

# COUNTRY ECONOMIC MEMORANDUM

## for São Tomé and Príncipe

### Background Notes

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#### Background Note 12 – What is the potential and obstacles for the fisheries sector in São Tomé and Príncipe?

Mirko Serkovic\*  
Julien Million

#### I. Introduction

1. **The purpose of this note is to give an overview of the fisheries sector in STP, its potential and obstacles, as well some policy recommendations to address these obstacles, ensure sustainable management of these resources, and tap into its potential.** It is organized in four section, besides this introduction. The second section describes the fishing sector in STP, while the third and the fourth outline the obstacles for the development of the artisanal and industrial fisheries respectively. The last section offers policy recommendations.

2. **Fisheries play an important role for the economic and social development of the country, however resources are likely over-exploited.** Coastal marine resources are showing signs of full or over-exploitation, in particular, around the São Tomé island. Before looking at increasing production of coastal resources, knowledge on the status of the fish stock would have to be improved through data collection and research to understand the potential of these resources and adequate sustainable management of these resources would have to be ensure through reinforced legal framework, governance and enforcement, as well as the potential development of co-management<sup>1</sup> system between the STP authorities and the fishing communities.

3. **Increased economic benefits from the artisanal and semi-industrial fisheries could be achieved without increasing the production by a better utilization of the catch, reduction of post-harvest losses, and improved value-addition.** This would require investment in small-infrastructures for fishing communities, e.g. cold storage, ice-machine and landing sites, for which proper management systems would have to be defined to ensure their sustainable use. Finally, there is potential for increased production of tuna and tuna-like species as well as small pelagics in Sao Tomé and Príncipe waters. This would require investment in adequate fishing vessels, in equipment and procedures to ensure safety-at-

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\* Natural resource management specialist and senior fisheries specialist, both at the World Bank Environmental Global Practice.

<sup>1</sup> a partnership arrangement between government and the local community of resource users, sometimes also connected with agents such as NGOs and research institutions, and other resource stakeholders, to share the responsibility and authority for management of a resource (© FAO 2008-2019. FAO Fisheries and Aquaculture Department. Rome. <http://www.fao.org/fishery/topic/16625/en> [Cited 6 March 2019])

sea of fishermen and in training of fishermen. Finally, in order to maximize the revenue generated from the foreign fishing fleet in STP, a review of the fishing agreements and private license agreements would need to be done in order to identify ways for STP to fully draw the benefits of the operations of these vessels in its waters.

4. **Any policy reform on fisheries, however, should be integrated within a Blue Economy policy framework.** This would allow to develop synergies and to achieve higher value of fisheries resources and aquatics ecosystem generating sustainable and inclusive growth. For example, tourism, a growing sector in São Tomé, could increase value-added in the fisheries sector and provide other income streams to fishermen. Fresh fish products from artisanal fishermen could command higher prices through the development of a supply network for hotels on the islands of São Tomé and Príncipe. The use of Marine Spatial Planning (MSP) could also offer STP with the possibility to address management challenges of its maritime sectors and develop a true Blue Economy for the benefit of its economy and its population, by providing a better vision to the government but also to the private sector for potential investment.

## II. The fishing sector in São Tomé and Príncipe

### Ila. The natural environment is more apt for offshore catch than intense catch at coastal areas.

5. **Despite having a large marine area, the continental shelf is limited.** As a Small-Island Developing State, São Tomé and Príncipe is heavily dependent on its marine resources, in particular, its fisheries resources. The waters under the jurisdiction of São Tomé and Príncipe, covering around 165,000 km<sup>2</sup>, are 160 times the size of its land area, but the area of the continental shelf (depths less than 200 meters), considered the most accessible fishing grounds for artisanal fishery, is limited to about 1,660 km<sup>2</sup>. The continental shelf is particularly narrow around the island of São Tomé covering around 440 km<sup>2</sup>, while it is larger around the island of Príncipe with 1,220 km<sup>2</sup>.

6. **The physical environment and the unfavorable environmental conditions: narrowness of the continental shelf, poverty of coastal upwelling, and the absence of large estuaries limit the productivity of STP waters and the potential for the development of demersal<sup>2</sup> fisheries.** The marine, physio-chemical and bathymetric environment around São Tomé and Príncipe is more favorable to offshore pelagic<sup>3</sup> fisheries than to coastal demersal fisheries. São Tomé and Príncipe is largely under the influence of the Guinea current<sup>4</sup>. This influence is higher around the island of Príncipe, with warmer sea surface temperature around 28-29°C and relatively low salinity (33-34 ‰), although the southern part of São Tomé island is affected by an upwelling resulting in lower sea surface temperatures, down to 23°C and higher salinity (up to 36‰). These conditions are therefore generally not very favorable for intense primary production. However, the oceanic waters of STP are in one of the important migration routes for

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<sup>2</sup> Species living in close relation with the bottom and depending on it. Example: Cods, Groupers and lobsters are demersal resources. The term “demersal fish” usually refers to the living mode of the adult (FAO glossary, <http://www.fao.org/3/y3427e/y3427e0c.htm>, visited: February 19<sup>th</sup>, 2019)

<sup>3</sup> Species that spend most of their life swimming in the water column with little contact with or dependency on the bottom. Usually refers to the adult stage of a species (FAO glossary, <http://www.fao.org/3/y3427e/y3427e0c.htm>, visited: February 19<sup>th</sup>, 2019)

<sup>4</sup> Institute of Marine Research, Norway, 2010. Cruise Reports “Dr. Fridjof Nansen” EAF – N2010/5 – Survey of the fish resources of São Tomé and Príncipe, May 2010. FAO Project CCP/INT/003/NOR.

tuna species in the Gulf of Guinea, whose resources are mostly exploited by foreign fleets operating in the Exclusive Economic Zone (EEZ) under private licenses or under fisheries agreements such as the SFPA with the European Union.

## **IIb. Fisheries is a significant economic activity, a source of income and protein.**

7. **Fisheries make an important contribution to the economy, livelihoods, and food security<sup>5</sup> of STP.** With an estimated contribution to GDP of US\$44.4 million in 2017, the primary sector, including agriculture and fisheries, represented around 12 percent of GDP in the last five years (2013-2017), according to the National Institute of Statistics. Fishing accounted for 6.5 percent of GDP, i.e. more than agriculture, on average from 2013 to 2017. The value-added from fisheries grew by 11 percent between 2013 and 2016, but then saw major decline (-8 percent) in 2017.

8. **Fishing is also the main source of income for coastal communities.** The national statistics office estimates that 4.6 percent of all employed population work on fisheries, with 89 percent of them being male. Artisanal fisheries directly employ over 5,000 people: fishers, and women selling and processing fish (palays). The level of fish consumption has continuously increased over the last few years and it is estimated at 45kg per capita per year, the highest fish consumption among coastal countries of Central Africa.

9. **The fishermen population is growing in STP.** In recent years, a growing number of young people are becoming fishermen, sometimes moving from inland villages to the island of São Tomé. Between the last two censuses of the fishing population, in 2007 and 2014, the number of small-scale fishermen grew by 25 percent to reach around 3,000 fishermen in 2014. Since then, there was no new census done, and the lack of real-time registration of fishermen does not allow access to up-to-date data.

10. **Fishing activities are mostly artisanal or small-scale<sup>6</sup> in São Tomé and Príncipe.** A small fleet of semi-industrial vessel exist, operating in national waters and in Gabon, however the fleet is ageing and lacks investment and infrastructure. No domestic industrial fleet exist, but a foreign fishing fleet targeting tuna is licensed to fish within São Tomé and Príncipe's EEZ. Tuna catches are not landed in the country and as such does not contribute to the supply of the national market nor to create value added locally. Today, STP has a Sustainable Fishing Partnership Agreement (SFPA) with the European Union, and private licenses with other Spanish-owned tuna vessels that yielded 0.2 percent of GDP in revenues for the government in 2017. The main sustainable revenues from the fisheries sector currently come from the selling of industrial tuna fishing licenses either paid by EU vessels operating within the STP-EU SFPA or paid by private shipowners in the framework of bilateral fishing agreements. The small-scale fisheries sector is largely undertaxed and operates in an open and almost free access, i.e. only a tax exists for boat registration by the Port Authority/Coast Guard.

11. **Estimated catches of domestic small-scale and semi-industrial fisheries have increased steadily over the last 20 years.** They are reported to have increased from 2,000 to 4,000 tons per year between

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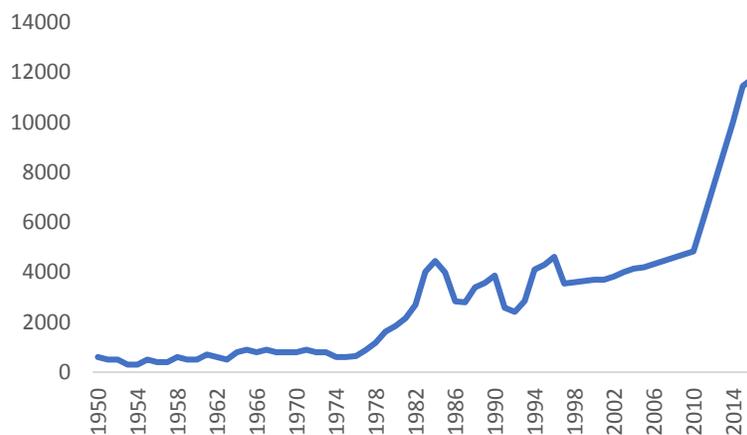
<sup>5</sup> STP is among the few countries in the world that have recognized the potential of fish for nutrition by including fish in their national school-feeding program (PNASE).

<sup>6</sup> Defined in law as being carried out in the coastal zone, using a boat whose means of propulsion is the paddle, the sail, or the outboard engine and having an autonomy of less than 24 hours.

the mid-1990s and mid-2000s (Figure 1). Production in 2016 was estimated between 11,000 and 12,000 tons with the large majority coming from the artisanal sector. In 2015, landings from the semi-industrial fishery were estimated at 740.1 tons, or 6 percent of the total landings of the national fisheries (FAO, 2017)

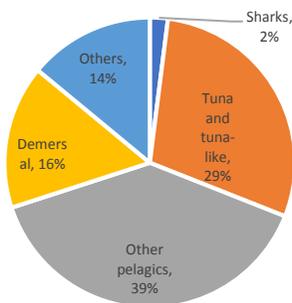
12. **Catches are mostly made of small and large pelagic species.** According to the statistics of Department of Fisheries, catches are composed by 16 percent of demersal species and about 70 percent of various pelagic species, with about 29 percent of tuna and related species. An estimate of the value of the national production in 2015 can be made by considering the average ex-vessel price of 45 STD / kg (= 2 USD / Kg) for all species combined, for a theoretical total value of USD 22.2 million.

**Figure 1 - Domestic fisheries production (in tons) in São Tomé e Príncipe: 1950-2016**



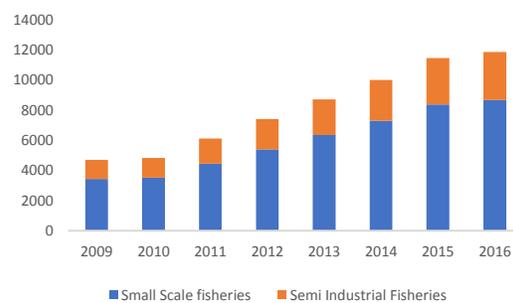
Source: FAO Fishstat

**Figure 2 - Domestic production by group of species: 2015**



Source: Directorate of Fisheries

**Figure 3 - Domestic production by fleet segment: 2015**



Source: Directorate of Fisheries

13. **Tuna resources are exploited by industrial foreign vessels, operating in STP under private licenses or fisheries agreements.** Around 20-25 EU tuna vessels, purse seiners and longliners, operate under the STP-EU SFPA and its implementing protocols. Other tuna vessels, flagged outside of the EU but some with beneficial ownership in the EU, are operating in STP under private licenses. The SFPA between the EU and São Tomé and Príncipe was concluded in 2007 and the latest protocol ended in May 2018. In April 2019, São Tomé and Príncipe and EU agreed on a new protocol. The catches of EU vessels in STP

waters varies from one year to another (**Table 1**). The reference tonnage in the EU SFPA under the previous protocol was set to 7,000 tons and has now been increased to 8,000 tons. Similarly, the sectoral support under the new protocol increased from EUR325,000 to EUR440,000. The EU SFPA is generating over 1 million euros for STP annually, including both the access and fishing rights, as well as the sectoral support component, representing an important and sustainable revenue from the fishing sector of the country. The catch and revenue derived from other tuna vessels operating in São Tomé and Príncipe under private licenses is not available.

**Table 1 - Tuna catches (in tons) by EU vessels under the EU-STP SFPA in STP waters: 2012 - 2016**

Flag		2012	2013	2014	2015	2016
<i>Purse seiners</i> <sup>7</sup>	French	223.00	4,498.78	5,995.56	5,296.00	2,462.50
	Spanish	212.80	60.80	2,840.60	7,038.70	544.70
	<b>Total</b>	435.80	4,559.58	8,836.16	12,334.70	3,007.20
<i>Longliners</i> <sup>8</sup>	Spanish	88.70	25.25			312.60
<b>TOTAL</b>		524.50	4,584.83	8,836.16	12,334.70	3,319.80

### **IIc. Fish stock in coastal waters are showing signs of full or overexploitation.**

14. **The status of the stocks of the demersal and small-pelagic resources in STP waters, exploited by the domestic fleet, is largely unknown.** Studies done in 1980 indicated a fishing biomass potential of 12,000 tons per year (9,000 tons around Principe, 3,000 around São Tomé), with 8,500 tons of pelagic species and 3,500 tons of demersal species (ORSTOM, and ex-URSS, 1982). Other studies indicate a maritime potential of 17,000 t of tuna per year (ICCAT 1998). Surveys conducted by the Institute of Marine Resources in Norway in 2004, 2005, 2006, 2007 and 2010 estimated overall biomasses of some selected coastal species<sup>9</sup> group between 1,500 and 2,500 tons.

15. **Research and data collection need improvement to better inform management of the resources and potential investment.** No research is regularly performed in São Tomé and Príncipe by the national authorities, mostly due to the lack of funding and research assets, and there is little data collection, such as catch data from the national fleet, at this time, that would allow stock assessment to be done or stock status indicators to be developed and provide reliable information on resources. In 2015, thanks to an FAO project and after 10 years of interruption, fisheries data collection resumed in STP. The current system relies on a network of 12 investigators spread over a dozen landing sites identified as the most important in terms of artisanal fleet and quantities landed. The catch data collected is coupled to frame survey data (census of the number of vessels) undertaken in 2014, but that should be updated. The system should also be enhanced by improving methods for estimating landed weight and species identification. Analysis of these data should be employed to derive indicators of the status of the main commercial stocks, and additional research on the resources, their habitat, etc. should be done, potentially in

<sup>7</sup> Fishing vessel using a purse seine, *i.e.* a net characterized by the use of a purse line at the bottom of the net

<sup>8</sup> Fishing vessel using a longline, *i.e.* a main line, to which baited or unbaited hooks are fixed at regular intervals

<sup>9</sup> Seabreams, grunts, croakers, groupers, snappers, *Brachydeuterus auratus*, sharks, rays, barracudas, cephalopod, ariomma, carangids

collaboration with other neighboring countries, such as Angola that has recently acquired a new research vessel.

**16. While there is no reliable information to assess the status of stocks, the observed dynamics of small-scale fisheries indicate full or overexploitation of resources, especially around the São Tomé island.** These dynamics include conflicts of use between fishermen of different communities, territorial expansion of traditional fishing activities, remoteness of fishing grounds, reduction in catch size for some high commercial value species, and localized decline in abundance and scarcity of some species. It is reported that some small-scale fishermen are fishing up to 40 miles from the shore, harvesting fishing ground between 100 and 250 meters depth. Some artisanal fishers are now using fishing nets of over one kilometer in length, fishermen from the northern part of São Tomé are now operating on fishing grounds in the south of the island, generating conflicts of certain communities, as resources have disappeared from their traditional fishing areas. This is also corroborated by the fact that catch levels of demersal species seem to have reached (or exceeded) the exploitable biomass estimates that had been made in the past. A project undertaken by local and international NGO's aims at initiating co-management processes with these small-scale fishermen communities. The early stages of these are initiatives intended to collect data and produce evidence on the resources and dynamics of fishing activities in order to support fisheries management processes decided by the communities.

**17. On the other hand, there are abundant stock of some offshore species, from which STP derives little benefit.** Tuna resources are managed regionally by the International Commission for the Conservation of Atlantic Tunas (ICCAT), of which STP is a member since 1983. Regional stock assessments of these highly migratory fishes indicate that certain tuna species: bigeye tuna and yellowfin tuna, are considered to be overfished in the Atlantic. The Eastern Atlantic skipjack stock is not overfished, and overfishing is not occurring. Between 2013 and 2017, annual catches of tuna and tuna-like species (except Bluefin tuna) in the Atlantic Ocean averaged 642,292 tons, and STP fleet contributed to 0.36 percent (average of 2,342 tons) to it, while catch by the EU fleet in the waters of São Tomé and Príncipe contributed to 0.52 percent, representing around 1.70 percent of the EU catch in the Atlantic Ocean for these species (data for the EU catch in STP from 2012 to 2016, see **Table 1**).

#### **IId. Climate change will affect STP, making sectorial reforms even more pressing**

**18. Climate change is expected to have substantial implications for marine ecosystems and fish stocks.** This is due to the array of human disturbances they are exposed to, and the high sensitivity of their biota to environmental fluctuations because species are close to their environmental limits. Human activities, *e.g.* as pollution, coastal development, fishing, *etc.* and changes in environmental conditions, *e.g.* increases in sea surface temperature, ocean acidification, decline in oxygen content, rise in sea levels, and increased ultraviolet (UV) exposure, adversely affect marine organisms and the associated ecosystem goods and services we derive from them, such as fisheries.

**19. As a Small Island Developing State, STP is likely to be strongly affected by climate change.** SIDS are particularly vulnerable to climate change. Their activities are often centered along the coastal areas, their economy is often largely dependent from sectors that are climate-sensitive (fisheries, agriculture, tourism, *etc.*) and they are affected by extreme weather events. Climate-change effects such as sea level

rise, temperature variations, increased frequency of extreme events (cyclones, droughts or flooding) will have important impacts on natural resources and economies of SIDS.

20. **Fishing activities would be affected due to sea level rise, changes in the distribution of fish resources, but also changes in the phenology and physiology of marine resources.** Local extinction rates are expected to increase considerably throughout the coast of Africa. These impacts are and will continue to be felt in fisheries that are already in a state of severe overexploitation (90 percent of the stocks are fully exploited or overexploited). Further, these impacts, by altering or destroying habitats and ecosystems, are decreasing the possibilities for that previously allowed depleted stocks to recover post-overexploitation. An on-going study on the impact of climate change on marine fisheries in Africa estimates that by the end of the century, the Maximum Catch Potential (MCP) of Sao Tomé and Príncipe could decrease by 40 percent<sup>10</sup>. This would have disastrous impacts as fisheries in STP play an important role not only for public earnings, but also for food security and livelihoods of its population.

21. **Fundamental reforms thus require stock recovery and restoration of habitats for better adaptation to climate change and increased resilience.** These reforms should be done in parallel and simultaneously: stock recovery (giving depleted and overexploited stocks a chance at a comeback), and restoration of the integrity of critical habitats on which the stocks depend, including, but not limited to, mangroves, coral reefs, and seagrass beds. The current general lack of information on the fish stocks in STP is an obstacle for analyzing in depth and monitoring the impact of climate change on its fisheries.

### III. **The main obstacles for artisanal fisheries are: (i) overexploitation of resources caused by poor sectorial management, (ii) old and unsafe vessels and inadequate equipment, (iii) poor infrastructure with inadequate governance, and lack of health and sanitation.**

#### IIIa. **Poor fisheries management is at the heart of overexploitation.**

22. **Demersal species seems to be at levels of full or overexploitation, leaving little room for increased productions, while the catch of pelagic species could be further developed.** For artisanal and small-scale fishermen both pelagic and demersal species are relevant, although the prospects for development of the sector are different for both groups. Pelagic species, *i.e.* small-pelagics (sardines, sardinellas, anchovies, *etc.*) and tuna and tuna-like species, make up 70 percent of catches in STP. These catches increased steadily over the last 20 years and have more than doubled since 2010. The large pelagics species are found in the vast EEZ of STP, with seasonal high abundances and are exploited both by the artisanal local fisheries, but also by foreign industrial vessels operating under private licenses or fisheries agreements. Demersal species are only exploited by artisanal fishermen on the narrow continental shelf of São Tomé.

23. **There is no control on the number of fishermen, boats, and catch size, which contributes to overexploitation.** The national fishing sector is operating with open and free access (that is, no limitation on the number of boats). Though fishing capacity is registered through fishing boats at the port authority/coast guard, the database is not maintained in real time, and the fisheries department, in charge

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<sup>10</sup> World Bank, *in preparation*. At the nexus of climate change and marine fisheries: assessing vulnerability and strengthening adaptation capacity in Africa.

of the management of the resources, does not have full access to this data. Thus, the management of fishing capacity for small-scale and semi-industrial fisheries is not fully controlled and the little data that is collected is not integrated for optimum use.

24. **The number and catch of foreign vessels are regulated by a licensing system, which hasn't been effective.** For foreign vessels, access is regulated through a licensing system. The Department of Industrial Fisheries is responsible for receiving applications for fishing licenses and for issuing these licenses, which are signed by the responsible minister. Though data management has been computerized since 2014, the system is inefficient and prone to human error. The numbering of licenses, as well as the monitoring of the validity of each license and the corresponding payments, cause several errors and there is no control system for entries. Given that the number of licenses issued is still low, the system could be improved easily.

25. **Besides access regulation, there are few fishery management measures included in the legal framework, in particular for the domestic fisheries, and enforcement is usually low.** There is currently no Marine Protected Area (MPA) in place around both islands of the country, but the government intends to create areas with specific regulations for fisheries (communitarian fishing area) in some identified zones. Some NGOs have also developed initiative to pilot community-led fisheries management in some area of São Tomé.

### IIIb. The fishing fleet is old, inadequate, and unsafe.

26. **The vessel fleet is composed mostly of single-person, wooden, non-motorized, small-capacity boats.** The registered fleet of artisanal and small-scale is recorded at 2,374 boats<sup>11</sup> mostly located in São Tomé (88 percent of total). Most of this fleet is composed of wooden canoes (pirogues), of which about 20 percent are motorized while the rest are propelled by sail/paddle. These boats are 5 meters to 12 meters in length, with a capacity of 0.1 to 0.5 gross ton (GT).

27. **There is a small and outdated semi-industrial fishing fleet in São Tomé and Príncipe.** The semi-industrial fleet of 10 active vessels<sup>12</sup> generally operates around the Island of Príncipe due to the abundance of coastal demersal resources, as well as within Gabon's EEZ. The fleet is old and often faces recurring breakdowns that limit its performance. Its activities are hampered by a lack of access to good quality ice, landing infrastructure, and financing. This fleet is in a state of survival.

28. **The fishing fleet, both of artisanal and semi-industrial boats, is clearly inadequate for proper fisheries development, but most importantly the current fleet and equipment cannot ensure the safety of the fishermen at sea.** The recently introduced PRAO-type canoe, propelled by sail and engine, is better suited and safer for local fishers, and is being promoted by the government through a 30 percent subsidy on its purchase price and the construction of boat manufacturing workshops publicly funded. Therefore, this new type of vessel is in high demand. Although the fleet is inadequate, the current levels of fishing effort of this artisanal seems to have resulted in an unsustainable exploitation of coastal resources. The

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<sup>11</sup> Fisheries Directorate Frame Survey, 2014.

<sup>12</sup> The 2014 frame survey identified 32 vessels: (a) 6 decked boats between 12 m and 14 m, (b) 10 canoes of 10 m (c) 11 boats of 8 m, and (d) 15 fiberglass boats of 5.5 m. Only 10 boats of this fleet remain currently active.

development of fishery cannot translate in higher level of exploitation of these resources but in diversification of the targeted species (*e.g.* tuna and tuna-like species), the improvement of the value-chain and value-added (*e.g.* conservation, processing, exports), etc. This could entail the development of a new fleet suited for tuna and tuna-like resources, which would operate from São Tomé and Príncipe, unloading its catches on the island to supply the local market and eventually exports. Additionally, private sector investment for better processing and value-added could be encouraged and could lead to export of fisheries products, generating a new type of revenue for STP.

29. **Fishing gear varies from beach to beach but the most used are the handline, bottom lines, drifting gillnets ('rede voador') and the circling gillnet ('maxipombo'), and bottom nets.** Spear fishing is unregulated and is expected to expand. The technique is highly profitable as it targets high-value commercial species, requires low investment, is low-cost, and is quite effective. Because the technique is popular among young fishermen without boats or gear, more spear fishing is expected because of the high unemployment of young people. The development of new gear could lead to the diversification of target species, and more sustainable fishing practices around São Tomé and Príncipe.

30. **The supply chain for fishing equipment and related activities is underdeveloped.** This weakness has led the government to substitute the private sector and play the role of importer and seller of fishing equipment. The task is difficult because governments are generally not properly equipped, nor skilled, to carry out these commercial activities in a sustainable manner.

### **IIIc. STP lacks infrastructure for handling, preserving, and commercializing fishes with severe consequences for health and sanitation.**

31. **Catches from national fishing activities supply only the domestic market as there are no significant export flows.** Most of the fresh fish production (70 percent) supplies the market in São Tomé and is sold in the city's central market. The fishery value chain includes three main segments: (a) production, with a small-scale and a semi-industrial fishing component; (b) fish trading, mostly by fishmongers (*palayes*), mostly women, and by wholesalers mainly supplying hotels; and (c) a small-scale processing segment of fish products (such as dried, salted, or smoked fish), mostly done by women. The production segment represents the highest share of value added (63 percent), followed by the commercialization of products (33 percent), mostly the trading of fresh products. The added value created by the artisanal processing of fish products is relatively small at 4 percent.

32. **The lack of post-harvesting facilities results in losses and low level of value addition.** High level of post-harvest losses (physical losses and losses of value) occur in STP, mainly due to the lack of conservation facilities, *e.g.* cold storage, ice-box and ice machine, all along the value chain. Most fishermen do not use ice or insulated containers on board their vessel, and there is a lack of properly equipped landing sites, including with proper conservation facilities. There is a need to improve the cold chain in São Tomé, which could quickly benefit communities and stocks. Because fish processing activities are done out of necessity (due to lack of means to conserve fresh fish) and with low-cost techniques such as salting and drying, the contribution of these activities to wealth generation is low. This value could be enhanced with better post-harvesting facilities and new processing methods to improve value-addition.

**33. Energy remains a strong constraint for the establishment of post-harvest facilities and thus for improvement of the fisheries value chain.** The structural insufficiency of electricity supply in STP as well as the associated high costs have a strong impact on the fisheries value chain, which is highly dependent on energy supply. Without energy, the use of ice, the operation of freezers and cold rooms are not possible. Innovative off-grid solutions could facilitate access to energy for fishing communities, ensuring better conservation of fisheries products and reducing post-harvest losses.

**34. Improvement of governance and management of landing site and trading infrastructures should go hand in hand with any new infrastructure.** Some important and modern infrastructures to land, conserve, and commercialize fish were built with public funding and by development partners, however, most of them are currently not working for various reasons, *e.g.* lack of consultations of communities during the design phase resulting in lack of ownership, bad design not adapted to the needs, lack of proper management of the facilities, etc. This often resulted in the rapid deterioration of the built infrastructure due to the lack of use and maintenance.

**35. The lack of adequate commercialization infrastructure is yet another obstacle to the development of the fisheries sector.** The city's central market, the most important trading location for fisheries product in STP (it is estimated that 70 percent of the fish production is sold at the STP market), also lacks conservation facilities, presenting potential health risks as well as resulting in significant post-harvest losses. The lack of organization of the producers, with lack of dedicated areas and stalls at the market, also results in an inefficient marketing system, resulting in commercial losses. Recently, a new central market was built in Bobo-Forro under the PRIASA II project. The facility includes a dedicated fish market that will provide improved conservation, processing and marketing facilities. However, the market is not yet functional, and its distance from the city center of São Tomé might pose some challenges. Smaller markets on São Tomé and Príncipe also need to be rehabilitated to provide better conservation and hygiene facilities to fishmongers and resellers, however, sustainable management system should be developed along this infrastructure.

**36. Lack of health and sanitation throughout the value chain is also hindering the development of the sector.** A general lack of principles of basic hygiene throughout the sector leads to a poor level of safety of fish products on the domestic market, increasing health risks for consumers and constituting a significant handicap for the access to profitable markets, including exports.

#### **IV. The investments needed for STP to capture higher value from industrial fishing are high and risky.**

**37. STP does not currently have a national industrial fleet.** The industrial fleets operating in STP are exclusively of foreign vessels, targeting tuna and tuna-like species, *i.e.* purse seiners and longliners. These vessels are not unloading their fish in STP, and therefore are not generating additional revenue for the country in the form of port fees, services to the fleet, *e.g.* provision of supplies, bunkering, repair and maintenance, etc.

38. **According to the study of the EU SFPA<sup>13</sup>, STP retains around 12 percent of the value added from the activities of the EU tuna vessels.** The direct and indirect value added of the tuna catches made by EU vessels in STP waters is shared between economic entities in the EU, STP, and other African coastal states, where the vessels are unloading or from where nationals are employed as crew members. From 2014 to 2016, STP retained 12 percent of the value added, while the EU retained 39 percent and other Africa countries retained 49 percent. This is explained by the fact, that the value added for STP is only due to the payment of access and fishing fees, with no other economic benefits derived from the fleet. The share of STP represents only around 5 percent of the turnover of the EU vessels in STP waters for these two years, on average 11 million EUR.

39. **Capturing more value-added from the industrial tuna fleet would require substantial investment and regulatory reforms.** In order to capture additional benefits from the EU and other non-EU fleets, STP would need to increase its economic linkages to these fleet, in particular by increasing the services it could provide to vessels and providing them with the necessary infrastructure. Increase the services that STP could provide to the fleet would require substantial investment, in particular to modernize the port facilities of the country and develop the services offered in order to allow vessels to use the port of STP for unloading or transshipping, supplying or bunkering, repair and maintenance. In addition, STP would have to compete with other ports of the region to attract these fleets that have traditionally been operating from ports such as Tema in Ghana, Abidjan in Ivory Coast or Dakar in Senegal. The risk associated to such investment would be very high. STP could also invest in the training of crew that could work on the tuna fishing fleet, review its access and fishing fees, etc. and eventually countries of the region could collaborate to better negotiate fishing agreement and maximize the revenue that could be extracted from these fisheries.

## V. Policy Recommendations

40. **A list of policy recommendations is advanced to address the four main obstacles identified.** Please see Table 2.

**Table 2 – Obstacles and policy recommendations for fisheries development**

Obstacles	Policy Recommendations
<b>Overexploitation due to poor management</b>	<ul style="list-style-type: none"> <li>• Improve data collection</li> <li>• Introduce co-management between government and local communities</li> <li>• Undertake research in collaboration with regional peers</li> </ul>
<b>Old and unsafe vessels and inadequate equipment</b>	<ul style="list-style-type: none"> <li>• Continue the promotion of safer vessels, such as the PRAO model</li> <li>• Create a homologation system for fishing vessels to deal with registration</li> <li>• Ensure availability of safety equipment for fishers, potentially through cooperatives or fishers associations</li> </ul>
<b>Lack of infrastructure</b>	<ul style="list-style-type: none"> <li>• Develop climate-smart fisheries infrastructure</li> </ul>

<sup>13</sup> Caillart, B. et al., 2017. Évaluation rétrospective et prospective du protocole à l'accord de partenariat dans le domaine de la pêche durable entre l'Union européenne et São Tomé-et-Príncipe. European Commission.

	<ul style="list-style-type: none"> <li>• Introduce co-management between government and local communities</li> </ul>
<b>Low benefit from offshore pelagic fisheries</b>	<ul style="list-style-type: none"> <li>• Develop offshore fisheries at a semi-industrial level</li> </ul>

**41. In order to ensure stock sustainability, STP must improve research and data collection on the status of coastal fish resources.** The prevailing lack of knowledge on the status of fish stocks poses a challenge to their sustainable harvest and management, as it prevents the government to make informed management decisions and does not allow the private sector to efficiently target their investments. STP should undertake national research campaigns, enhanced data collection and analysis, and reinforce its scientific capacity for fish stock assessments. For example, data-poor assessment methods could be used to derive stock status indicators for the main commercial species. Given that some marine resources are migratory and shared between countries (i.e., tuna), and for cost-effectiveness, research efforts should be undertaken in collaboration with other countries.

**42. In order to improve the management of fisheries resources, the government could delegate responsibility to local communities under co-management agreements.** Co-management systems, by which management responsibilities are shared between government and local communities, could be implemented in STP to ensure a sustainable exploitation of the resource. Community management associations with legal access rights has proved to be an effective mechanism for introducing new management measures, local surveillance, stock enhancement measures, and participatory surveillance, which together has helped to improve stock status in the co-managed fishing areas. Co-management, a bottom-up process that imply behavioral changes, may require considerable time to evolve and considerable efforts in raising awareness and strengthening the capacities of local actors. Co-management has been successful in communities with strong social cohesion, clear community tenure rights and when accompanied by an increase in the overall level of income of the community and when sustainability is built into its operation. Co-management would also involve strengthening the control of artisanal fisheries by better structuration of the sector, smart registration and licensing to keep up-to-date numbers of active vessels and fishers, which could in turn provide artisanal fishers with improved safety and security by professionalizing their activities and potentially leading to improvements in social protection, insurance, access to credit, and so on.

**43. Improved regional cooperation for research, management of shared-resources, data sharing, monitoring control and surveillance, and negotiation of fishing agreements.** Regional cooperation between neighboring countries of the region can assist STP to address common constraints affecting its fisheries sectors, i.e. weak governance and management, low capacity and investment through regional platforms of which STP is a member, the International Commission for the Conservation of Atlantic Tunas (ICCAT) and the Gulf of Guinea Regional Fisheries Commission (COREP). This could be done through a mutualization of assets (research and monitoring, control, and surveillance), exchange of lessons and experiences, etc. Improved regional cooperation could also allow STP and other countries to speak with a unified and stronger voice in international and regional fora, and in negotiations of fishing agreements.

**44. In order to address safety issues, STP should improve the artisanal fleet through better suited and safer vessels.** The Government of STP should continue to promote the acquisition of the PRAO

vessels, and other type of safer boats, which provide a safer and more adequate tool to fishers. The use of such vessel allow fishers to go farther out in the sea, targeting species such as the pelagic species, and do so in better and safer conditions, hence reducing the fishing effort on the coastal resources. This would require continued investment in the promotion of this type of boats, training and capacity building of fishers and boat builders, acquisition and distribution of safety equipment, etc. Systems to rescue fishers in difficulty should also be set up in parallel, with a clear identification of stakeholders and responsibility. Finally, data of incident and accident at-sea should be collected, and a database should be created.

**45. In order to address the lack of infrastructure, the GoSTP should aim to reduce post-harvest loses and improve value-added with the development of climate-smart<sup>14</sup> fisheries infrastructures in fishing communities.** The lack of conservation and processing facilities leads to inefficiencies and losses along the value chain. In addition, fish is traditionally processed by being dried, salted or smoked, but often with inefficient equipment that impacts negatively the product quality and the health of the processors. Well-designed landing and processing centers that provide multiple services and facilities for fishing communities, along with good management practices and a realistic management and business model, can be impactful for beneficiary communities while at the same time reducing greenhouse gas emissions and being more resilient to climate-change. It is critical that sustainability is embedded into the operations of these centers, involving the private sector as much as possible, especially for processing facilities.

**46. In order to benefit more from offshore pelagic fisheries, the country is advised to develop the national tuna fishery, at semi-industrial level.** The development of a domestic tuna longline fishery in STP could be encouraged, given the potential to increase the national production, the value of the resource, to reduce pressure on coastal resources, and the fact that the foreign fleet does not generate much value-added to the local economy. Through the development of such a fleet, STP could domesticate a higher proportion of the tuna catches in its EEZ, mostly made by foreign vessels. The fleet, being based in STP, would also provide employment opportunities, potentially for artisanal fishers, and if coupled with the deployment of Fishing Aggregating Devices and a better control of the artisanal fleet, could result in a reduction of the fishing effort on coastal fisheries, allowing demersal stocks to rebuilt. The development of national tuna flee would require investment, both public and private, in adequate fishing vessels, in land-based infrastructures and services, equipment and procedures to ensure safety-at-sea of fishers, as well as in training and capacity building for skippers and crew. In addition, pole-and-line fishing technique for tuna in STP waters may also be trialed, but require different set of skills, very specialized vessels and a good availability of bait fish.

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<sup>14</sup> These are infrastructures, which are more respectful to the environment, in particular with regards to emissions, but also more resilient to climate change.