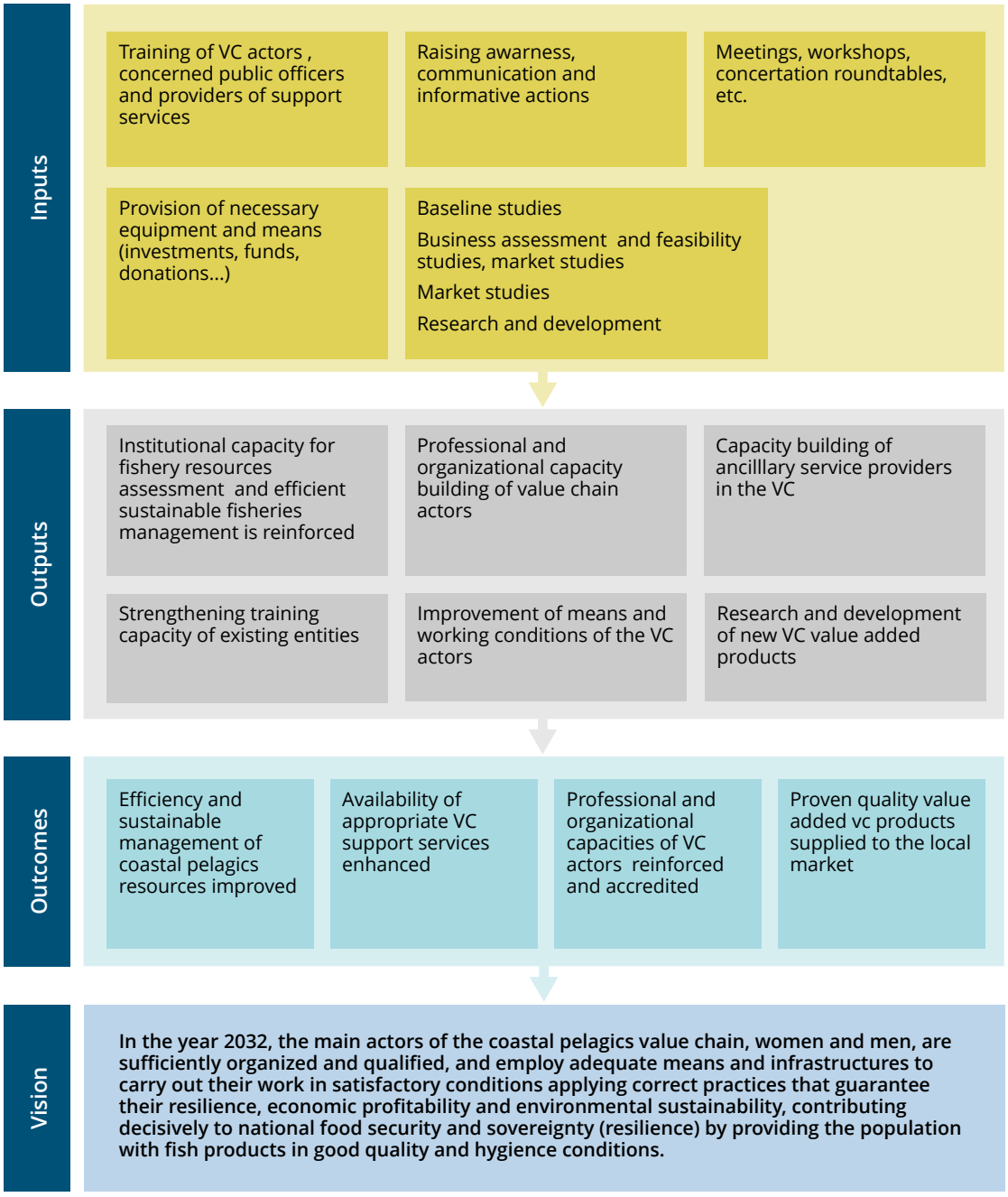
4. ***Valorise and differentiate the VC products***

   The activities included here focus on increasing the local market supply with healthy and nutritious fish products, differentiated not only by their nature and quality but also by their attributes related to environmental sustainability, geographical origin and cultural tradition. This outcome aims to capitalise and make visible, in an efficient and demonstrative way, the results of actions carried out in the previous outcomes.

   The valorisation of products in the value chain has two main purposes. On the one hand, to access more demanding markets, such as school canteens, hospitals and other public or private institutions, as well as restaurants and supermarkets. And on the other hand, to increase the general awareness of the importance that those VC products have for the Food Security and Nutrition (FSN) of the population, inspiring the actors in the value chain themselves to increase their awareness of their responsibility as food suppliers.

Figure 11 illustrates the Theory of Change that portrays the main inputs or activities that result in the corresponding outputs and these, in turn, in the outcomes (indicating a change in behaviour) needed to achieve the vision.

Figure 11: Theory of change for the overall upgrading strategy of the coastal pelagics value chain in Sao Tome and Principe



Source: De Labra, G., Vilela López, B., Prieto Porriños, G., Blanc, P.P., Vasta, A. & Anibal, O. 2023. *The coastal pelagics value chain in Sao Tome and Principe: Summary report*. Rome, FAO

Successful implementation of the upgrading strategy should result in: an **improved business performance** of the VC actors; a **favourable enabling environment**, founded on the effective and sustainable management of the fishing resources and the increased efficiency of the monitoring and control procedures; and an **upgraded governance**, based on efficient organization, availability of appropriate equipment and infrastructures, and efficient institutions which govern and support fair value chain operations.

For the **improvement of business models**, special attention has been given to the following considerations:

1) Due to the high national demand for coastal pelagics and its relevant contribution to national food security and sovereignty, local market supply is a priority and the expansion to international or regional markets has not been contemplated.
2) Regarding the catch, the objective is to increase safety and efficiency without increasing fishing effort, since there are indications that fish stocks are fully exploited.

Taking into consideration the above, the upgraded business models will be supported in three main examples:

1) **Reduce fresh fish traders' product losses and percentage of fish that needs to be salt-dried to avoid spoilage. Operating profits for fresh fish sales can be significantly improved (+ 25 percent) by reducing** the percentage of spoiled fish and increasing the percentage of fresh fish sold in good conditions, thanks to the application of good handling and hygiene practices together with the correct use of ice for the preservation of fresh fish. Table 3 below shows the comparative costs and profits of the current and upgraded situation.

Table 3. Fresh fish traders' current and potential operating accounts and profits

Item: VC coastal pelagics except skipjack tuna	Current situation: Marketed fish is 85% Fresh / 15% Dry. 6% of losses from fish inputs		With upgrading : Marketed fish is 90% fresh / 10% dry. 2% losses from fish inputs	
Revenues (received by actor)	**Kg**	**STN**	**Kg**	**STN**
Total fresh sales	1 852	94 177	2 022	103 298
Total dry sales	245	13 369	165	8 232
Total revenues	2 097	107 546	2 187	111 530
Costs (paid by actor)				
Fresh fish inputs	1 972	76 338	2 065	80 270
Dry Fish inputs	317	10 596	224	6 720
Salt (STN 1.7 per kg dry fish) (*)	2 289	539	2 289	381
Ice*		2 250		3 717

(cont.)

Item: VC coastal pelagics except skipjack tuna	Current situation: Marketed fish is 85% Fresh / 15% Dry. 6% of losses from fish inputs		With upgrading : Marketed fish is 90% fresh / 10% dry. 2% losses from fish inputs	
Revenues (received by actor)	**Kg**	**STN**	**Kg**	**STN**
Transport, food, packaging... (STN 50 x 150 days)		7 500		7 500
Total costs		**97 223**		98 588
Operating profits		**10 323**		**12 942**

Source: De Labra, G., Vilela López, B., Prieto Porriños, G., Blanc, P.P., Vasta, A. & Anibal, O. 2023. *The coastal pelagics value chain in Sao Tome and Principe: Summary report*. Rome, FAO

2) **Improving marketing to differentiate salt-dried high-quality products**. At the market, both types of salt-dried products (ones salt-dried from fresh fish and others to avoid spoilage) are sold without any differentiating arrangement, which makes it quite difficult for the buyer to differentiate between products made from top-quality raw material and those made from already deteriorated or about to deteriorate fish. Thus, investing in marketing (labelling, branding, advertising, presentation, etc.) represents a clear opportunity for business improvement, particularly for those producers who produce their foodstuffs from first quality raw materials and need to sell it with a cost benefit.

3) **Functional associations and/or micro-enterprises develop new products that open access to other markets. The improvement actions to be implemented will help** fish trader associations and micro-enterprises to develop new products, such as handmade preserves, ready meals, fish burgers, well-packed dried and smoked fish, aimed at creating added value, taking advantage of more efficient processing techniques. These products will be suitable for other markets, such as school feeding programmes or institutional canteens, and will be properly branded. The project will support the product development phase as well as the establishment of product quality and manufacturing protocols with at least three pilot entities (associations or micro-enterprises).

Improving the **socio-cultural enabling environment** requires the active involvement of the VC actors, and the strategy will enable the realization of activities dealing with the following issues:

1) **Improving awareness and recognition**, both at the institutional and social level, **of the importance of the coastal pelagics value chain** regarding: its **contribution to the national food and nutritional security**; its importance in the **maintenance and creation of employment**, particularly for the women; and its **contribution to the country's food sovereignty**, as it involves locally sourced food products that minimise imports of other foods and increase resilience in the face of food crises due to external factors. This recognition should lead, at the political level, to the definition and **adoption of measures and regulations that assures the formalization and adequate organization** of the activity, guaranteeing adequate working conditions for the VC actors and facilitating adequate access to financial resources.

2) **Improving the availability of efficient services, infrastructures and equipment indispensable** for the appropriate functioning of the VC. This will be addressed primarily by i**mproving the local training capacity** and local know-how, specifically aimed at the **provision of specialized staff** and services contributing to the modernization of the VC and providing local solutions to local problems commonly encountered in different areas of the value chain, particularly in those related to modern boat-building, cold chain facilities and equipment and appropriate fish transport.

Regarding the **institutional dimension**, upgrading the **institutional enabling environment** will require interventions aimed at **strengthening fisheries administration institutional capacities** to improve its performance in three fundamental functions:

1) **Coastal pelagic fishing resources assessment and management**.

2) The **inspection capacity for monitoring, surveillance and control of both catch and post-harvest activities**, assuring the widespread use of both responsible fishing and good hygiene practices.

3) The **review and updating of existing regulations**, based on available scientific evidence, as well as the **definition and elaboration of new regulations and resource management plans**, based upon ecosystem and best management approaches and oriented to both sustainable development of the activity and the preservation of biodiversity.

For this purpose, the operational and technical capacities of relevant staff and officers will be strengthened and updated.

Finally, activities aimed at **upgrading the governance** of the VC tackle the situation of widespread informality, which is considered a main weakness for the correct functioning of the VC. The **professionalization** process of the VC actors is mainly aimed at strengthening their human capacities, not only in essential aspects related to the current activities they carry out (fishing, marketing, processing, etc.) but also in complementary subjects that will help them to carry out these tasks in a functional and profitable way, such as accounting, business management, entrepreneurship, associative management, etc. Furthermore, given the consequence of having efficient and operational professional organizations, activities aimed at strengthening and reactivating existing associations will be carried out, which will contribute to a more resilient VC.

The professionalization of the fish traders will effectively contribute to **reducing the gender gap**, as it will imply a greater and better organization of women in sharing and defending their interests, as well as a greater recognition of their work and status by society and institutions. This new status will also have a positive and decisive influence on their consideration as creditworthy subjects by financial institutions, NGOs and development projects.

To complete the upgrading strategy development, the upgrading strategy is linked back to the sustainability impact it is expected to have in the economic, social and environmental domains.

The **key economic, social and environmental performance indicators under current and upgraded conditions are shown in Table 4. These indicators show the positive impacts of the upgrading strategy across the three elements of sustainability.**

Table 4: Key economic, social and environmental performance indicators under current and upgraded practices (aggregated at VC level)

Economic indicators	Current situation	With upgrading
Total VC direct value added	USD 4.17 million	USD 4.45 million
Social indicators	**Current situation**	**With upgrading**
Proportion (%) of actors part of community associations	23 % fishers / 33 % fish traders	75%
Proportion (%) of vessels that are not dugout canoes	10%	32.5%
Proportion (%) of VC actors (fishers and fish traders) officially recognized as professionals	0%	75%
Proportion (%) coastal pelagic products marketed following food hygiene international standards	Tbd	75%
Environmental indicators	**Current situation**	**With upgrading**
Stock status	Subject to overfishing and overfished in some areas	Stocks not subject to overfishing and not overfished
Number of fisheries management plans updated and improved annually	0 per year	1 per year
Proportion (%) of artisanal vessels that fish with authorization	0%	90%

Source: De Labra, G., Vilela López, B., Prieto Porriños, G., Blanc, P.P., Vasta, A. & Anibal, O. 2023. *The coastal pelagics value chain in Sao Tome and Principe: Summary report.* Rome, FAO

The strategy aims to strengthen the VC organization and its professional and technical capacity. The resilience of the VC to potential market shocks will be enhanced through improving the cold chain services and its equipment (fridges and freezers) for the storage of processed coastal pelagics which will increase the capability of VC actors to store their products.

The 'diversity' of the value chain will also be enhanced, thereby increasing resilience to market shocks, through the new marketing channels (e.g. PNASE or other institutional canteens) and products (e.g. handmade preserves, ready meals, fish burgers, etc.) developed for the sale of coastal pelagics.

Actions in the upgrading strategy related to increasing and strengthening VC actor participation in representative associations will increase levels of 'participation and inclusion', thereby increasing resilience, and will also serve to increase 'connectivity' allowing value chain actors to respond to shocks and challenges in a coordinated manner. Training linked to the professionalization of the sector will also serve to increase the potential for 'learning and adaptation' and thereby the resilience of the VC actors.

5. Implementation plan for the upgrading strategy

In this final section of the report, the upgrading strategy presented in Section 4 is translated into a VC upgrading implementation plan.

The activity and investment plans in this section, Table 5 below, is for the whole upgrading strategy, rather than being FISH4ACP-specific. Costs are indicative only and based on the best assessment possible during the design and analysis phase and may be adjusted during the implementation period if necessary.

Table 5: Summary of upgrading activities and investments (in USD)

Outcome 1: Improved management of the coastal pelagic fishery resources for their sustainable exploitation		Funding source	Total Costs (USD)	Type of cost	Timing (by)
Outputs	**Activities**				
1.1. Capacity building programme for collecting, processing and analysing fish stock assessment statistical data is designed and implemented	1.1.1 Conduct a fleet and fish traders frame survey	FISH4ACP	15 000	Facilitation / studies	2023
		Government	10 000		
	1.1.2 Elaborate a coastal pelagics data collection plan based on the results of the current fisheries statistics system assessment, and train data collectors on its implementation.	FISH4ACP	27 000	Training / Facilitation	2023
	1.1.3 Implement the data collection operational plans, including elaboration and allocation of fitted guides and equipment and yearly review of plans	FISH4ACP	18 000	Facilitation / studies	2023-25
		Government	131 000		2024 onwards
	1.1.4. Update training and technical assessment for data encoding and storage on an appropriate database	FISH4ACP	22 000	Training / Facilitation	2023
			3 000	Equipment	
	1.1.5 Update training, definition of standard models and indicators for data analysis and stock assessment reporting.	FISH4ACP	23 000	Training / Facilitation	2024
	1.1.6. Annual review of analysis and reporting by a stock assessment specialist (university, international agency, NGO) for comments and proposals for improvement.	FISH4ACP	23 000	Facilitation / studies	2024-25
		Government	29 400		2026 onwards

(cont.)

Outcome 1: Improved management of the coastal pelagic fishery resources for their sustainable exploitation		Funding source	Total Costs (USD)	Type of cost	Timing (by)
Outputs	**Activities**				
1.2. A fisheries management plan, to be biannually reviewed and updated, is designed and communicated	1.2.1 Elaborate a fisheries resources management plan, including a review and proposals for improvement of existing fisheries regulations and the implementation strategy.	FISH4ACP	22 000	Facilitation / studies	2024
	1.2.2 Elaborate and implement a communication plan, as well as produce and distribute manuals in plain language.	FISH4ACP	10 000 13 000	Facilitation / studies Equipment / materials	2024
1.3 Training of fishery inspectors to develop operational fishery inspection plans completed	1.3.1. Design and implement a training programme and operational plans for improving the MCS of the coastal pelagic fishery.	FISH4ACP	22 000	Training / Facilitation	2023
	1.3.2 Define, procure and allocate equipment and materials necessary for carrying out the inspection operational plans.	FISH4ACP	7 000	Equipment / materials	2023
	1.3.3 Implement fishery inspection operational plans with adaptive reviewing procedures based on fishery inspectors and inspection plan yearly performance.	FISH4ACP Government	17 000 60 000	Facilitation / studies	2024-25 2026 onwards
1.4. Training of fisheries sanitary inspectors to develop Sanitary Inspection Plan for coastal pelagic products and ad hoc operational plans completed	1.4.1 Train fish food safety officers using ad hoc training plan and manuals developed based on current capacity and needs assessment	FISH4ACP	25 000	Training / Facilitation	2023
	1.4.2 Elaborate the sanitary inspection operational plan for the CPVC products, including sanitary inspection procedures with appropriate materials and actions for raising awareness.	FISH4ACP	21 000 7 000	Equipment Facilitation	2023-24
	1.4.3. Implement the operational plans using trained staff and appropriate means, including annual review of inspection plans and performance assessment of fishery sanitary inspectors.	FISH4ACP Government	17 000 60 000	Facilitation / studies	2024-25 2026 onwards

(cont.)

Outcome 2: VC actors are organized and officially acknowledged as professionals		Funding source	Total costs (USD)	Type of cost	Timing (by)
Outputs	**Activities**				
2.1 The principles and procedures for achieving the professional status of artisanal fisher and fish trader are established and agreed	2.1.1 Technical advice to the competent administrations (Fishery, Health, Labour...) for the discussion and elaboration of a professionalization proposal for the fish trader and artisanal fisher occupations.	FISH4ACP	20 000	Facilitation	2023
	2.1.2 Carry out awareness-raising and information campaigns highlighting the advantages of attaining the professional status of fish trader and fisher, and facilitate a consultation process between the fishery administration and the fish trader and fisher associations.	FISH4ACP	15 000	Facilitation	2023
	2.1.3 Elaborate an official regulatory document concerning the professionalization of the fish trader and fisher, to be ratified by the competent authorities.	FISH4ACP	45 000	Facilitation	2023
2.2 The professionalization processes is defined and regulated for each sub-sector.	2.2.1 Participative design of the official training programmes (OTP) compulsory to achieve the accreditation of professional fish trader or artisanal fisher.	FISH4ACP	14 000	Facilitation	2023
2.3. An upgrading training programme for professional VC actors, with special focus on associations strengthening, is designed	2.3.1 Participative design of upgrading training programmes (UTP) aimed at improving entrepreneurial/ performing capacities of VC actors and strengthening associations	FISH4ACP	30 000	Facilitation	2023-204
2.4 Training services and appropriate equipment for implementing the qualifying and upgrading training programme are established and functional	2.4.1 Agreement with (at least) an institution (vocational training school or NGO) for implementing the training programmes as well as for the planification and implementation of the training programmes along all the coastal communities.	FISH4ACP	17 000	Materials	2023-2025
			118 000	Training	
		Government	18 000	Materials	2026 onwards
			46 000	Training	

(cont.)

Outcome 3: Service providers capacities strengthened to improve VC actors working conditions and products quality		Funding source	Total costs (USD)	Type of cost	Timing (by)
Outputs	**Activities**				
3.1 Study to determine the most convenient boat design and material to capture coastal pelagics	3.1.1 Conduct a study to determine: i) the most convenient boat design and material to capture coastal pelagics; ii) the existing offer, in quantity and quality, of service providers	FISH4ACP	16 000	Facilitation / studies	2023
3.2 Training to build modern and safer fishing boats completed	3.2.1 Training in modern and safe boat building through agreement with local private craft shipyards.	FISH4ACP	20 000	Training	2023
			5 000	Materials	
3.3 Training on how to maintain/repair cold chain equipment completed	3.3.1 Train cold chain specialists	FISH4ACP	42 000	Training	2023-2025
			10 000	Materials	
3.4 Use of alternative energies for refrigeration is promoted	3.4.1 Promote the use of alternative energies for refrigeration equipment	FISH4ACP	12 000	Equipment	2023-2024
			5 000	Facilitation	
3.5 Technical and financial feasibility study on alternatives to improve fishery products transportation, to promote and support the creation of appropriate fish transport services is supported	3.5.1 Carry out a technical and feasibility study for improving the fish transport services in compliance with international standard regulations.	FISH4ACP	6 500	Facilitation / studies	2024
	3.5.2 Promote and support the creation of appropriate road fish transport services. (Financial support via Output 3.7)	FISH4ACP	7 500	Facilitation / studies	2024
			3 000	Equipment / materials	
	3.5.3 Support the local initiatives deemed relevant for establishing a "formal and effective" fish transport service between Sao Tomé and Principe.	FISH4ACP	8 000	Facilitation	2024
			2 000	Equipment / materials	
3.6 Appropriate infrastructures specified, procured and delivered	3.6.1 Facilitate key infrastructure to improve the performance of the coastal pelagics VC	PRIASA	tbd	Plant and equipment	2024 onwards
3.7 Based on established self-help groups, awareness and access to finance sources has been improved	3.7.1 Design and establish specific financial products with conditions suitable and affordable for the VC actors.	FISH4ACP	7 500	Facilitation	2023-2024
	3.7.2 Facilitate access to credit and savings mechanisms through the establishment of self-help groups	FISH4ACP	320 000	Facilitation	2024-2025
		COMPRAN / Private sector	384 000	Facilitation	

(cont.)

Outcome 4: New value added VC products available in the market through new channels		Funding source	Total costs (USD)	Type of cost	Timing (by)
Outputs	**Activities**				
4.1 Social awareness campaigns aimed at producers and consumers for understanding the importance of food safety and responsible fishing in fishery products.	4.1.1. Raising awareness communication strategy on the importance of adopting responsible fishing and good hygiene VC products practices	FISH4ACP	7 500	Facilitation	2023
	4.1.2. Implement the awareness campaigns	FISH4ACP	24 000	Materials	2023-2025
4.2 Technical advice for research and development of new quality products derived from VC, with a special focus on child consumers is supported and provided.	4.2.1 Conduct market studies for assessing the opportunity and feasibility of supplying new VC products, including quality labelled products, to different market niches (with a particular focus on child consumption).	FISH4ACP	7 500	Facilitation / studies	2023
	4.2.2 Encourage the research and development of new quality products derived from CPVC (based on the assessed market opportunities).	FISH4ACP	9 000	Facilitation / studies	2024
	4.2.3 Training and technical support to 3 to 5 associations or micro-enterprise members, selected through an open "call for proposals", for the elaboration of new, quality products.	FISH4ACP	28 000 5 000	Training Equipment / materials	2023-2024
	4.2.4 Design, produce and distribute advertising and merchandising items (banners, posters, t-shirts, caps, aprons, tools, etc.) to promote new products manufactured	FISH4ACP	8 000 10 000	Facilitation Equipment / materials	2024
4.3 A national network of value-adding associations or SME embracing the "quality label" is promoted and established.	4.3.1 Inform and encourage the pilot projects associations / SME to create a functional network (for improving visibility, differentiation and consumer recognition of their products).	FISH4ACP	4 000	Facilitation	2024

(cont.)

Outcome 4: New value added VC products available in the market through new channels		Funding source	Total costs (USD)	Type of cost	Timing (by)
Outputs	**Activities**				
4.4 Agreements between the processing associations / SME and relevant institutions for the purchasing of new fish products are promoted and implemented	4.4.1. Advise on the elaboration of commercial agreements between public or private institutions with the processing associations / SME.	FISH4ACP	4 000	Facilitation	2024
4.5 The multi-stakeholder partnership (MSP) contributes to project/ strategy management.	4.5.1. Set up the MSP	FISH4ACP	3 000	Facilitation	2023-2025
	4.5.2 Support and coordinate the implementation of the upgrading strategy activities.	FISH4ACP	15 000	Facilitation	2024-2025
		Private sector	35 000		2026 onwards

Source: De Labra, G., Vilela López, B., Prieto Porriños, G., Blanc, P.P., Vasta, A. & Anibal, O. 2023. *The coastal pelagics value chain in Sao Tome and Principe: Summary report*. Rome, FAO

Activities to be financed by:

FISH4ACP[18] Donors

Mixed sources e.g. FISH4ACP and government, other donors and private sector)

Drawing on the information provided above (Table 5), Table 6 below provides an overview of the funds needed to execute the activities and the expected source of the funds.

Table 6: VC upgrading investment table (USD)

In USD	Financing sources				Total
Type of investment	FISH4ACP (2023-2025)	Other donors (COMPRAN)	Government (2023-2032)	Private sector (2023-2032)	Totals by type
Facilitation/ studies	681 500	145 400	290 000	274 000	1 390 900
Equipment, materials	132 000		18 000		150 000
Training	327 000		46 000		373 000
Totals by source	1 140 500	145 400	354 000	274 000	1 913 900

Source: De Labra, G., Vilela López, B., Prieto Porriños, G., Blanc, P.P., Vasta, A. & Anibal, O. 2023. *The coastal pelagics value chain in Sao Tome and Principe: Analysis and design report*. Rome, FAO

Table 7 shows the key stakeholders involved in the four elements/outcomes of the strategy.

Table 7. Key stakeholders and catalysts involved in the upgrading strategy and its four elements

Upgrading strategy elements	Key stakeholders and catalysts involved
Improved coastal pelagics resources management	• Department of Fisheries • VC actors • VC associations • FISH4ACP • Port Captaincy • Food Safety and Quality Inspectors
Fishers and fish traders professionalization	• Department of Fisheries • VC actors • VC associations • FISH4ACP • Vocational training centres • NGOs
Coastal pelagics new inputs and service providers development	• Department of Fisheries • VC actors • VC associations • FISH4ACP • Ministry of Planning, Finance and Blue Economy • Boatyard owners • Cold chain operators • Public transport and cargo boats operators • Other donors • Micro finance institutions
New sales channels utilized and new safe coastal pelagic products available on the market	• Department of Fisheries • VC actors • FISH4ACP • VC associations • PNASE • Hotels and restaurants • Other donors

Source: De Labra, G., Vilela López, B., Prieto Porriños, G., Blanc, P.P., Vasta, A. & Anibal, O. 2023. *The coastal pelagics value chain in Sao Tome and Principe: Summary report*. Rome, FAO

The risk analysis (Table 8 below) describes some of the risks that can hamper the achievement of the envisioned impact and presents the associated mitigation measures contemplated in the strategy. The risks are listed from higher to lower, and the overall risk level is calculated by multiplying risk likelihood by risk impact.

Table 8. 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
Most fishers oppose sustainable resource management measures, which they consider as going against their own interests.	The design and implementation of a management plan is essential for assuring the sustainable exploitation of the coastal pelagics resources and avoiding overfishing. The fishers' understanding and adoption of these measures are a prerequisite for the plan to be effective and successful.	4	5	20	The project foresees communication and consultation activities to involve fishers in the elaboration and acceptance of the plan. The implementation of some co-management projects of marine protected areas in some parts of the coast with the support of the NGO OIKOS could be used as clear examples of the importance and positive effect of establishing management rules that limit the indiscriminate exploitation of the resources.
The decline of fishery resources, due to the lack of effective management measures is increasingly jeopardising the profitability of fishers and fish traders activities, as well as the supply of fish products to the population.	Complaints that fish stocks have been declining over the last few years need to be checked against statistical data to confirm whether this decline is due to an increase in the number of fishers (and decreasing catch per unit effort) or whether there is actually a decline in the overall catch.	4	4	16	The project foresees two types of actions to address this risk. First, strengthen and improve stock assessment capacity, and design and implement a resource management plan and regulations. And second, improve the capacities and knowledge of the actors involved to make better use of fishery products and reduce losses due to poor handling, transformation and conservation of fishery products.

(cont.)

Risk Name	Risk Nature	Risk Likelihood (1-5)	Risk Impact (1-5)	Overall risk level (1-25)	Mitigating Options
Poverty and lack of alternative livelihood compels fishers to continue using illegal fishing practices.	Implementation of management measures such as closed fishing seasons, prohibition of destructive fishing gear, limited quota, etc. cannot be assured if the fishers do not have sufficient economic alternatives to follow the measures and are forced to transgress them to guarantee their livelihood.	4	4	16	The upgrading training activities in outcome 2 aim to improve skills related to small business management, promoting entrepreneurship, as well as savings and economic planning.
Banks are reluctant to grant credit to VC actors and demand unaffordable conditions.	The upgrading strategy is based on reinforcing the capacities of the VC actors so that they acquire the necessary skills and credibility to be eligible for credit. However, banks generally consider fishing to be a high-risk activity and the conditions for granting credit are unaffordable for the stakeholders.	4	4	16	FISH4ACP explores different alternatives in collaboration with other donors to support VC actors to meet the required conditions to obtain a formal credit
A majority of stakeholders opposes the formalization and professionalization of artisanal and fish trader fishing activities.	The professionalization of the activities of fish traders and artisanal fishers is essential to change the current situation of informality and lack of rights and responsibilities that prevails in the VC.	3	5	15	Information and awareness-raising campaigns are planned prior to the adoption of measures to professionalize and formalize these activities. It is essential that these campaigns are designed with the support of professional communication experts who are familiar with the particular idiosyncrasies of coastal communities, and are carried out with special commitment, with the support of experts who know how to convey and argue the advantages of these measures for those affected.

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Risk Name	Risk Nature	Risk Likelihood (1-5)	Risk Impact (1-5)	Overall risk level (1-25)	Mitigating Options
There are no carriers interested in offering an adequate fish transport service in accordance with international hygiene standards.	The transport of fish is carried out under poor hygiene conditions, with the fish mixed with products of all kinds, including polluting products such as gasoline and detergents.	3	4	12	FISH4ACP will carry out market studies and propose alternatives for stowage and transport of fish that are profitable for transporters and that guarantee adequate hygiene conditions.
A significant proportion of the actors are not interested in participating in the training activities associated with the professionalization process.	The training of actors is essential for an effective and successful professionalization process.	3	4	12	It is envisaged that the training will take place in the different communities and will be adapted to the timetables and different levels of education of those concerned. The implementation of demonstration projects and incentive mechanisms to encourage participation are also envisaged.

Source: De Labra, G., Vilela López, B., Prieto Porriños, G., Blanc, P.P., Vasta, A. & Anibal, O. 2023. *The coastal pelagics value chain in Sao Tome and Principe: Summary report*. Rome, FAO

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This report presents the results of the value chain analysis of the coastal pelagics value chain in Sao Tome and Principe 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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