

# Chapter 4. Local communities, global resources

Yellowfin tuna (*Thunnus albacares*) in Cabo Verde

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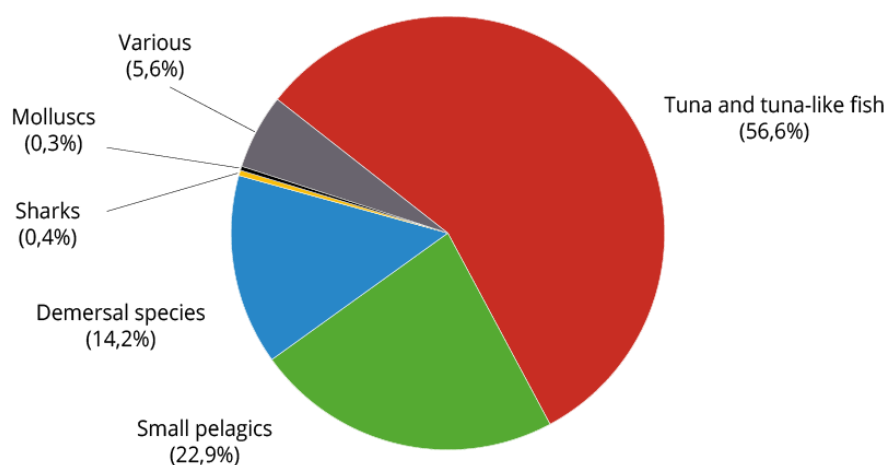
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- 1 Fishery resources are one of the few natural resources in Cabo Verde. Although the archipelago is located close to an important area of primary productivity and has a large exclusive economic zone (EEZ) of 734,265 km<sup>2</sup>, its potential in fishery resources is low. The archipelago's small continental shelf extension, its volcanic origin, the scarcity of local upwelling systems, the hydrological and oceanographic regimes of its marine waters, the absence of rivers, and the scarcity of rainfall are all factors explaining this relatively modest potential.
- 2 Cabo Verde shows the characteristic marine biodiversity of other tropical island systems, with a wide variety of species, yet the populations of certain species are small with relatively low abundance. The main fishery resources are large pelagic fish, small pelagic fish, demersal fish, surface sharks, deep-sea fish, lobsters and other gastropods. Large oceanic pelagic species include yellowfin tuna (*Thunnus albacares*), skipjack tuna (*Katsuwonus pelamis*), bigeye tuna (*Thunnus obesus*), little tunny (*Euthynnus alletteratus*), frigate tuna (*Auxis thazard*) and wahoo (*Acanthocybium solandri*). This group also includes mahi-mahi (*Coryphaena hippurus*) and beaked species (Istiophoridae, Xiphiidae). These are all essentially oceanic migratory species that come to the waters of Cabo Verde seasonally, although some species have resident populations.
- 3 Tuna fishing is an important sector in Cabo Verde, accounting for 25% of the total fisheries catch (fig. 1). It is very important both for local artisanal fishing communities and for the fishing agreements that exist between Cabo Verde and foreign fleets. One of the most economically important species is yellowfin tuna, accounting for about 55% of the artisanal catch and 24% of the national catch of tuna in Cabo Verde (INDP, 2019). This tropical and subtropical species is distributed mainly in the epipelagic oceanic waters of the Atlantic, Pacific and Indian Oceans (ARRIZABALAGA *et al.*, 2015). In the Atlantic, yellowfin tuna migrates seasonally, avoiding areas with the lowest sea surface temperatures (SSTs). Catches of yellowfin tuna are high in the waters surrounding Cabo

Verde, especially during the second, third and fourth quarters of the year. During the first two quarters, yellowfin tuna is mainly concentrated in the equatorial Atlantic and extends its range into the Gulf of Guinea. Juvenile yellowfin tuna extend their habitat into the western subtropical Atlantic to the Gulf of Maine (FONTENEAU and SOUBRIER, 1995). Exploited sizes range from 30 cm to over 170 cm; the species' size at maturity is about 100 cm. In an analysis of the habitat requirements of tuna worldwide, ARRIZABALAGA *et al.* (2015) show that yellowfin tuna have very specific habitat requirements, with a preference for warm surface waters (>24°C). The highest catch rates in the tropical Atlantic are associated with water temperatures of 24–25°C (LAN *et al.*, 2013).

- 4 This chapter focuses on this species central to international negotiations and to the daily life of local artisanal fishermen, which is illustrated by a photo report of a fishing day in São Pedro.

**Figure 1.** Average percentage (%) of landings by species group over the period 2014–2018



Source: Annual national fisheries statistics published by the Cabo Verde National Institute for Fisheries Development (INDP)

## Yellowfin tuna fishing in Cabo Verde

- 5 As in several other West African countries, the fisheries sector in Cabo Verde is a multifunctional activity of major economic, social and environmental importance. Fish and fishery products are the staple food and the main source of animal protein for a large part of the Cabo Verdean population. Fishing is integral to the country's cultural heritage and also promotes tourism (recreational fishing). Exports of fishery products are crucial to the balance of payments, accounting for more than 80% of the value of the country's goods exports. Although its primary contribution to national wealth is modest, the fisheries sector is of great strategic importance to the economic and social development of Cabo Verde in general. This sector is subject to regulation both nationally and internationally through contracts.

## Yellowfin tuna, an essential national resource

- 6 The yellowfin tuna fishery is regulated at the national level by a Fisheries Resource Management Plan adopted in 2020.<sup>1</sup> The current plan sets out the broad guidelines for fishery policy for the period 2020–2024. It is supplemented by biannual executive plans for the management of fisheries resources. The major innovation of this new fisheries management plan is the introduction of a system of individual quotas for several species. Yellowfin tuna fishing is not covered by the quota system, but the plan specifies that it be organised in strict compliance with the rules laid down by the International Commission for the Conservation of Atlantic Tunas (ICCAT). It also states that the licensing system will be revised to grant separate licences for each species of tuna. A specific plan for the different species fished is established annually: the plan for the yellowfin tuna fishery emphasises the importance for industrial fishing vessels to provide catch statistics. It is also innovative in requiring socio-economic studies on the fishery.
- 7 The Cabo Verde Fisheries Resource Management Plan divides the fleet into three categories: artisanal, industrial and semi-industrial. In practice, the boundary between the artisanal and (semi-) industrial fishing sub-sectors is not clear. There are interactions and complementarities in terms of personnel, with fishermen moving from one sector to the other to take advantage of the possibility of larger catches and higher incomes. Furthermore, it is important to take into account existing synergies in terms of exchange of experience, know-how and joint use of certain infrastructure.

### Limited semi-industrial and industrial fishing

- 8 Industrial and semi-industrial fishing, which targets small pelagic fish, tuna, sharks, crustaceans, etc., is carried out by 13 communities, with 119 vessels of an average length of 12 m. Table 1 shows the species of tuna fished. The 2011 census shows that the largest vessels are located on the Barlavento Islands, where the maximum size observed is 26 m (on São Vicente Island). Santiago Island hosts the largest number of vessels (47%), followed by São Vicente and Sal with 27% and 10% respectively. Santo Antão, Maio and São Nicolau, and Brava, represent only 6%, 4% and 1% of the fleet respectively (INDP, 2019). The industrial and semi-industrial fleet is old, consisting of vessels ranging from 4 to 28 years of age (average 17 years), internal engine power of 25 to 500 horsepower (HP), gross register tonnage (GRT) between 2.5 to 121, and an average of ten crew members per vessel.

Table 1. Total catch (in tonnes) for tuna species over the period 2013–2018 (including flagged vessels)

Species	2013	2014	2015	2016	2017	2018	Total
SKJ	16,444	16,615	17,600	10,925	7823	1154	70,561
YFT	7596	4763	7866	6990	2837	1572	31,623
FRI	2717	5686	3556	2324	1795	4773	20,850
BET	1378	2368	2764	1680	1107	1418	10,714

WAH	445	445	445	490	228	298	2352
LTA	570	310	131	218	113	104	1445
<b>Total</b>	<b>29,149</b>	<b>30,188</b>	<b>32,364</b>	<b>22,625</b>	<b>13,902</b>	<b>9,319</b>	<b>137 547</b>

BET: bigeye tuna (*Thunnus obesus*); FRI: frigate tuna (*Auxis thazard*); LTA: little tunny (*Euthynnus alletteratus*); SKJ: skipjack tuna (*Katsuwonus pelamis*); WHA: wahoo (*Acanthocybium solandri*); YFT: yellowfin tuna (*Thunnus albacares*)

Source: INDP

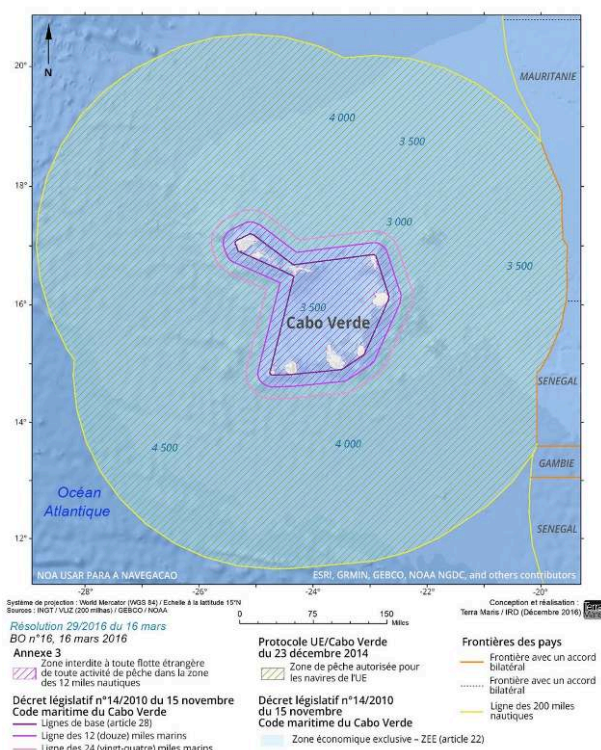
### Artisanal fishery

- 9 Cabo Verdean legislation defines artisanal fishing as fishing by vessels that do not have a deck and use only ice or salt to preserve fishing products. Artisanal fishing is traditional on all the islands. It is an important source of employment and, on some islands, is one of the main productive activities and a focus for development. It employs about 2.1% of the total population and 5.2% of the Cabo Verdean workforce. It directly employs more than 5000 fishermen, who have an average age of 45 (INDP, 2019). The sale and distribution of fishery products is almost exclusively carried out by women. In the artisanal fishing sector, women mainly work as fish sellers and are on average 40 years old (INDP, 2011).
- 10 The artisanal fleet consists of 1239 boats, each manned by three or four fishermen and operating in the coastal zone up to 3 miles from land. These vessels are distributed in 80 landing ports. Artisanal fishing boats vary in length from 4 to 8 m long and in width from 1.5 to 2.5 m. They are mainly built of wood and have an average age of 8 years. The means of propulsion are outboard motors, sails and oars. The rate of motorisation was 72% in 2011 (INDP, 2011), although more recent, unofficial results from field surveys have shown values above 80% throughout the archipelago. The engine power varies between 5 and 25 HP and can be combined with oars or spark plugs. The most commonly used fishing device is the hook and line, with 99% of these devices used in artisanal fishing.
- 11 Artisanal catches take a wide variety of species, landing over 150 species each year (GONZÁLEZ and TARICHE, 2009). This multispecies fishery is related to variation in the number and type of gear used, and also to the fact that with a single type of gear it is possible to catch different species. Vessels fish for tuna, demersal species and small pelagic fish by line as well as by seine, gillnet and beach net. The principal method is handline (89%), followed by diving (5%), gillnet (3%), seine (1%) and beach net (1%) (INDP, 2011).
- 12 According to statistics from the Cabo Verde National Institute for Fisheries Development (INDP), from 2014 to 2018 the tuna group made up the largest landings over the years, followed by demersal species and then small pelagic species, except for 2018, when demersal species were the main group caught (INDP, 2019).
- 13 Yellowfin tuna (*Thunnus albacares*) represent 24% of the total artisanal and industrial tuna catch in Cabo Verde and 55% of the artisanal tuna fishery (INDP, 2019). This species is thus a resource with a significant impact on artisanal fishing communities in Cabo Verde.

## Yellowfin tuna, a shared resource

- 14 Tuna fishing in Cabo Verde is carried out by both national and foreign fleets. The foreign fleets include European, Chinese, Japanese and Senegalese vessels that operate in the national waters of States linked by a bilateral fishing agreement. In recent decades, Cabo Verde has signed fisheries agreements and contracts with several countries/regions, including Senegal, China and Japan, as well as with the European Union (EU). These authorise these countries to fish in the Cabo Verde EEZ according to the rules set out in the Fisheries Management Plan, i.e. beyond a 12-mile zone from the baseline (fig. 2).
- 15 The Fisheries Partnership Agreement (FPA) between the EU and the Republic of Cabo Verde, signed on 24 July 1990, is one of the oldest. Since then, six protocols have been implemented, three under the FPA, which came into force on 1 September 2007.

Figure 2. Map of the management plan for fishing by foreign fleets in the Cabo Verde EEZ



Source: IRD/Terra Maris

## EU Sustainable Fisheries Partnership Agreements (SFPAs)

- 16 The European Economic Community concluded its first bilateral fisheries agreements in the late 1970s. More than 30 other bilateral agreements have been concluded to date, mainly with developing countries in Africa and the Pacific. The negotiation of bilateral fisheries agreements multiplied after the adoption of the United Nations Convention on the Law of the Sea (UNCLOS) in 1982. This international convention establishes legal sovereignty over living marine resources in maritime areas of coastal states within 200 nautical miles of the baseline (i.e. the EEZ). Consequently, bilateral agreements with third countries have been necessary to allow EU fleets access to surplus fish stocks not

used by the local fleets of coastal states. Each Sustainable Fisheries Partnership Agreement (SFPA) is an exclusive agreement: once concluded, EU vessels can only fish under that SFPA, and they are not allowed to enter into private agreements with that partner country.

- 17 The SFPA defines the scope and basic principles of cooperation. It is supplemented by a protocol that allows access for European vessels and specifies fishing opportunities, quantities, payment methods, cooperation arrangements, etc.
- 18 SFPAs with third countries are negotiated and concluded by the European Commission (EC) on behalf of the EU. They allow EU vessels to fish for surplus stocks in the country's EEZ in a legally regulated environment. These agreements also include resource conservation and environmental sustainability, ensuring that all EU vessels are subject to the same rules of checks and transparency. A human rights clause has also been included in all protocols of these fisheries agreements.
- 19 Nonetheless, these agreements have been repeatedly criticised for failing to adequately address the ecological and, to a lesser extent, socio-economic sustainability of the European fishing industry. Critics of the international dimension of the policy are additionally concerned about the moral propriety of a rich and powerful region buying up the fisheries resources of poor and vulnerable countries (KACZYNSKI and FLUHARTY, 2002; BARTELS, 2007; SSNC, 2009 in CARNEIRO, 2012).
- 20 With respect to the ecological sustainability of the agreements, there are concerns about the low level of knowledge of the status of many negotiated stocks, and the generally inadequate levels of monitoring and verification of EC fishing activities. In general, EC fisheries agreements have been and continue to be implemented in contexts of insufficient information and checks, and the case of Cabo Verde is no exception.

### **The current EU-Cabo Verde protocol**

- 21 The EU fishing protocol currently in force with Cabo Verde was adopted on 20 May 2019. This fishing agreement allows European vessels from Spain, Portugal and France to fish in Cabo Verdean waters and is part of the tuna network fisheries agreements in West Africa.
- 22 The fishing opportunities for EU vessels under Article 5 of the agreement are:
  - freezer purse seiners for tuna: 28 vessels
  - pole-and-line vessels for tuna: 14 vessels
  - surface longliners: 27 vessels.
- 23 Article 4(2) specifies the annual amount of financial compensation paid by the EU referred to in Article 7 of the agreement, which amounts to €750,000, broken down as follows:
  - an annual amount of €400,000 per year as financial compensation for access to resources, equivalent to a reference tonnage of 8000 tonnes per year
  - a specific amount of €350,000 per year to support the implementation of the Cabo Verde sectoral fisheries policy.
- 24 In addition, the fees payable by European shipowners for fishing authorisations issued under Articles 5 and 6 of the agreement and in accordance with the procedures laid down in Chapter II, Section 2 of the annex to this protocol amount to €600,000 per year.

- 25 This financial contribution is supplemented by an obligation of scientific cooperation detailed in Article 6. During the period covered by the protocol, the EU and the Cabo Verde authorities must monitor the trend of catches, fishing effort and the state of fisheries resources in the Cabo Verde fishing zone for all the species covered by the protocol, including yellowfin tuna.
- 26 Specific measures apply to tuna vessels. Pole-and-line fishing is authorised in an area beyond 12 nautical miles from the baseline, and seine and surface longline fishing beyond 18 nautical miles from the baseline.
- 27 During the 2014–2018 agreement, 38 fishing licences were granted to vessels in 2015, 42 in 2016, and 45 in 2017, with an average utilisation rate of 59.1%. The country with the highest utilisation of fishing opportunities was Spain, with 26 licences granted in 2015, 28 in 2016, and 34 in 2017, with a maximum utilisation rate of 37% in 2015 and 39% in 2016. The country with the next highest utilisation rate was France, with 14% in 2015 and 15% in 2016. It should be noted that Portuguese vessels in this period made the least demand for fishing licences, with about 4% (ALMADA, 2018).
- 28 Table 2 shows the annual utilisation rate by vessel type in 2015, 2016 and 2017.

Table 2. Annual utilisation rate by type of vessel

	Utilisation rate (%)		
	2015	2016	2017
Seiners	75	75	75
Surface longliners	75	40	53
Pole and line	61.5	69	62

Source: INDP (2018)

- 29 According to ALMADA (2018), the ex-post evaluation of the current protocol indicates that the utilisation of the negotiated fishing opportunities by EU vessels is acceptable if one takes into account the efficiency of these vessels in terms of quantities caught during the period 2015–2017. The average annual catch under the agreement was 6181 tonnes, with an estimated overall value of €4.2 million per year for the EU countries and Cabo Verde (profits for operators, salaries for EU and Cabo Verde crews, and some profits for the downstream processing of catches in canneries in Côte d'Ivoire, Spain and France).

## The importance of yellowfin tuna for local communities: the case of São Pedro

- 30 Fishing plays an important socio-economic role in the fishing communities of Cabo Verde. It is their main economic activity, sometimes complemented by other activities such as livestock, trade and, more recently, tourism. Fishing both provides income to the communities and is the largest employer of local people, including women.



- 31 Cabo Verde has about 83 fishing communities, which are almost all organised in associations. The typical profile of an artisanal fisherman is an individual with generally low income. Many households have an average of between five and seven members. Despite compulsory primary education, the level of education remains low, with a predominance of dropouts around the fourth year of primary education (compulsory education in Cabo Verde includes six years of primary education and two years of secondary education). This reduces the opportunity to engage in alternative economic activities and means those working in the fisheries sector are among the workers most likely to be poor (for initiatives to address this, see Box 1).

### **Box 1. A priority on training and capacity building**

Osvaldina SILVA, President of the Cabo Verde INDP

The Cabo Verde government is committed to supporting training and research to ensure the effective implementation of marine spatial planning (MSP). The country's MSP process began with the political decision to transition from a maritime economy to a blue economy, with the adoption as early as 2015 of the Charter to Promote Blue Growth, reinforced by the Political Charter for the Blue Economy in Cabo Verde (Resolution 172/2020). In this context, the São Vicente Special Maritime Economic Zone (SVMEEZ) was created with the objective of using the geographical location and marine resources of Cabo Verde to develop an integrated maritime economy, thus promoting a value chain of industries and services related to the sea (Law 94/IX/2020). To implement this approach, it is imperative to invest in human resource capacity building, which requires the active participation of several sectors: education, training (technical and vocational) and research (academic and applied). To this end, the government of Cabo Verde has established the Campus do Mar, under the Ministry of the Sea and the Ministry of Education, as a training and research platform to support the MSP process.

The aim of the platform is to develop innovative programmes and strategic partnerships related to the ocean, fisheries, maritime transport technology and climate change (Legislative Decree 1/2020, Article 6). The Campus do Mar is an integrated structure with three poles: the School of the Sea (Emar), the Institute of the Sea (Imar) and the Atlantic Technical University (UTA).

- Emar is a public institution that aims to develop and implement basic modular vocational training in the ocean, the maritime economy and related fields (Legislative Decree 2/2020, Article 1).
- Imar aims to promote and coordinate applied scientific research in fisheries, oceanography, marine biology, aquaculture, the technological development of fisheries and fisheries statistics (Legislative Decree 40/2019, Article 4).
- The UTA aims to promote high-level training – ethical, cultural, scientific, artistic, technical and professional – through a diversified educational offer, conducting research, transferring and exchanging knowledge, providing continuing education and supporting development and entrepreneurship. This will contribute to the social and economic development of the country and the region and to the protection and dissemination of Cabo Verde's natural and cultural heritage, as well as provide services to the community (Legislative Decree 53/2019, Article 2). The UTA's teaching and research units are the Institute of

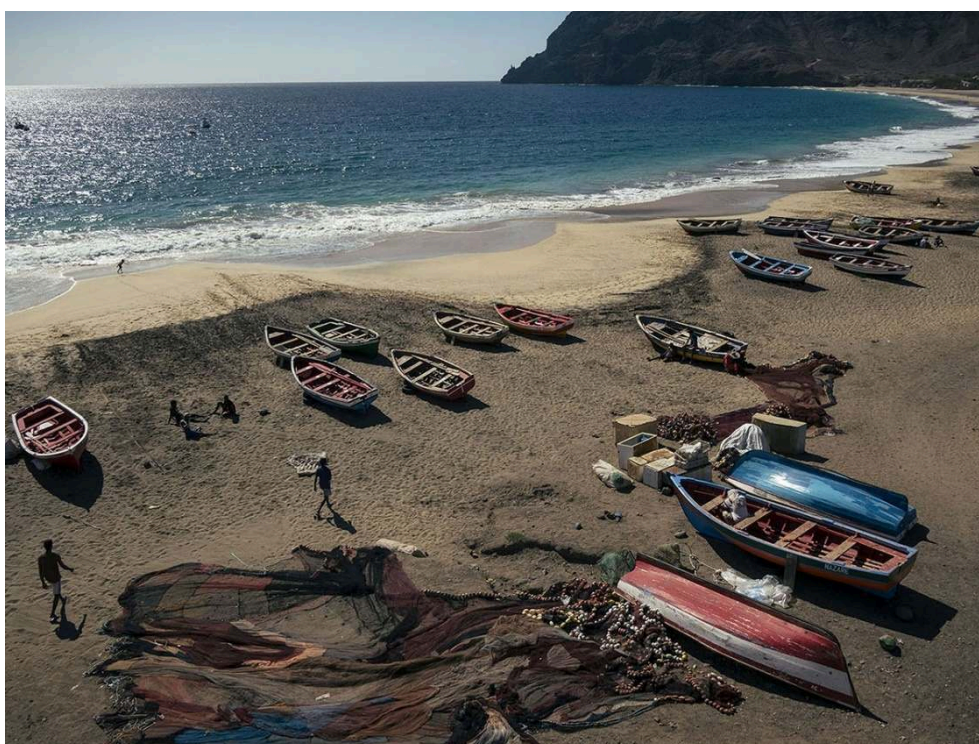


Engineering and Marine Sciences on the island of São Vicente, the Institute of Aeronautics and Tourism on the island of Sal, the Institute of Agricultural Science and Technology on the island of Santo Antão and the Institute of Arts, Technology and Culture on the island of São Vicente (Legislative Decree 53/2019, Article 78). The UTA has set up a Master's degree on climate change and marine sciences in partnership with the West African Science Service Centre on Climate Change and Adapted Land Use (WASCAL), and a Master's degree and doctoral programme in oceanography and marine resources management in partnership with the University of Vigo in Spain. The UTA conducts multidisciplinary and interdisciplinary research and aims to inform policymaking at regional, national and international levels. In addition to the traditional disciplines, issues related to marine spatial governance are addressed.

These three complementary institutes will build capacity and skills for the implementation of marine spatial planning in Cabo Verde.

- 32 São Pedro is a fishing village on the island of São Vicente in the Cabo Verde archipelago (fig. 3). It is one of the country's fishing communities where the main target species are tuna and small pelagic species; yellowfin tuna is among the most caught species. The following case study presents the yellowfin tuna fishery in the community of São Pedro.

**Figure 3.** Artisanal fishing boats in Sao Pedro



© S. Hervé

- 33 The village is located 7 km southwest of the city of Mindelo, the capital of the island. To the northeast of the village is the airport that serves the island. The landscape is arid, but has a sheltered bay enjoyed by international visitors with its good conditions for

water sports such as diving and windsurfing. Ecotourism based on sea turtle watching is also developing, but lacks regulation and technical monitoring (INDP, 2019).

- 34 The population of São Pedro is estimated to be 991 inhabitants (513 males and 478 females) distributed in 203 households (INE, 2010), with 435 active residents aged 15 years and over. Two of the community's social organisations are the Association for Community Development and the Association of New Generation Fishermen of São Pedro. The latter was created in 2002 with the aim of defending the interests of the fishermen and, indirectly, of the community itself, whose families depend on fishing activity. Fishing thus plays an important role in the local socio-economic dynamics of the community, with more than half of the population living on the income from this activity. The main species caught are small pelagic species, tuna and buzio-cabra (a gastropod mollusc), which are mostly sold at the Mindelo fish market.
- 35 According to the Directorate General of Marine Resources, in 2018 the community of São Pedro had 36 artisanal boats (fig. 4), of which two were inactive, representing an inactivity rate of 6%. The motorisation rate is 100%, slightly higher than the 96% rate for the rest of the island. The community of São Pedro accounts for 31% of all boats on the island of São Vicente.
- 36 As in most Cabo Verde fishing communities, the handline is the most common fishing gear used for tuna fishing, with single circle or J hooks (fig. 4). All the gear is prepared the day before and each boat uses four to six lines with bait.

**Figure 4.** Fisherman preparing lines and hooks



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- 37 Mackerel scad (*Decapterus macarellus*), bigeye scad (*Selar crumenophthalmus*) and herring (*Sardinella maderensis*) are the main bait used. Other small pelagic species or additional small species can be used as bait. If fishermen are unable to catch live bait, they use dead bait.



- 38 Tuna fishing activity starts early in the morning with the first team of two boats leaving a few hours before the rest of the fishermen. This team concentrates on finding bait, and later the other fishing boats join them to share it. They surround the school to keep the bait alive until the other boats come to collect it (fig. 5).

**Figure 5.** Boats surrounding the bait



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- 39 Each boat has its own small tank on board where bait is stored and kept alive to the extent possible until the end of the fishing activity. The baitfish are kept oxygenated by a fisherman who feeds the tanks with seawater collected with a bucket. Each tank has small holes in the bottom to drain off excess water (fig. 6).

Figure 6. Distribution of bait to boats prior to fishing activity



© Silva, 2019

- 40 Another way to capture bait is by trolling with small hooks dangling artificial lures to catch small tuna species, including *Auxis thazard* and *Euthynnus alletteratus*, which is later used as bait for yellowfin tuna.
- 41 There are two ways the artisanal fishermen fish for yellowfin tuna: by anchoring (or drifting) or by trolling. When anchoring or drifting, the fisherman places the bait on the surface or at different depths depending on the behaviour of the tuna. The other method is trolling, which involves hooking the bait by the head and then dragging it behind the boat to lure the large tuna (fig. 7).

**Figure 7. Tuna trolling from a boat**



On the horizon, some boats also fishing for tuna are at anchor.

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- 42 After hooking a tuna, the fisherman catches it by hand and lands the larger specimens with a gaff after knocking them out with a large stick (fig. 8).



Figure 8. Fisherman holding a captured tuna with a gaff



© Silva, 2019

- 43 The landings are made on the beach of São Pedro. A small part of the catch is sold locally, and the majority is transported to be sold at the fish market in Mindelo.

## Conclusion

- 44 Artisanal fishing is a very important sub-sector in Cabo Verde from a socio-economic point of view. It employs many people (more than 5000 fishermen and about 1000 women fish sellers) and is an important source of animal protein for the local population. According to recent INDP statistics, tuna species make up the largest catch by weight for artisanal fishing. Yellowfin tuna (*T. albacares*) represent 24% of the total tuna catch in Cabo Verde and 55% of the artisanal fishery (INDP, 2019). As this species is an important social and economic resource for artisanal fishing communities in Cabo Verde, the yellowfin tuna fishery should be given special attention in future marine spatial planning for Cabo Verde.

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## NOTES

1. Legislative Decree 2/2020 of 19 March 2020.
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# Marine spatial planning in the tropical Atlantic

From a Tower of Babel  
to collective intelligence



  
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## Cover caption

Fisherman at Tamandare, Brasil (2019) | Paddle RISE

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