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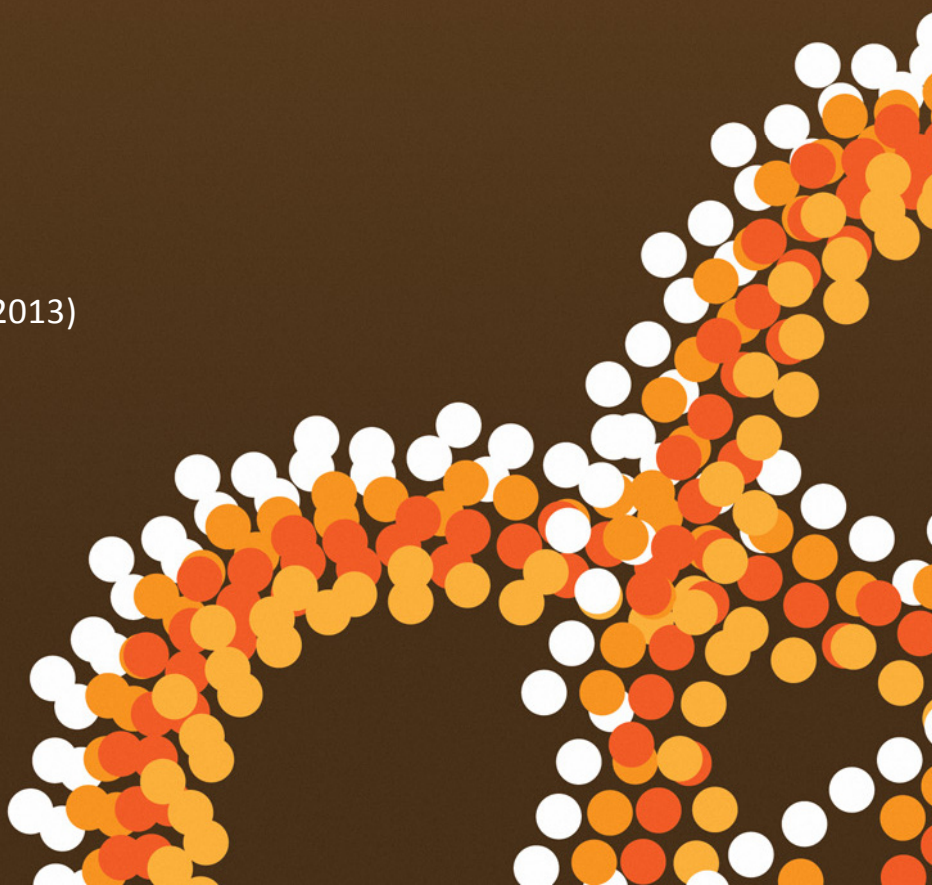
Baseline survey on socio-economic benefits of artisanal tuna fishery in Mozambique

Final report

23rd September 2013

(Reviewed on the 18th November 2013)



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Title and Authors

TITLE:

Baseline survey on socio-economic benefits of artisanal tuna fishery in Mozambique

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DATE:

Delivered on the 23rd September 2013

Reviewed on the 18th November 2013

ACKNOWLEDGMENTS:

We'd like to thank the two students of Lúrio University, Zamira Azize and Jamen Mussa, and also Enia de Sousa from CTV, for the support in data collection. Our many thanks to Harith Morgadinho and Isabel Marques da Silva for all the logistic support they've given us in Pemba. We are grateful to our interviewees for the precious time they have concede us for undertaking the interviews.

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Executive Summary

Tuna is one of the most globally traded and consumed seafood. Due to the high demand for tuna and tuna-like species, the fishery is facing huge challenges with respect to sustainable exploitation across the globe. The Western Indian Ocean (WIO) region accounts for 70-80% of the Indian Ocean tuna catch, and about 20% of the global production. It is reported that Mozambican artisanal marine fishery contributes over 80% of the national marine fish production, being used as food or source of income to coastal fishing communities. However there is no adequate information on how much of this are tuna and or tuna-like species. The main aim of this assessment was to provide baseline information on socio-economic issues around artisanal tuna fishery in Mozambique. The information generated would then be used to inform policy and decision making process in order to help promote sustainable use, management and development of the artisanal tuna fishery. The following questions oriented the assessment:

- i) Are there enough tuna stocks to support an artisanal fishery economy in Mozambique?
- ii) How much is the artisanal tuna fishery in Mozambique worth?
- iii) Are there conditions for this type of fishery to be implemented?
    - Is there technical and logistic capacity for it?
    - Does Mozambique have the capacity to create and guarantee the distribution and commercialization of this tuna?

The assessment included a literature review to determine the current knowledge about the artisanal tuna fisheries in Mozambique and interviews with relevant stakeholders, who were grouped in three categories: fishermen (representing fishermen associations or individually), market (restaurants, hotels, wholesalers) and institutions (Government, NGOs and donors). A total of 77 individuals were interviewed in Maputo, Nacala/Ilha de Moçambique and Pemba. In addition, the economic value of the artisanal tuna in Mozambique was estimated using the Economics of Ecosystems and Biodiversity (TEEB) methodology.

All fishermen interviewed were males, of Mozambican nationality and were on average 39.9 years old, with most of them (63.8%) being between 20 and 40 years old. The majority of the individuals interviewed (48.9%) had relatively small households of up to five members. About a third revealed that they had a household comprised of 6 to 10 people. More than half of the fishermen interviewed (53.2%) declared that they were not members or were not associated with any form of community-based organization. It was clear that "associativism" is still a "novelty" in Mozambique as previously reported.

Most individuals interviewed were either captains of the vessels (38.3%) or members of the crew (36.2%), and a very small number actually owned a boat. The majority (57.4%) uses dhows (propelled by outboard motors, sails or oars), followed by dugout canoes and other smaller boats. Overall, the boats were on average 7.1 m long and varied from 2.5 to 17 m, with boats being larger in Pemba when compared to Maputo or Nacala/Ilha de Moçambique. Number of crew per boat varied considerably (1 to 32 men) with the majority of the individuals (46.8%), stating that the crew was comprised of one to five men. Only men partake in offshore fishing activities, with women generally helping with disembarking and selling of the catch.

Beach seine nets are primarily used in Maputo (Costa do Sol and Marítimo), while the majority of the individuals interviewed use hand lines (38.3%) and purse seine nets (31.9%). Fishermen in the north use mainly purse seines when targeting tuna. Artisanal fishermen spent an average of 41.3 hours per week fishing with a variation between 18 to 84 hours. Fishermen in Maputo (39.6 h/week) and Pemba (36.5 h/week) spent about the same time fishing, while those in Nacala/Ilha de Moçambique almost double it (56.8 h/week). This might indicate a reduction in the availability of stocks.

About half of the interviewed individuals (51.1%) stated that they currently catch tuna. The majority (70.2%) said they would target tuna if they could, while only 10.6% were not interested in catching tuna. Kawakawa (*Euthynnus affinis*), yellowfin (*Thunnus albacares*) and "bonito" were the most common species caught and according to almost half of the interviewed individuals that do catch tuna, the fishing grounds are relatively close (less than 3 nautical miles) to their base port and more than a third mentioned that it is located between 3 and 10 nm. From the interviews, an estimated 4.38 kg of tuna was caught per week per

fishermen. As the number of artisanal fishermen that target and catch tuna in Mozambique is currently unknown, it was assumed that at least 50% of the 100,000 reported artisanal fishermen in the country (using the same percentage that resulted from the interviews in assessment) could potentially capture a total of 219,792 kg of tuna/week. From the interviews, the average price tuna in the market is 100.00 Mts/kg, thus rendering an estimated ecosystem service value of 21,979,167.00 Mts/week.

In general, tuna available in Maputo is either sourced locally or imported mainly from South Africa and accordingly transported in refrigerated trucks. Elsewhere, no such transport and distribution facilities exist at local level and usually the tuna is delivered fresh, straight from the beach to the businesses or local markets. Apart from the freezing facilities in the Maputo fishing harbour no such facilities are available elsewhere for the artisanal fishermen targeting tuna. Nevertheless, the majority of the market managers interviewed (57.9%) declared that the local sourced tuna is of good or excellent quality, although some commented that it was of poor quality especially for the canning industry. This is probably caused by the fact that tuna is not bled upon capture nor processed whatsoever by the fishermen. This, as well as the fact that tuna is still not a major component of the dietary culture of most Mozambicans, was highlighted by some as a deterrent for large-scale investment in the industry.

Although no updated data on stocks is available, it is believed that given the current number of fishermen involved and the existing fishing technology, the inshore stocks are sufficient to sustain an artisanal tuna industry.

Tuna is not part of the general “dietary culture” in Mozambique and there is a strong need to develop a marketing and education strategy in order to develop the domestic market. There is also a need to improve the overall fishing and processing technology in the artisanal sub-sector of the tuna fishery. Not only regarding the fishing gear used, but immediate processing on board (bleeding and/or gutting) and preservation. This will implicate education programmes and eventually subsidies to enable local artisanal fisheries to develop their capacity. Furthermore, on-land processing, storage and distribution facilities and infrastructures are largely lacking and need to be established.

Introduction and assessment framework

Tuna is one of the most globally traded and consumed seafood. Due to the high demand for tuna and tuna-like species, the fishery is facing huge challenges with respect to sustainable exploitation across the globe. Bluefin tuna, for example, is near extinction, while albacore, in the Indian Ocean, is currently overfished and bigeye and yellow-fin tuna are approaching maximum sustainable yield levels. The tuna catch in the Indian Ocean is on average over one million tons annually fetching approximately 1.5-2 billion Euro per annum. The Western Indian Ocean (WIO) region accounts for 70-80% of the Indian Ocean tuna catch, and about 20% of the global production. The tuna fishery could play an important role in the national economy of the respective developing coastal and island states in the WIO, as well as to the food security of their population; however, this potential has not been maximized.

It is reported that Mozambique artisanal marine fishery contributes over 80% of the national marine fish production, being used as food or source of income to coastal fishing communities. However there is no adequate information on how much of this are tuna and or tuna-like species. This lack of information on artisanal tuna fishery hampers the development of adequate management and development options for maximizing the socio-economic benefits for the country.

The main aim of this assessment is to provide baseline information on socio-economic issues around artisanal tuna fishery in Mozambique. The information generated will be used to inform policy and decision making process in order to help promote sustainable use, management and development of the artisanal tuna fishery in the country.

Objectives

Considering what was said before the main questions to be answered with this assessment are:

- Are there enough Tuna stocks to support an artisanal fishery economy in Mozambique?
- How much is the artisanal tuna fishery in Mozambique worth?
- Are there conditions for this type of fishery to be implemented?
    - Is there technical and logistic capacity for it?
    - Does Mozambique have the capacity to create and guarantee the distribution and commercialization of this Tuna?

Assessment design

This assessment was designed in accordance with the Terms of Reference prepared for this service. The following scheme shows the several activities that were undertaken.

Both the inception and the interim reports were delivered according to the schedule that was prepared for this service. This report refers to activity 7 presented in the previous scheme (Draft Version of the Final Report). The National Stakeholders Workshop and the Final Report are subsequent tasks; therefore, they won't be mentioned at this stage.

Assessment schedule

The following schedule is based on the one presented in the Inception Report, however it includes the changes that have been done subsequently.

Tasks	3-7 Jun	10-14 Jun	17-21 Jun	24-28 Jun	1-5 Jul	8-12 Jul	15-19 Jul	22-26 Jul	29 Jul - 2 Aug	5-9 Aug	12-16 Aug	19-23 Aug	26-30 Aug	2-6 Sep	9-13 Sep	16-20 Sep	To be done
1 – Kick-off meeting and Preparation of an Inception Report																	
2 – Literature review																	
3 – Interviews and Consultations design																	
4 – Fieldwork: Interviwes and Consultations																	
5 – Interim report																	
6 – Statistical Analysis																	
7 – Final report																	
8 – National Stakeholders Workshop																	
9 – Final report with workshop resume																	

Report structure

In order to achieve the objectives that were defined for this assessment and to simplify the final report the next sections are divided in methods and results, structuring it on the issues mentioned below:

Methodological approach

- Literature review on tuna fisheries in Mozambique and the Western Indian Ocean
- Interviews and Consultations
    - Questionnaires design
    - Fieldwork
        - Sampling
        - Protocol for data collection
- Statistic analysis
- Economic valuation of artisanal tuna fishery

Results and Discussion

- Literature review on tuna fisheries in Mozambique and the Western Indian Ocean
- Interviews and Consultations
- Background analysis of the fishing sector, including: (i) details of fishing gears used and main fishing areas and efforts; (ii) information on exploited tuna and tuna-like species; (iii) number of fishermen by gender with specifications on level of engagement of these fishermen in tuna fisheries (i.e. full-time or part-time).
- Assessment of livelihood benefits to fishermen and other direct and indirect dependants of tuna fisheries.
- Economic valuation of artisanal tuna fishery, including a reasonable quantification of the financial value of artisanal tuna fisheries in the country.
- Analysis and mapping of key Civil Society Organisations (CSOs) engaged in fisheries issues in Mozambique, including fisheries associations and Fishing Community Committees.

- Analysis of the national and local supply chain of tuna fishery and the level of market demand for tuna (both from sustainable and non-sustainable sources) in Mozambique.
- Assessment and general overview of governmental and international institutions about the artisanal tuna fishery in Mozambique.

Just right after the Results and Discussion chapter um have another one that gives recommendations on development and management options to ensure tuna fishery generates sustainable benefits to the national and local economies while taking into consideration gender and environmental concerns. The following section is the Conclusions.

The final section of the report is the Annexes chapter, which includes 3 topics:

- Annex I – Final questionnaires
- Annex II – List of contacted stakeholders and interviews undertaken
- Annex III – Most relevant graphs and tables obtained by the statistical analysis
- Annex IV – Summary of the answers that demanded a justification or an opinion

Methodological approach

Literature review on tuna fisheries in Mozambique and the Western Indian Ocean

This assessment started with a literature review in order to determine the current knowledge about artisanal tuna fisheries in Mozambique. Therefore 70 potential references with information on tuna were consulted and 27 of them were considered relevant and analyzed[1].

Interviews and Consultations

As defined in the inception report, the most relevant task of this assessment consisted in interviewing and consulting relevant stakeholders that could give important insights about artisanal tuna fisheries. Therefore, in order to proceed with this assessment, 3 types of stakeholders were defined:

- Institutions: Represent most of the stakeholders and include Governmental and Private Institutions as well as NGOs and other countries' representatives in Mozambique;
- Markets: Represent the stakeholders that potentially can buy, sell, transport or storage tuna in Mozambique;
- Fishermen: Represent fishermen associations or individual fishermen that can potential be involved in tuna artisanal fisheries.

[1] (ICCAT, 2006), (Pillai & Satheeshkumar, 2012), (Gillet, 2011), Leal (2009), Palha de Sousa (2011a), Patria et al (2011), Palha de Sousa (2012), Talvonem & Bours (201, ACPFishII (2011), Cayré (1991), Rohit & Rammohan (2009), Stéquert & Conand (2004), Langley et al. (2009), Garibaldi (2012), Kimani et al (2009), Ardil et al (2011), Standing (2009), Gillett (2011), Mugo (2005), Lawson et al (1996), Tolvanen & Bours (2012), Lan & Lee (2011), Gaski (1993), Olivier (2002), Moreira Rato (1983), Pó et al (1992), ADNAP (2013).

Questionnaires design

Three different questionnaires' (Annex I) models were developed based on other assessments on fisheries already undertaken and on good practices for creating questionnaires (Hill & Hill 2008).

In what regards the Institutions, a 23 questions model was prepared, consisting mainly of yes/no questions. Most of these were formulated in order to justify and develop opinions about a specific theme, so that detailed information could be extracted to this assessment.

Regarding the Markets we designed a questionnaire with open and closed questions obtaining qualitative information to complement information obtained by the other variables. This model had 24 questions.

The Fishermen questionnaire was mainly comprised of closed questions obtaining more quantitative information. A total of 36 questions were posed to this stakeholders' group.

The questions were grouped in three categories: i) socioeconomic data, ii) fishing related data (type of vessel, number of people of the crew, length of the vessel, fishing distance to shore) and iii) specific information about tuna (economic value, what kind of species are fished, number of kilograms/week fished, fishing methods, number of fishing hours, fish preservation).

Depending on the stakeholder, the questionnaires had more or less questions in each of the above-considered categories.

Fieldwork

Sampling

According to the inception report, only the cities of Maputo (Maputo) and Pemba (Cabo Delgado) were supposed to be the focus areas of this assessment. Nevertheless we have managed to include two additional areas in the Nampula province (Ilha de Moçambique and Nacala), although with a much smaller effort (**Erro! A origem da referência não foi**

encontrada.). Therefore, the data for this baseline assessment was collected in Maputo, Cabo Delgado and Nampula provinces, specifically in: i) Maputo – Maputo city, Costa do Sol, Clube Marítimo, Matola and Catembe; ii) Cabo Delgado – Pemba, Ruela, Praia de Paquitequete, Praia do Wimbe and Nhamimbe; iii) Nampula: Nacala Porto, Praia de Fernão Veloso and Ilha de Moçambique.

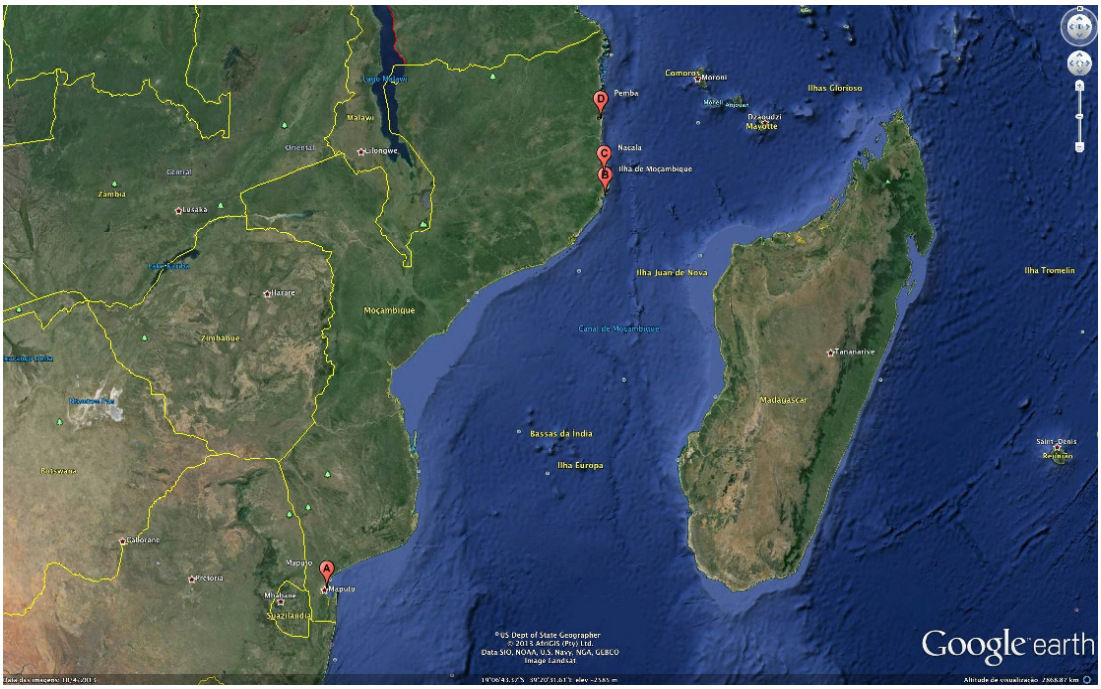

Figure 1 – Sampling areas: A- Maputo; B- Ilha de Moçambique; C – Nacala; D – Pemba (Image Source: Google Earth)

As it was defined in the terms of reference of this assessment and also stated in the inception report, the samples were selected from a set of previously defined stakeholders (non-random sampling). In what regards the Institutions we selected the ones that could play a relevant role, due to information that could provide to this assessment. In what concerns the Markets we selected those that were somehow related to the marketing and distribution of fish and that could potentially work directly or indirectly with tuna. In the case of the Fishermen the major fishing centres of Maputo and Pemba were selected. In this last case, the number of respondents was conditioned by the number of the available days covered by the budget allocated for this task.

The interviews were undertaken between the 4th of July and the 28th of August 2013. **Erro! A origem da referência não foi encontrada.** shows the interviews period by sampling area and the team members who undertook the interviews.

Table 1 – Interviews period and name of the interviewers in each sampled area.

Sampling area	Interview period	Interviewer
A – Maputo	4th July to 28th August 2013	Carlos Litulo and Rodrigo Santos
B – Ilha de Moçambique	29th July 2013	Rodrigo Santos
C – Nacala	2nd and 3rd August 2013	Rodrigo Santos
D - Pemba	8th to 10th August 2013	Marcos Pereira, Zamira Azize, Jaime Mussa e Enia de Sousa

The Fishermen interviews were undertaken in specific days previously defined by the project team. However, the date when the Institutions and Markets interviews were undertaken varied according to the availability of each specific stakeholder.

Protocol for data collection

On a first step, the three questionnaire models were submitted and reviewed by WWF, who gave several suggestions. These and several other improvements were included in the final versions of the questionnaires. Adaptations of the questionnaires to each of the stakeholders groups to be contacted were also undertaken. On a second step, phone or email contacts were established with the institutions and markets stakeholders who were selected for being interviewed.

In Maputo and Nampula provinces the interviews were conducted by one interviewer who identified the above-mentioned stakeholders, scheduled the interviews and conducted the interviews using the questionnaires that were prepared for this study, independently on who the stakeholder was. The interviews took between 20-30 minutes and the interviewees were asked to answer to all the questions in the forms. After each interview was undertaken the questionnaire was screened to detect any flaws. When clarifications were needed, the interviewees were contacted again.

For Cabo Delgado, the approach was slightly different. The project team-leader conducted a workshop with two students of Lúrio University (Universidade do Lúrio) and a CTV staff member on tuna fishing and social aspects related to its fishing. They were all local inhabitants

and spoken the local languages. After the workshop, the first series of interviews in the identified fishing centres were conducted using the same questionnaires that were used in Maputo and Nampula under the guidance of the project team leader. Within the number of hours allocated for this task as many fishermen as possible were interviewed. Additionally, the project team leader interviewed selected local stakeholders belonging to the Institutions and Market groups.

Annex II shows the entities and the dates of all interviews undertaken to fishermen, markets and institutions.

Statistical Analysis

Data from the questionnaires was placed in a Google Sheet specifically developed for each type of questionnaire and later converted to SPSS 22.0. Then we proceeded to data validation before continuing the statistical analysis. An exploratory and descriptive data analysis was undertaken using frequency tables for qualitative variables. For the quantitative variables the calculation of location and dispersion measures (mean, standard deviation, median, minimum and maximum) was undertaken. Graphical representations were also used in order to highlight the results. Once the sampling process was not random it was not possible to make statistical inferences but only identify aspects and patterns of greatest interest to the collected data (Murteira 1993).

Because the interviews were undertaken in few sites within each province, for the means of the statistical analysis and comparisons at a spatial scale, the questionnaires were grouped in 3 areas: i) Pemba (refers to all the questionnaires from Cabo Delgado); ii) Nacala / Ilha de Moçambique (the ones undertaken en Nampula province); iii) Maputo (the ones undertaken in Maputo area).

The team members also undertook the content analysis of the questions that included justifications or opinions so that this information could feed the discussion section of the assessment.

Economic valuation of artisanal tuna fishery

Currently the economic valuation of the ecosystems services is considered an essential tool to evaluate the real contribution of ecosystem processes and biodiversity to human welfare and how human actions lead to environmental change with impacts on human welfare. Understanding the economic significance of the ecosystems and biodiversity empowers the political and strategic decisions that promote sustainable development and halt the biodiversity loss.

One of the tasks of this assessment intends to determine the economic value of artisanal fishery of tuna in Mozambique and also to define further work that can improve this analysis.

This work was based on the important contributions of *The Economics of Ecosystems and Biodiversity* (TEEB), "*a global initiative focused on drawing attention to the economic benefits of biodiversity including the growing cost of biodiversity loss and ecosystem degradation.*" (www.teebweb.org).

The approach was based in 4 steps adapted from TEEB (2013):

1. **Identify the aim of the valuation** - the objective of the economic valuation was determined to complement the analysis of the socio-economic issues around artisanal tuna fishery in Mozambique and to present recommendations to further studies. The expectations and strategic interests defined to the artisanal fisheries of tuna were taken into account so it was possible to find the most suitable valuation for this service.
2. **Identify the Ecosystem Services to be assessed** - the ecosystem service was characterized in terms of its biophysical aspects and also regarding its spatial and temporal dimensions.
3. **Determine the valuation method(s)** - the economic valuation method was established according to literature recommendations, namely TEEB (2010). The chosen option (method) was identified and its benefits were recognized.

Assess and value ecosystem services - according to previous steps, the ecosystem service was economically assessed. Besides the ecological information presented in the characterization of the ecosystem service, it was also taken into account the socio-economic data collected during this assessment.

Results and Discussion

Literature review on tuna fisheries in Mozambique and the Western Indian Ocean

Tunas are epi and mesopelagic saltwater fishes that belong to the tribe Thunini, a sub-group of the mackerel family (Scombridae)- which together with the tunas, also includes the bonitos, mackerels, and the Spanish-Mackerels. Thunini comprises several species among them: the yellowfin tuna (*Thunnus albacares)*, skipjack tuna (also called bonito) (*Katsuwonus pelamis*), blackfin tuna (*Thunnus atlanticus*), the albacore (*Thunnus alalunga)*, the Atlantic Blue fin tuna (*Thunnus thynnus*), the bigeye tuna (*Thunnus obesus)*, the longtail tuna (*Thunnus tonggol),* the Pacific bluefin tuna (*Thunnus orientalis)*, the southern bluefin tuna (*Thunnus maccoyii)*, the little tunny (*Euthynnus alletteratus*) among others (ICCAT, 2006). They are widely distributed throughout the world and generally occur in temperate to tropical waters between about 45 degrees north and south of the equator (Pillai & Satheeshkumar, 2012).

The Indian Ocean is one of several important tuna fishing areas of the world. Compared to the Atlantic and eastern/western Pacific, a high proportion of catches in the Indian Ocean comes from areas beyond national jurisdiction. In addition, tuna catches in this region are split about equally between industrial and non-industrial fisheries.

The total value of the tuna catch in the Indian Ocean is not well understood. Several estimates of the landed value of the catch are in the range of € 1.5 to 2 billion, with the relatively high prices paid for artisanal caught tuna being a major factor in the overall value (Gillet, 2011).

Among the tunas, there are very commercially important species all over the world (frequently referred to as the principal market tuna species). They include (ordered by catch weight): skipjack, yellowfin, bigeye, albacore and three species of bluefin. The first three species are tropical and the remainders are temperate. The principal market species are widely distributed in the Atlantic, Indian and Pacific Oceans. The southern bluefin tuna migrates between all three Oceans, along the southern hemisphere. Most other species constitute different stocks

in the different Oceans. The principal market tunas are subject of intensive international trade for canning and sashimi on the global scale (Talvonem & Bours, 2012, ACPFishII, 2011; Palha de Sousa, 2011; Cayré, 1991).

Several studies have been carried out on tuna biology throughout the world. Rohit & Rammohan (2009) studied fishery and biological aspects of the yellowfin tuna (*Thunnus albacores*) along the Indian coast of Adhra. Stéquert & Conand (2004) and Langley *et al*. (2009) studied growth of the bigeye (*Thunnus obesus*) and yellowfin tunas (*Thunnus albacores*) in the Western Indian and Pacific oceans. Lee *et al*. (2005) studied spatial and temporal distribution of bigeye tuna in Taiwan. Cayré (1991) studied behavior of yellowfin and skipkack tunas in the Comoros Islands using ultrasonic tagging. Garibaldi (2012) examined the global FAO tuna capture production over the past six decades. Kimani *et al.* (2009) studied trends and governance of in the tuna fishing sectors in the Western Indian Ocean region. Ardil *et al.* (2011) reviewed the by catch and discard issues in the Indian Ocean tuna fisheries. Standing (2009) was occupied analyzing the growth in the certification of tuna fishing in southern Africa. Gillett (2011) promoted pole-and-line tuna fishing in the Pacific Islands. Mugo (2005) conducted a tagging program for the yellowfin, bigeye and skipjack tunas in Tanzania. Lawson *et al.* (1996) reported on the tuna fishery in Indian Ocean using data collected between 1980 to 1985. Tolvanen & Bours (2012) found large quantities of skipjack tuna while cursing the Indian Ocean waters. Lan & Lee (2011) studied the effects of climatic and marine environmental variations associated with fishing conditions of tuna species in the Indian Ocean. Gaski (1993) carried out a study on the examination of Bluefin tuna trade in the Japanese market. Olivier (2002) studied growth of yellowfin tuna in the Western Indian Ocean based on length frequency data analysis.

With regard to Mozambique, very few studies have been conducted on tuna. In 1983, an experimental program of pole-and-line/live bait fishing was started as a mean to assess the potential for surface tuna fishery at the semi-industrial level by Moreira Rato. Pó *et al.* (1992) studied growth of skipjack tuna using fork length data. A team of Mozambican scientists joined the RV «Dr. Fridtjof Nansen»- Joint NORAD/Mozambique/FAO project to investigate the fish resources off coast of Mozambique in 1978. Leal (2009) found tuna larvae while studying vertical dynamics of planktonic communities at Sofala bank, central Mozambique. More recently, Palha de Sousa (2011a) presented information on fisheries, research and statistics.

Patria *et al.* (2011) described the catch and effort and national data collection and processing systems available for the tuna industry. Palha de Sousa (2011b) presented some results on Mozambique tuna fishing using by catch data. Also Palha de Sousa (2012) reported on the occurrence of some tuna species associated with sharks. Nevertheless, nothing is known about the amount of tuna that is caught by recreational fishery in Mozambique.

According to Patria *et al.* (2011) Purse seine and long line are the two main fishing techniques used in Mozambique in the tuna fishery. Those activities are undertaken by distant water fishing fleets, which operate in the EEZ as from 12 nautical miles off shore from January to December.

Purse seine fishing occurs mainly between the parallels 10º 32' and 20º south. The purse seine fleet is comprised of vessels from France, Spain and Seychelles. Long line fishing occurs between 20º and 26º 52' south, with particular intensity below parallel 25º south. For the purse seine fleet, the peak period of fishing activities occurs between March and June. The longline fleet operates from January to December in Mozambique waters and the peak period is from December to February.

Over the last 10 years, the total catch in Mozambique waters ranges from 948 T to 17.470 T per year. For the period 2005 / 2010, 264 licenses and 486 licences were issued respectively to purse seine vessels and longline vessels, giving an average of 125 tuna licences issued per year. The number of longline vessels operating in Mozambique EEZ has declined substantially since 2007. In 2010, a total of 31 fishing companies were authorized to fish large pelagic species. (Patria *et al*. 2011).

The composition of catch in the purse seine fleet is about two thirds of the catch for skipjack, and a little less than one third for yellow-fin tuna. The composition of longline catch, expressed in number of fish is 65% for yellowfin tuna , 14% Albacore, 13% bigeye, and 3% swordfish (Source IOTC Database 1983-2006).

It is largely believed that Mozambique has got a very strong potential to develop tuna fishing in the next coming years. But there are also some factors that should be taken into account in order exploit tuna sustainably. For example, fisherman should be organized collectively, well equipped, the country should invest more money on good processing infrastructures; enforce

fishing and management legislation as well as licensing policy. Currently, Mozambique is on the way to achieve all these goals with the approval of the new tuna fishery strategy plan (ADNAP, 2013).

The Indian Ocean Tuna Commission (IOTC) was created to manage tuna and tuna-like species in the Indian Ocean and adjacent seas. Its main objective is to promote cooperation among its members with a view to ensuring, through appropriate management, the conservation and optimum utilization of stocks and encouraging sustainable development of fisheries based on such stocks. Mozambique is full member of this organization, since February 2012. According to Palha de Sousa (2001a), the management regime of the tuna fishery is still under development and complying with international and national regulations. For tuna, the main management tool in Mozambique is the issue of fishing licenses or Fisheries Partnership Agreements, with the EU..

The strategic development plan for the tuna fishery (PEDPA) was developed through a participatory process, involving different stakeholders with interest in this type of fishery (ADNAP 2013). It has resulted in a document that was approved by the Mozambican Council of Ministries on the 9th of July 2013. Among other things, it was based in the analysis of the current situation of the tuna fishery in the world, in the region, and especially in Mozambique. It also analysed the duties and responsibilities of the country towards international agreements and protocols, especially at a regional level. The document sets out four strategic objectives, in line with the Fisheries Master Plan 2010-2019, namely:

- To increase the contribution of the tuna fishery for food security and nutrition of the local population;
- To encourage a greater contribution of the tuna fishery for the economic and social development of the country;
- To promote a greater contribution of this fishery for the equilibrium of the country's balance of payments;
- To strengthen the effective control of the country on the tuna fishery in the exclusive economic zone, promoting its sustainable management.

Although the strategy focuses essentially on the industrial fishing, it also considers small-scale fishery, which includes artisanal fishery. This is exclusively dedicated to nationals operating

within Mozambican waters (till 12 nautical miles) and beyond, if the vessels meet the technological requirements and security for this purpose. The strategic plan for the artisanal tuna fishery encompasses the following main activities:

- Promotion of the semi-industrial and artisanal fishery for tuna and similar species;
- Definition of appropriate fishing technologies (fishing gear) for tuna fishing;
- Promotion of public consumption of tuna and by-catch; and
- Development of infrastructures for tuna storage and processing.

Interviews and Consultations

The three different questionnaires were applied to 77 stakeholders: i) 47 fishermen, ii) 19 people who work in Markets and iii) 11 professionals who work for relevant Institutions (Table 2).

Table 2 – Number of questionnaires obtained by stakeholders group by sampling area.

Stakeholders group	Maputo	Nacala / Ilha de Moçambique	Pemba	Total
Fishermen	21	8	18	**47**
Markets	15	2	2	**19**
Institutions	7	0	4	**11**
Total	**43**	**10**	**24**	**77**

A summary of the main results obtained after applying the statistical and content analysis to the obtained answers to the questionnaires is presented below. The detailed tables and graphs of the analysis are presented in Annex III. The answers that included a justification or an opinion are summarized in Annex IV.

The following topics describe the main results obtained by analysing the answers to the questionnaires undertaken to fishermen, markets and institutions during this assessment, discussing them according to the objectives that were previously defined.

Background analysis of the fishing sector

The great majority of individuals interviewed were fishermen (97.9%) (Photo 1 and Photo 2). All were males, of Mozambican nationality and the average age was 39.9 ± 10.6 (SD) with most of them (63.8%) being between 20 and 40 years old (Annex III.3). The majority of the individuals interviewed (48.9%) had relatively small households of up to five members (Figure 2). About a third (31.9%) revealed that they had a household comprised of 6 to 10 people (Figure 2). Twenty-five (53.2%) declared that they were not members or associated with any form of community-based organization and the remaining individuals interviewed were members of seven different organizations of which 11 were members of "Associação de Pescadores da Costa do Sol" (Annex III.3).

Photo 1 – Examples of the fishermen interviewed in Nacala (Fernão Veloso beach).

Photo 2 – Examples of the fishermen interviewed in Pemba.

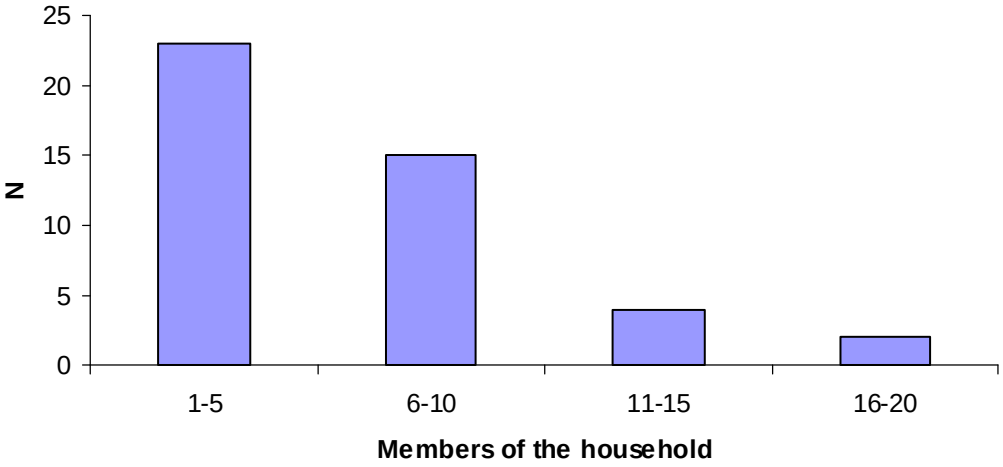

Figure 2 – Number of people per household.

Most individuals interviewed were either captains of the vessels (38.3%) or members of the crew (36.2%), and only five of them (10.6%) actually owned a boat (Table 3). When asked about the type of the boat used, the majority (57.4%) mentioned dhows (propelled by outboard motors, sails or oars), followed by dugout canoes (21.3%) and other smaller boats (Table 4 and Photo 3). Overall, the boats were on average 7.1 m long (SD = 3.5) and varied from 2.5 to 17 m. Boats were relatively larger in Pemba (8.5 m ± 3.5) when compared to Maputo (6.1 ± 2.7) or Nacala/Ilha de Moçambique (6.9 ± 4.7).

Table 3 – Occupation of the interviewed individuals with regards to their fishing activities.

Occupation	Frequency (N)	Percentage
Captain	18	38.3
Crew	17	36.2
Diver	3	6.4
Mechanic	4	8.5
Owner	5	10.6
Total	47	100.0

Table 4 – Types of boat used in the tuna artisanal fishery, according to the interviewed individuals.

Boat type	Frequency (N)	Percentage
Dugout canoe	10	21.3
Dhow	27	57.4
Dinghy	5	10.6
Flat boat	4	8.5
N/A	1	2.1
Total	47	100.0

Number of crew per boat varied considerably (1 to 32 men) with the majority of the individuals (46.8%), stating that the crew was comprised of one to five men (**Erro! A origem da referência não foi encontrada.**). On average, Pemba crews were larger (14.4 ± 7.8) than those fishing from Maputo (6.0 ± 3.2) or Nacala/Ilha de Moçambique (9.3 ± 11.4). Only men partake in offshore fishing activities, with women generally helping with disembarking and selling of the catch.

Fishing is a very important source of income. The great majority (87.2%) revealed that it was the only source of income while the remaining mentioned agriculture, informal trade and services as additional sources of income (Table 5).

About half of the interviewed individuals (51.1%) stated that they currently catch tuna. The majority (70.2%) said they would target tuna if they could, while only 10.6% were not interested in catching tuna. The remaining (19.1%) did not answer the question.

Photo 3 – Examples of the types of boat used in the tuna artisanal fishery in Pemba (starting on the top left and on clockwise direction: dugout canoes, dhow and dinghy).

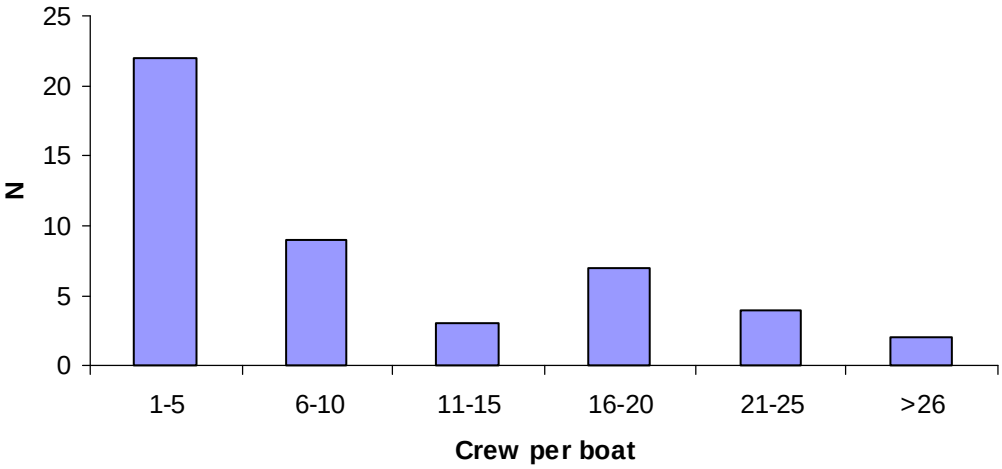

Figure 3 –Crew size per boat.

When asked which tuna species were caught the most, kawakawa (*Euthynnus affinis*) and yellowfin (*Thunnus albacares*) and bonito were the most common (Table 6). Almost half of the interviewed individuals that do catch tuna, declared that the fishing grounds are relatively close (less than 3 nautical miles) to their base port and more than a third mentioned that it is located between 3 and 10 nm (Table 7).

Table 5 – Activities that are undertaken by the interviewees and order of importance to their households

Activity	Order of importance to the interviewee				
	1st	2nd	3rd	4th	5th
Fishing	42 (89.4%)				
Machamba (subsistence agriculture)		2 (4.3%)		1 (2.1%)	1 (2.1%)
Shellfish and fish selling	5 (10.6%)	6 (12.8%)			
Salary (service)		1 (2.1%)	1 (2.1%)		
Informal trade	2 (4.3%)	8 (17.0%)	1 (2.1%)		
Others	1 (2.1%)				

Beach seine nets are primarily used in Maputo (Costa do Sol and Marítimo; 8.3%), while the majority of the individuals interviewed use hand lines (38.3%) and purse seine nets (31.9%). Thus, fishermen in the north use mainly purse seines when targeting tuna. An average of 41.3 (±16.5) hours per week are spent fishing with a variation between 18 to 84 hours. Fishermen in Maputo (39.6 ± 14.1 hours/week) and Pemba (36.5 ± 11.8 hours/week) spent about the same time fishing, while those in Nacala/Ilha de Moçambique almost double it (56.8 ± 23.3 hours/week). This might indicate a reduction in the availability of the stock.

Table 6 – Frequency of the main tuna species mentioned as being caught by the interviewed individuals. One individual may have mentioned more than one species.

Species	Frequency (N)	Percentage
Yellowfin (*Thunnus albacares*)	8	25.0
Bigeye (*Thunnus obesus*)	4	12.5
Skipjack (*Katsuwonus pelamis*)	4	12.5
Kawakawa (*Euthynnus affinis*)	9	28.1
Bonito*	7	21.9

* Bonito – refers to several smaller members of the tuna family, including skipjack and kawakawa (does not include the yellowfin tuna).

Table 7 – Distance to fishing grounds from base port.

Distance (nm)	Frequency (N)	Percentage
<3	14	48.3
3-10	10	34.5
>10	5	17.2
Total	29	100.0

It is clear from the results presented above that fishermen in the north are provided with better natural conditions for tuna fishing when compared to those in Maputo, and thus used more appropriate gear.

Assessment of livelihood benefits to fishermen and other direct and indirect dependants of tuna fisheries

Currently, the targeted artisanal tuna fishery is in its infancy in Mozambique, and tuna are usually caught as by-catch of a more diversified fishery. For example, tuna species account for less than 3% of the catches recorded by the National Institute for Fisheries Research (IIP) in Pemba (Henriques Bustani, pers. com).

As highlighted previously, fishing is a major (if not the most important) source of income for most of the fishermen and members of their households (Table 5 and Figure 2). Only men engage in fishing activities, however, women are more involved in processing and trading in the local markets.

If a targeted tuna fishery were developed, it would surely improve the livelihoods of the coastal communities including women, as usually tuna is sold for higher prices as it is rated as a first grade fish.

Economic valuation of artisanal tuna fishery

Identification of the aim of the valuation

The objective of this exercise is determined by the Terms of Reference of the assessment. The overall objective of the assessment is to provide baseline information on socio-economic issues around artisanal tuna fishery in Mozambique and, therefore, inform the policy and decision making processes that will support sustainable use, management and development of the artisanal tuna fishery.

One of the most important aspects of an accurate baseline characterization is to know how much this activity is worth and how much it can grow in a sustainable way. Promoting sustainable use of tuna fish stocks means that important income is generated to local communities but also that the tuna fish maintains healthy populations. Determining the economic value of artisanal fishery of tuna also helps the establishment of monetary targets that can be better understood by the general population (avoiding highly technical communications).

For the above reasons, the economic valuation of the artisanal tuna fishery in Mozambique has the following objectives:

- Inform what is the current value of this activity;
- Help establishing a sustainable growth for this activity;
- Support managers to determine the costs and benefits of promoting (with actions) this economic activity

Identification of the Ecosystem Service to be assessed

To perform this analysis several concepts had to be considered and, again, TEEB was the primary source of references. Here, ecosystem service is the "*direct and indirect contributions of ecosystems to human wellbeing*" (source: TEEB Glossary). In this particular case, the

ecosystem service is to provide food (tuna), which brings benefits to human welfare, primarily nutrition but also pleasure. Benefits are defined as "*positive change in wellbeing from the fulfilment of needs and wants*" (source: TEEB Glossary).

As previously mentioned, the provisioning service is to provide tuna fish as a source of food but only the tuna caught by artisanal means. This means that only certain species are captured and commercialized - the smaller ones - and that the fishery mainly occurs in the nearshore (<10nm).

On the other hand, tuna fish are migratory species so the study area of this project (nearshore of the surveyed areas) represents a very restricted territory. Therefore, the present assessment only analyses a geographically restricted area of a much wider ecosystem service.

To summarize, in this case, the ecosystem service to be assessed is tuna as a food source captured nearshore by the Mozambican artisanal fishery.

Determination of the valuation method

Determining the economic value of an ecosystem service implies establishing the magnitude of the impact that such service has on human welfare, and to do so it is necessary the use of a broad set of indicators. As highlighted in TEEB (2010), "*in economics, value is always associated with trade-offs, i.e. something only has (economic) value if we are willing to give up something to get or enjoy it*" and monetary valuation is the common metric to do so.

There are multiple approaches to estimate an ecosystem service value and they are split into two categories:

- biophysical, using a cost of production perspective that "derives values from measurements of the physical costs of producing a given good or service" (TTEB, 2010)
- preference-based (TEEB, 2010) that "rely on models of human behaviour and rest on the assumption that values arise from the subjective preferences of individuals" (TEEB, 2010).

This assessment uses the preference-based category of methods, in particular, the market analysis method as its tool. This method is commonly used to obtain the value of provisioning services, such as food, because the commodities produced by provisioning services are often sold on markets. As highlighted in TEEB (2010), "*market prices can be good indicators of the value of the ecosystem service that is being studied".*

In order to determine the ecosystem service value, the following formula was used:

Estimated no. of tuna fish captured (kg) X average price of tuna (MZN/kg)

In the following chapter, the ecosystem service value will be determined. On a firs step the gathered data is presented and shown how it was considered in the valuation.

Assessment and valuation of the ecosystem service

To assess and value the ecosystem service it is necessary to determine the number of tuna fish that is captured by artisanal means in Mozambique and also the price of tuna in the market.

The interviews performed during this assessment showed that 24 of the 47 fishermen interviewed (51%) fish, at least, 105,5 kg/week (Table 8).

Table 8 – Results from the interviews to 24 of the 47 fishermen that capture tuna fish by artisanal means (kg of tuna fish captured per week)

Amount	Minimum capture (kg)	No. of fishermen	Total amount (minimum) (kg)
<1kg	0,1	5	0,5
1 to 5kg	1	5	5
5 to 10kg	5	8	40
>10kg	10	6	60
		Total	**105,5**

It is thought that over 100 000 people are directly involved in artisanal fisheries as fishermen (Patria *et. al*, 2011) but, of course, not all of them capture tuna. As it is unknown the number of artisanal fishermen that capture tuna, it was assumed that at least 50% of them do (using the same percentage that resulted from the interviews in this project). Therefore, a total of 50 000 fishermen could capture a total of 219 792 kg/week.

According to the interviews, the average price of selling the tuna in the markets is 100 Meticais (MZM) per Kg even though this value is highly variable (see average MZM/kg in Maputo, Nacala and Pemba in Table 9).

Table 9 – Average price of one kg of tuna fish sold in markets in Maputo, Nacala and Pemba.

Site	Average (MZM/kg)
Maputo	130,8
Nacala	122,9
Pemba	81,3
Global	100,8

Assuming this data and applying the formula to economically valuate the ecosystem service:

No. of tuna fish captured		Price of tuna		Ecosystem service value
219 792 kg/week	X	100 MZM/kg	=	21 979 167 MZM/week

Using the previous assumptions, tuna fish captured in the nearshore of Mozambique by artisanal fishery as an ecosystem service worth an estimated value of **21 979 167 MZM/week**.

Estimation of the financial value of artisanal tuna fisheries in the country

An estimated value of **21 979 167 MZN/week** was obtained for tuna captured nearshore in Mozambique by the artisanal fishery as an ecosystem service. The results show that the tuna fish provided as food is a high value ecosystem service. However, it is important to attend to the following gaps in this analysis:

- the interviews were performed in 3 different fishing communities but it is highly possible that they do not show all the differences along the coast;
- the amount of tuna fish captured per week was determined by a sample of 24 interviews and the estimates were established by the lowest values of captures (kg/week);

- the tuna fish price used as a reference was also obtained by the interviews and the observed variance indicates that there are significant differences along the communities where tuna is commercialized;
- also, it was assumed, for the purpose of this study, that there are 50 000 fishermen that fish and sell tuna but is possible that this number is lower;

Therefore, it is important to proceed with further studies that will improve this analysis and point out a more accurate number for the value of this ecosystem service. To do so, we recommend the following actions:

- estimate the number of fishermen that capture tuna fish by artisanal means by contacting fishermen associations and communities along the coast;
- determine the total amount of tuna fish captured by artisanal means in the nearshore of Mozambique by choosing several fishermen communities along the coast and performing interviews to a wider population. This number should take into account the variance in captures along the year and also the species captured;
- assess the market price of tuna fish (only the one that comes from artisanal fishery) in several markets along the Mozambique coastline. Establish an average price per region.

After having a more precise value for the ecosystem service it will be possible to support important decisions and strategic analysis such as:

- Establishment of a sustainable growth rate for this activity without compromising the ecosystems but promoting economic growth in fishermen communities;
- Improve the artisanal fishery of tuna by analysing the costs and benefits of interventions and their results on the economic value of the ecosystem service (e.g. building a tuna fish storage has a cost but it will increase the value of the ecosystem service);
- Assess the effects of conflicting activities in terms of the decrease on the ecosystem service value (e.g. altering the coastal socio-economic dynamics of a community for tourism purpose might significantly decrease the value of this ecosystem service as the artisanal fishery might be reduced).

Analysis and mapping of key Civil Society Organisations (CSOs) engaged in fisheries issues in Mozambique, including fisheries associations and Fishing Community Committees

Pereira (2008) prepared a report on the capacity of civil society organizations (CSOs) including fishermen associations in Mozambique. Of a total of 43 organizations contacted, 24 were covered throughout the country, which included nine fishermen associations (Table 10). The study showed that in general NGOs in Mozambique were relatively young, understaffed, under-funded and poorly equipped.

Table 10 – National CSOs working with coastal and marine issues in Mozambique, including fishermen associations (from Pereira, 2008). Codes of areas of activity are as follows: A = advocacy and lobbying; C = conservation; D = development; E = education and awareness; F = fishermen association; N=networking; R=research and monitoring.

Organization's Name (Acronym)	Location	Areas of Activity
Fisheries-related NGOs		
Associação dos Armadores de Pesca de Moçambique (ASSAPEMO)	Beira, Sofala	A/D/F/N
Associação de Pescadores de Chicuque (Ligoga)-HIV/SIDA (APCL)	Maxixe, Inhambane	D/E/F
Associação dos Pescadores de Inhassoro (API)	Inhassoro, Inhambane	D/E/F
Associação de Pescadores de Nanhimbe (APENA)	Pemba, Cabo Delgado	A/D/F
Associação de Pescadores de Zavala (APEZA)	Zavala, Inhambane	A/D/F
Associação dos Pescadores de Fadar-Vano	Pemba, Cabo Delgado	D/E/F
Associação dos Pescadores de Govuro (APEGO)	Govuro, Inhambane	D/E/F
Associação Moçambicana dos Pescadores de Inhassoro (AMOPI)	Inhassoro, Inhambane	D/E/F
Wiwanana	Pemba, Cabo Delgado	D/E/F
Other NGOs		
Associação Olhos no Horizonte (EOTH)	Maputo	A/E

Organization's Name (Acronym)	Location	Areas of Activity
Associação para Agricultura Biológica, Biodiversidade e Desenvolvimento Sustentável (ABIODES)	Maputo	A/D/E
Associação Centro Terra Viva - Estudos e Advocacia Ambiental (CTV)	Maputo	A/E/R
Associação de Limpeza e Meio Ambiente (ALMA)	Tofo, Inhambane	D/E
Associação de Mackomane (ADM)	Quissico, Inhambane	D/E
Associação para Investigação Costeira e Marinha (AICM)	Maputo	E/C/R
Associação para Preservação e Defesa do Meio Ambiente (Livaningo)	Maputo	A/E
Associação para Saúde Ambiental (ASA)	Xai-Xai, Gaza	A/D/E
Associação dos Mergulhadores Activos para Recursos Marinhos (AMAR)	Tofo, Inhambane	A/E
Associação dos Naturais e Amigos da Ilha da Inhaca (ANAII)	Maputo	A/D/E/
Associação Meio Ambiente de Cabo Delgado (AMA)	Pemba, Cabo Delgado	A/C/D/E/
*JA!*Justiça Ambiental (JA)	Maputo	A/E
Kanha Kwetu	Benguérua, Vilanculos	A/D/E
Kuwuka Juventude Desenvolvimento e Advocacia (Kuwuka)	Maputo	A/E/R
Thomba Yedho	Bazaruto, Inhassoro	A/D/E

Also, it highlighted that while an enabling environment and legal framework for NGO establishment and functioning was established, there were several procedural difficulties. There was still a lot to be accomplished with regards to training, communications and networking, and general institutional capacity building in order to enable the CSOs to perform their role in the marine and coastal environment in the country.

It was clear from the interviews that associativism is still a "novelty" in Mozambique as reported by Pereira (2008). The majority of the fishermen interviewed in our assessment (83.0%) were not engaged or anyway associated with any organization that manages or is part of any decision-making processes. The situation is somehow different in the northern part of the country where some fishermen are indeed members of community associations, which manage local conflicts and fishing zones.

Analysis of the national and local supply chain of tuna fishery and the level of market demand for tuna (both from sustainable and non-sustainable sources) in Mozambique

From the interviews undertaken to several managers of restaurants, hotels and similar (fish markets), a relatively good picture was drawn of the current local market for tuna (Annex II). The outputs of the statistical analysis that was undertaken to this group of stakeholders are presented in Annex III.2, as well as a summary of the justifications and opinions given by the interviewees (Annex IV.2).

The majority of the businesses visited (73.7%) keep tuna in their menus or list of products mainly because tuna is highly sought after by customers, who rate it equally to salmon and because it is part of the diet of an increasing Asiatic population in Mozambique. On the other hand, tuna is viewed as a relatively scarce product, not readily available on the market, and not accessible to low income communities.

In general, tuna available in Maputo is either sourced locally or imported mainly from South Africa and accordingly transported in refrigerated trucks. Elsewhere, no such transport and distribution facilities exist at local level and usually the tuna is delivered fresh, straight from the beach to the businesses or local markets (Figure 4).

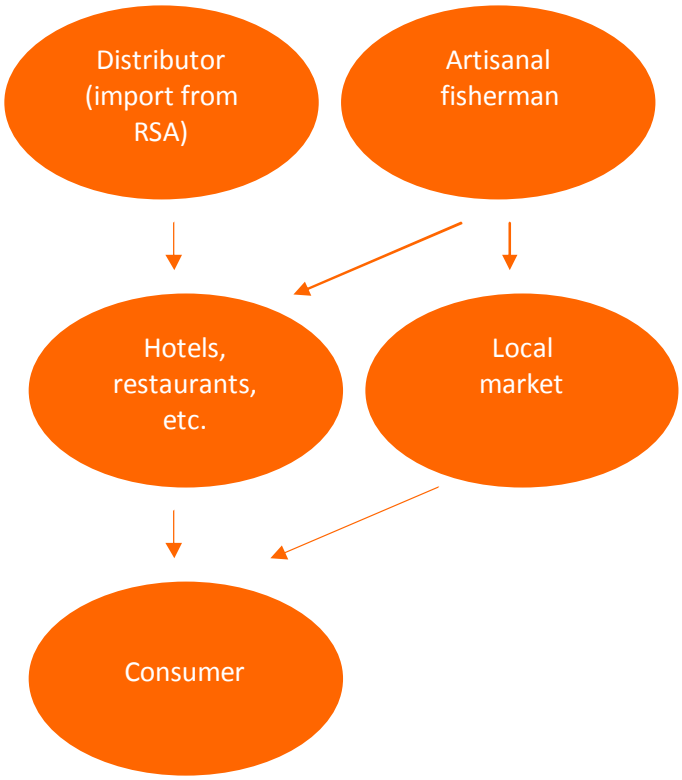

Figure 4 – Supply chain of tuna products in Mozambique.

About half of the interviewed businesses had capacity for preservation of the tuna whether in freezers, cooler boxes or ice containers. However, only one of the individuals interviewed declared that ice was taken on board and used to preserve the catches. Apart from the freezing facilities in the Maputo fishing harbour no such facilities are available elsewhere for the artisanal fishermen targeting tuna. In places where such facilities exist, these are not operational due to poor maintenance. Nevertheless, the majority of the managers (57.9%) interviewed declared that the local sourced tuna is of good or excellent quality, although some commented that it was of poor quality especially for the canning industry. This is probably caused by the fact that tuna is not bled upon capture nor processed whatsoever by the fishermen. This, as well as the fact that tuna is still not a major component of the dietary culture of most Mozambicans, was highlighted by some as a deterrent for large-scale investment in the industry.

Assessment and general overview of governmental and international institutions about the artisanal tuna fishery in Mozambique

A total of 11 institutions were contacted (Annex II). These ranged from Governmental, Academic, NGOs and Donors/International partners, based in Maputo and Pemba. The most relevant tables and graphs obtained from the statistical analysis of the questionnaires that were undertaken to this group of stakeholders are presented in Annex III.1. A summary of the justifications and opinions given by the interviewees is also presented in Annex IV.1.

Eight of the institutions interviewed were not aware of the current stocks of tuna in Mozambique. Reference was made to poor data, although one mentioned an annual catch of about one million tonnes. The fact that tuna displays highly migratory behaviour within the region was highlighted as a contributing factor for the poor knowledge of stocks in the region, despite the continuous monitoring effort by the Indian Ocean Tuna Commission. A potential over-exploitation of the resource was also brought up. Only four were not aware of the species being caught by the tuna artisanal sector in Mozambique. On the other hand, yellowfin, bigeye and skipjack were the most cited species, followed by kawakawa.

All institutions were in agreement that it is possible to develop a successful artisanal tuna fishery in Mozambique, as long as a sound feasibility study is conducted. Such study should thoroughly address issues such as species seasonality, fishing gear to be licensed and, above all, building capacity within the fishermen and promote associativism in order to channel governmental support. The need for improved fishing gear and boats was raised as a way to efficiently exploit the resource. The development of processing infrastructures was also highlighted as a pressing need.

Some institutions based in Maputo, noted that tuna is captured by the artisanal fishery, although not as the main target (accounting for only 2-3% of the reported catches between

January-June). Only the industrial sector targets tunas directly. It was mentioned that large schools of "coastal" tuna pass by in certain seasons and is thus accessible to the artisanal fishery (mainly skipjack) in addition to the "oceanic" tuna, which is accessible to the industrial fishery. The case of Cabo Delgado, where large catches of tuna have been reported, was emphasized, thus there is a large potential for the introduction of improved techniques, which would increase productivity, especially in Pemba and Nacala. Memba on the other hand, was rejected as no preservation conditions are in place. One respondent declared that the tuna fishery in Mozambique is currently inefficient given the inadequate boats and fishing gear used.

When asked about the Ministry of Fisheries' plans with regards to the tuna artisanal fishery in Mozambique, nine of the respondents answered positively. They knew that a strategic plan was being drafted by the National Fisheries Administration – ADNAP (it was eventually approved by the Council of Ministers on 9 July 2013). Also a consultative meeting had been held recently on the issue. In terms of its integration within the region it was regarded as a must given its availability and the fact that it is currently under-exploited in Mozambique.

The question about the local capacity to support the artisanal tuna fishery in Mozambique raised the cultural "dietary" issue, as tuna is not part of the typical dietary culture of Mozambicans. Therefore several challenges lie ahead. In addition, the technical aspects of the fishery (gear, boats, processing, transport, storing and trade) were also highlighted. The need to build local capacity amongst the fishermen was again mentioned. Attracting foreign investors was also proposed.

Six institutions argued that regulating the tuna fishery in the country would not be problematic as the country would adopt the management principles put forward by the IOTC, not only because it is a common shared resource but also due to the fact that Mozambique has adhered to the IOTC as a full member. Additionally, the current fisheries legal framework is perceived as adequate and introducing the tuna fishery would not constitute a problem. However, there is a need to improve and strengthen the intervention of the community fisheries councils (CCPs).

Monitoring and managing the fishery was also seen as possible without major obstacles, although the relevant institutions need to be reinforced with appropriate human and material

resources. This aspect was seen as fundamental along with licensing, inspection and law enforcement.

The last aspect considered in the interviews relates to the storing, transport and distribution of the tuna to the final consumer. The majority considered that currently no infrastructures and suitable conditions are available. There is provision in the strategic plan for such developments but it was stressed that feasibility studies must address this with due diligence. Some respondent suggested using the transport facilities currently being used in the shrimp and crustacean fishery. Distribution networks were not seen as currently viable (especially in the north), given the poor road network and undeveloped market.

Recommendations on development and management options

This chapter is intended to provide recommendations on development and management options to ensure tuna fishery generates sustainable benefits to the national and local economies while taking into consideration gender and environmental concerns.

According to the strategic plan for the development of the tuna fishery in Mozambique (ADNAP, 2013), four main actions are to be implemented within the small-scale fishery for tuna:

- Promotion of the semi-industrial and artisanal fishery for tuna and similar species;
- Definition of appropriate fishing technologies (fishing gear) for tuna fishing;
- Promotion of public consumption of tuna and by-catch; and
- Development of infrastructures for tuna storage and processing.

While these encompass the overall actions needed, they represent general guidelines only and a proper in-depth action plan needs to be drafted.

The results of the survey show that about 50% of the fishermen in Maputo and Cabo Delgado, catch tuna, although tuna seems to be complementary to their main target species. Many of them do fish for tuna out of the 3 nm limit, which overlaps with the area where industrial fisheries take place. This has important implications, in terms of the development of the industrial tuna sector in Mozambique, as it will have to accommodate the needs of the small-scale sector. This is already mentioned in the strategic plan and further substantiated by the present assessment. This is even more relevant, given the high contribution of the tuna fishery to the national economy. Although based on a small sample, the study provides a first glimpse of the value of the artisanal tuna fishery in Mozambique.

It is imperative that cultural and behavioural aspects be taken into account when producing such plan of action, as the artisanal fishing community is much diversified along the coast. The plan must also include training programmes in onboard fish processing and preservation, in order to ensure the quality of the product offered to the consumer.

The results of the questionnaires to the market stakeholders suggested that it might be difficult to ensure a domestic market for the tuna, as only selected restaurants serve tuna and it is not part of the local "dietary culture". As mentioned in the strategic plan, marketing and education programmes need to be implemented in order to promote tuna within the Mozambican consumer.

Given the fundamental role of women in the socio-economy of any artisanal fishery, it is recommended that women be included in any training programs. While women do not partake in the fishing activities directly, they have a fundamental role in processing and trade.

The strategic plan refers to the creation of tuna processing plants in Maputo and Nacala. While this is an important, it may not be sufficient. The results suggest that fishermen education and capacity building in tuna processing and preservation is of paramount importance. Training in adequate fishing methods and gear is also fundamental. Lastly, transport of tuna to the consumers in adequate freezing conditions seems to be lacking at the moment. This issue should also be addressed and could potentially open other markets especially in landlocked cities such as Chimoio, Tete and Lichinga. The costs of capitalizing, running and maintaining a tuna fishing operation might surpass the capacity of the majority of artisanal fishermen in Mozambique. Fishing associations and other forms of community enterprises should be promoted and initial credit lines will need to be put in place. Such small companies would also need to be established in order to run and maintain ice production, small processing plants, and storage and distribution networks.

Fishing gear used to catch tuna (e.g. long lines and purse seines) has been shown to be detrimental to other species including threatened and/or protected species, such as marine turtles and dolphins. These aspects should be dealt with accordingly in the education and development components of the action plan of the artisanal tuna fishery.

The seasonality of the resource must also be taken into account especially in the southern part of the country. This is especially important, as a dedicated year long artisanal tuna fishery does not seem feasible.

Conclusions

Although no updated data on stocks is available, it is believed that given the current number of fishermen involved and existing fishing technology, the inshore stocks are sufficient to sustain an artisanal tuna industry.

- The tuna captured nearshore by the artisanal fishery, worth an estimated value of 21 979 167.00 MZM/week as an ecosystem service. This figure is an indication and must be substantiated in the future, suggests of the potential of this fishery for the national economy;
- Tuna is not part of the general “dietary culture” in Mozambique and there is a strong need to develop a marketing and education strategy in order to develop the domestic market;
- There is a need to improve the overall fishing and processing technology in the artisanal sub-sector of the tuna fishery. Not only regarding the fishing gear used, but immediate processing on board (bleeding and/or gutting) and preservation. This will implicate education programmes and eventually subsidies to enable local artisanal fisheries to develop their capacity. Furthermore, on-land processing, storage and distribution facilities and infrastructures are largely lacking and need to be established.

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Annexes

Annex I – Final questionnaires

Annex II – List of contacted stakeholders and interviews undertaken

Annex III – Most relevant Graphs and Tables obtained by the statistical analysis

Annex IV – Summary of the answers that demanded a justification or an opinion

Annex I – Final questionnaires

AI.1 – Institutions

AI.2 – Markets

AI.3 - Fishermen

Questionário: Instituições

Somos trabalhadores da Biodinâmica, uma empresa que foi contratada no âmbito de um estudo sobre a pesca artesanal de atum em Moçambique.

A sua participação nesta entrevista é voluntária e confidencial. O seu nome e os seus contactos pessoais não ficarão registados e qualquer resposta dada por si no âmbito deste questionário como não será fornecida a elementos estranhos à equipa de trabalho. Gostaríamos de pedir a sua colaboração e a sua resposta honesta.

Fica ao seu critério a recusa em responder a qualquer questão que lhe seja colocada e de parar a entrevista em qualquer momento. A entrevista demorará cerca de 20 a 30 minutos. Agradecemos desde já a sua colaboração. Muito obrigado.

*Obrigatório

Questionário preparado por Biodinâmica, S.A. para WWF Moçambique

1. **1 - Referência** *
   Inserir o número do inquérito, o qual tem que ser único

   .....

2. **2 - Data** *
   Inserir data de realização do Inquérito

   .....
   Exemplo: 15 de dezembro 2012

3. **3 - Local** *
   Inserir o local de realização do inquérito

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4. **4.1 - Coordenadas GPS (X)** *
   Inserir as coordenadas GPS, coluna X do local onde o inquérito foi realizado

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5. **4.2 - Coordenadas GPS (Y)** *
   Inserir as coordenadas GPS, Coluna Y do local onde o inquérito foi realizado

6. **5 - Entrevistador** *
   Inserir o primeiro e último nome do entrevistador

7. **6 - Idade** *
   Inserir a idade do inquirido

8. **7 - Género** *
   Escolher o género do inquirido
   Marcar apenas uma oval.

   - ◯ Masculino
   - ◯ Feminino

9. **8.1 - Qual o local onde nasceu (País)?** *
   Inserir o nome do País onde o inquirido nasceu

10. **8.2 - Qual o local onde nasceu (Província)?** *
    Inserir o nome da Província onde o inquirido nasceu

11. **8.3 - Qual o local onde nasceu (Distrito)?** *
    Inserir o nome do Distrito onde o inquirido nasceu

12. **8.4 - Qual o local onde nasceu (Comunidade)?** *
    Inserir o nome da Comunidade onde o inquirido nasceu

13. **9 - Há quanto temo vive nesta comunidade?** *
    Inserir o número de anos (em forma numérica) em que o inquirido vive na comunidade (se for meses, extrapolar para anos, ou seja 6 meses = 0,5)

14. **10 - Qual o seu local de trabalho?** *
    Colocar o nome da Aldeia ou Cidade onde o inquirido exerce a profissão

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15. **11 - Qual a instituição ou organização onde exerce o seu trabalho?** *
    Inserir o nome da instituição ou organização onde o inquirido exerce o seu trabalho

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16. **12 - Pode descrever o seu cargo?** *
    O inquirido deve descrever o cargo que exerce

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17. **13 - Sabe qual é o estado actual dos stocks de atum (<10 mn)?** *
    Caso tenha conhecimento, o inquirido deve descrever qual o estado actual dos stocks do atum a menos de 10 milhas náuticas da costa

    Marcar apenas uma oval.

    - ◯ Sim
    - ◯ Não

18. **13.1 - Caso tenha conhecimento do estado actual dos stocks de atum a <10mn, pode descrever esse mesmo estado?**
    Caso tenha conhecimento, o inquirido deve descrever qual o estado actual dos stocks do atum a menos de 10 milhas náuticas da costa. Se o inquirido respondeu anteriormente que não tem conhecimento, escrever N/A

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19. **14 - Quais as espécies que são potencialmente interessantes para serem exploradas pelo sector artesanal?** *
    Caso o inquirido tenha conhecimento, mostrar as fotos e seleccionar as espécies da lista abaixo. Caso o inquirido não saiba, o entrevistador deve seleccionar a opção "Não sabe"
    Marcar tudo o que for aplicável.

    - [ ] Albacora (yellow-fin)
    - [ ] Gaiado
    - [ ] Patudo
    - [ ] Merma
    - [ ] Não sabe o nome
    - [ ] N/A
    - [ ] Outra: .....

20. **15 - Acha que há potencialidade para o desenvolvimento da pesca artesanal do atum em Moçambique?** *
    Escolher a opção abaixo consoante a resposta do inquirido. Pedir para que o inquirido justifique sempre a sua opinião, preenchendo a pergunta 15.1
    Marcar apenas uma oval.

    - ◯ Sim
    - ◯ Não
    - ◯ Não sei

21. **15.1 - Pode desenvolver a sua opinião acerca da resposta anterior?** *
    Pedir sempre para que o inquirido justifique a sua opinião relativa à resposta à pergunta anterior. Caso não tenha justificado, colocar a expressão N/J

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22. **16 - Pensa que o Ministro das Pescas planeia promover a pesca artesanal do atum?** *
    Escolher a opção abaixo consoante a resposta do inquirido. Pedir para que o inquirido justifique sempre a sua opinião, preenchendo a pergunta 16.1
    Marcar apenas uma oval.

    - ◯ Sim
    - ◯ Não
    - ◯ Não sei

23. **16.1 - Pode desenvolver a sua opinião acerca da resposta anterior?** *
Pedir sempre para que o inquirido justifique a sua opinião relativa à resposta à pergunta anterior. Caso não tenha justificado, colocar a expressão N/J

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24. **17 - Acha que existe capacidade local para suportar a pesca artesanal de atum?** *
Escolher a opção abaixo consoante a resposta do inquirido. Pedir para que o inquirido justifique sempre a sua opinião, preenchendo a pergunta 17.1
Marcar apenas uma oval.

- ◯ Sim
- ◯ Não
- ◯ Não sei

25. **17.1 - Pode desenvolver a sua opinião acerca da resposta anterior?** *
Pedir sempre para que o inquirido justifique a sua opinião relativa à resposta à pergunta anterior. Caso não tenha justificado, colocar a expressão N/J

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26. **18 - E quanto à regulação desta actividade?** *
Escolher a opção abaixo consoante a resposta do inquirido. Pedir para que o inquirido justifique sempre a sua opinião, preenchendo a pergunta 18.1
Marcar apenas uma oval.

- ◯ Sim
- ◯ Não
- ◯ Não sei

27. **18.1 - Pode desenvolver a sua opinião acerca da resposta anterior?** *
Pedir sempre para que o inquirido justifique a sua opinião relativa à resposta à pergunta anterior. Caso não tenha justificado, colocar a expressão N/J

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28. **19 - E no que diz respeito à gestão da pesca artesanal de atum?** *
Escolher a opção abaixo consoante a resposta do inquirido. Pedir para que o inquirido justifique sempre a sua opinião, preenchendo a pergunta 19.1
Marcar apenas uma oval.

- ◯ Sim
- ◯ Não
- ◯ Não sei

29. **19.1 - Pode desenvolver a sua opinião acerca da resposta anterior?** *
Pedir sempre para que o inquirido justifique a sua opinião relativa à resposta à pergunta anterior. Caso não tenha justificado, colocar a expressão N/J

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30. **20 - E relativamente à monitoria desta actividade?** *
Escolher a opção abaixo consoante a resposta do inquirido. Pedir para que o inquirido justifique sempre a sua opinião, preenchendo a pergunta 20.1
Marcar apenas uma oval.

- ◯ Sim
- ◯ Não
- ◯ Não sei

31. **20.1 - Pode desenvolver a sua opinião acerca da resposta anterior?** *
Pedir sempre para que o inquirido justifique a sua opinião relativa à resposta à pergunta anterior. Caso não tenha justificado, colocar a expressão N/J

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32. **21 - Existem nesta região meios e capacidade para armazenar atum?** *
Escolher a opção abaixo consoante a resposta do inquirido. Pedir para que o inquirido justifique sempre a sua opinião, preenchendo a pergunta 21.1
Marcar apenas uma oval.

- ◯ Sim
- ◯ Não
- ◯ Não sei

33. **21.1 - Pode desenvolver a sua opinião acerca da resposta anterior?** *
Pedir sempre para que o inquirido justifique a sua opinião relativa à resposta à pergunta anterior. Caso não tenha justificado, colocar a expressão N/J

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34. **22 - Nesta região existem meios para transportar atum?** *
Escolher a opção abaixo consoante a resposta do inquirido. Pedir para que o inquirido justifique sempre a sua opinião, preenchendo a pergunta 22.1
Marcar apenas uma oval.

- ◯ Sim
- ◯ Não
- ◯ Não sei

35. **22.1 - Pode desenvolver a sua opinião acerca da resposta anterior?** *
Pedir sempre para que o inquirido justifique a sua opinião relativa à resposta à pergunta anterior. Caso não tenha justificado, colocar a expressão N/J

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36. **23 - Nesta região existem meios para distribuir o atum ao consumidor final?** *
Escolher a opção abaixo consoante a resposta do inquirido. Pedir para que o inquirido justifique sempre a sua opinião, preenchendo a pergunta 23.1
Marcar apenas uma oval.

- ◯ Sim
- ◯ Não
- ◯ Não sei

37. **23.1 - Pode desenvolver a sua opinião acerca da resposta anterior?** *
Pedir sempre para que o inquirido justifique a sua opinião relativa à resposta à pergunta anterior. Caso não tenha justificado, colocar a expressão N/J

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Questionário: Mercado

Somos trabalhadores da Biodinâmica, uma empresa que foi contratada no âmbito de um estudo sobre a pesca artesanal de atum em Moçambique.

A sua participação nesta entrevista é voluntária e confidencial. O seu nome e os seus contactos pessoais não ficarão registados e qualquer resposta dada por si no âmbito deste questionário como não será fornecida a elementos estranhos à equipa de trabalho. Gostaríamos de pedir a sua colaboração e a sua resposta honesta.

Fica ao seu critério a recusa em responder a qualquer questão que lhe seja colocada e de parar a entrevista em qualquer momento. A entrevista demorará cerca de 20 a 30 minutos. Agradecemos desde já a sua colaboração. Muito obrigado.

*Obrigatório

Questionário preparado por Biodinâmica, S.A. para WWF Moçambique

1. **1 - Referência** *
   Inserir o número do inquérito, o qual tem que ser único

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2. **2 - Data** *
   Inserir data de realização do Inquérito

   .....
   Exemplo: 15 de dezembro 2012

3. **3 - Local** *
   Inserir o local de realização do inquérito

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4. **4.1 - Coordenadas GPS (X)** *
   Inserir as coordenadas GPS, coluna X do local onde o inquérito foi realizado

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5. **4.2 - Coordenadas GPS (Y)** *
   Inserir as coordenadas GPS, Coluna Y do local onde o inquérito foi realizado

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6. **5 - Entrevistador** *
   Inserir o primeiro e último nome do entrevistador

7. **6 - Idade** *
   Inserir a idade do inquirido

8. **7 - Género** *
   Escolher o género do inquirido
   Marcar apenas uma oval.

   - ◯ Masculino
   - ◯ Feminino

9. **8.1 - Qual o local onde nasceu (País)?** *
   Inserir o nome do País onde o inquirido nasceu

10. **8.2 - Qual o local onde nasceu (Província)?** *
    Inserir o nome da Província onde o inquirido nasceu

11. **8.3 - Qual o local onde nasceu (Distrito)?** *
    Inserir o nome do Distrito onde o inquirido nasceu

12. **8.4 - Qual o local onde nasceu (Comunidade)?** *
    Inserir o nome da Comunidade onde o inquirido nasceu

13. **9 - Há quanto temo vive nesta comunidade?** *
    Inserir o número de anos (em forma numérica) em que o inquirido vive na comunidade (se for meses, extrapolar para anos, ou seja 6 meses = 0,5)

14. **10 - Qual o seu local de trabalho?** *
    Colocar o nome da Aldeia ou Cidade onde o inquirido exerce a profissão

15. **11 - Qual a instituição ou organização onde exerce o seu trabalho?** *
    Inserir o nome da instituição ou organização onde o inquirido exerce o seu trabalho

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16. **12 - É pescador?** *
    Seleccionar Sim ou Não consoante a resposta do inquirido. No caso de responder Sim, preencher a pergunta 12.1
    Marcar apenas uma oval.

    - ◯ Sim
    - ◯ Não

17. **12.1 - A que Associação ou entidade equivalente pertence?** *
    Caso o inquirido tenha respondido Sim à pergunta 12 preencher o nome da Associação ou Entidade a que pertence. Caso a pergunta não seja aplicável ao caso, colocar a expressão N/A

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18. **13 - Cargo/Descrição das suas tarefas** *
    Escolher na lista abaixo o cargo ou tarefas desempenhadas pelo Inquirido
    Marcar apenas uma oval.

    - ◯ Mestre da embarcação/Tripulante
    - ◯ Proprietário
    - ◯ Gerente
    - ◯ Funcionário
    - ◯ N/A
    - ◯ Outra: .....

19. **14 - O atum fresco faz parte da sua lista de produtos /menu?** *
    Seleccionar Sim ou Não consoante a resposta do inquirido. No caso de responder Não, preencher a pergunta 14.1
    Marcar apenas uma oval.

    - ◯ Sim
    - ◯ Não
    - ◯ N/A

20. **14.1 - Porque razão o atum fresco não faz parte da sua lista de produtos /menu?** *
Caso o inquirido tenha respondido Não à pergunta 14, explicar qual a razão. Caso a pergunta não seja aplicável ao caso, colocar a expressão N/A

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21. **15 - Pedem-lhe ou já lhe pediram no passado atum com frequência?** *
Seleccionar Sim ou Não consoante a resposta do inquirido. No caso de responder Sim, preencher a pergunta 15.1
Marcar apenas uma oval.

- ◯ Sim
- ◯ Não
- ◯ N/A

22. **15.1 - Se lhe pedem ou já pediram atum, quais as espécies?** *
Caso o inquirido tenha respondido Sim à pergunta 15, mostrar as fotos e seleccionar as espécies da lista abaixo
Marcar tudo o que for aplicável.

- ☐ Albacora (yellow-fin)
- ☐ Gaiado
- ☐ Patudo
- ☐ Merma
- ☐ Não sabe o nome
- ☐ N/A
- ☐ Outra: .....

23. **16 - Onde obtém o atum?** *
Escolher as opções da lista abaixo caso o inquirido venda/compre com atum. Se escolheu a opção "importado do exterior" passar para a pergunta 16.1
Marcar tudo o que for aplicável.

- ☐ Compro localmente
- ☐ Compro a nível da região/província
- ☐ Importado do exterior
- ☐ N/A
- ☐ Outra: .....

24. **16.1 - Em que país?** *
Caso o inquirido responda "Importado do exterior" na pergunta 16, referir qual o país. Caso a pergunta não seja aplicável ao caso, colocar a expressão N/A

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25. **17 - Se comprado localmente, como avalia a sua qualidade?** *
Caso o inquirido compre o atum localmente, escolher o nível de qualidade com base na lista apresentada abaixo
Marcar apenas uma oval.

- ◯ Muito pouca qualidade
- ◯ Pouca qualidade
- ◯ Qualidade satisfatória
- ◯ Boa qualidade
- ◯ Excelente qualidade
- ◯ N/A

26. **18 - Quanto paga por kg de atum (MZN/USD)?** *
Inserir sempre o valor em forma numérica em meticais. Caso o valor tenha sido dado em Dólares, converter para meticais à taxa do dia em que o inquérito foi realizado. Caso a pergunta não seja aplicável ao caso, colocar a expressão N/A

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27. **19 - Quantos kg de atum vende em média? (escolher uma opção)** *
Se o inquirido vender atum seleccionar de acordo com a matriz apresentada abaixo, ou seja, a unidade deve ser por semana, por mês ou por ano. Uniformizar sempre para Kg
Marcar apenas uma oval por linha.

	Por semana	Por mês	Por ano	N/A
< 1 Kg	◯	◯	◯	◯
1-5 Kg	◯	◯	◯	◯
5-10 Kg	◯	◯	◯	◯
> 10 Kg	◯	◯	◯	◯
N/A	◯	◯	◯	◯

28. **20 - Qual é a sua capacidade de transporte de atum?** *
Se o inquirido transportar atum, preencher em forma numérica, uniformizando sempre para Kg. Caso a pergunta não seja aplicável ao caso, colocar a expressão N/A

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29. **21 - Qual é a sua capacidade de armazenamento de atum?** *
Se o inquirido armazenar atum, preencher em forma numérica, uniformizando sempre para Kg. Caso a pergunta não seja aplicável ao caso, colocar a expressão N/A

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30. **22 - Nesta região existem meios para armazenar atum?** *
Escolher a opção abaixo consoante a resposta do inquirido. Pedir para que o inquirido justifique sempre a sua opinião, preenchendo a pergunta 22.1
Marcar apenas uma oval.

- ◯ Sim
- ◯ Não
- ◯ Não sei

31. **22.1 - Pode desenvolver a sua opinião acerca da resposta anterior?** *
Pedir sempre para que o inquirido justifique a sua opinião relativa à resposta à pergunta anterior. Caso não tenha justificado, colocar a expressão N/J

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32. **23 - Nesta região existem meios para transportar atum?** *
Escolher a opção abaixo consoante a resposta do inquirido. Pedir para que o inquirido justifique sempre a sua opinião, preenchendo a pergunta 23.1
Marcar apenas uma oval.

- ◯ Sim
- ◯ Não
- ◯ Não sei

33. **23.1 - Pode desenvolver a sua opinião acerca da resposta anterior?** *
Pedir sempre para que o inquirido justifique a sua opinião relativa à resposta à pergunta anterior. Caso não tenha justificado, colocar a expressão N/J

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34. **24 - Nesta região existem meios para distribuir atum?** *
Escolher a opção abaixo consoante a resposta do inquirido. Pedir para que o inquirido justifique sempre a sua opinião, preenchendo a pergunta 24.1

Marcar apenas uma oval.

- ◯ Sim
- ◯ Não
- ◯ Não sei

35. **24.1 - Pode desenvolver a sua opinião acerca da resposta anterior?** *
Pedir sempre para que o inquirido justifique a sua opinião relativa à resposta à pergunta anterior. Caso não tenha justificado, colocar a expressão N/J

.....

.....

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.....

.....

Questionário: Pescadores

Somos trabalhadores da Biodinâmica, uma empresa que foi contratada no âmbito de um estudo sobre a pesca artesanal de atum em Moçambique.

A sua participação nesta entrevista é voluntária e confidencial. O seu nome e os seus contactos pessoais não ficarão registados e qualquer resposta dada por si no âmbito deste questionário como não será fornecida a elementos estranhos à equipa de trabalho. Gostaríamos de pedir a sua colaboração e a sua resposta honesta.

Fica ao seu critério a recusa em responder a qualquer questão que lhe seja colocada e de parar a entrevista em qualquer momento. A entrevista demorará cerca de 20 a 30 minutos. Agradecemos desde já a sua colaboração. Muito obrigado.

*Obrigatório

Questionário preparado por Biodinâmica, S.A. para WWF Moçambique

1. **1 - Referência** *
   Inserir o número do inquérito, o qual tem que ser único

   .....

2. **31/07** *
   Inserir data de realização do Inquérito

   .....
   Exemplo: 15 de dezembro 2012

3. **3 - Local** *
   Inserir o local de realização do inquérito

   .....

4. **4.1 - Coordenadas GPS (X)** *
   Inserir as coordenadas GPS, coluna X do local onde o inquérito foi realizado

   .....

5. **4.2 - Coordenadas GPS (Y)** *
   Inserir as coordenadas GPS, Coluna Y do local onde o inquérito foi realizado

   .....

6. **5 - Entrevistador** *
   Inserir o primeiro e último nome do entrevistador

   .....

7. **6 - Idade** *
   Inserir a idade do inquirido

   .....

8. **7 - Género** *
   Escolher o género do inquirido
   Marcar apenas uma oval.

   - ◯ Masculino
   - ◯ Feminino

9. **8.1 - Qual o local onde nasceu (País)?** *
   Inserir o nome do País onde o inquirido nasceu

   .....

10. **8.2 - Qual o local onde nasceu (Província)?** *
    Inserir o nome da Província onde o inquirido nasceu

    .....

11. **8.3 - Qual o local onde nasceu (Distrito)?** *
    Inserir o nome do Distrito onde o inquirido nasceu

    .....

12. **8.4 - Qual o local onde nasceu (Comunidade)?** *
    Inserir o nome da Comunidade onde o inquirido nasceu

    .....

13. **9 - Há quanto temo vive nesta comunidade?** *
    Inserir o número de anos (em forma numérica) em que o inquirido vive na comunidade (se for meses, extrapolar para anos, ou seja 6 meses = 0,5)

    .....

14. **10 - Qual o seu local de trabalho?** *
    Colocar o nome da Aldeia ou Cidade onde o inquirido exerce a profissão

    .....

15. **11 - Qual a instituição ou organização onde exerce o seu trabalho?** *
    Inserir o nome da instituição ou organização onde o inquirido exerce o seu trabalho

    .....

16. **12 - Com quantas pessoas vive, contando consigo?** *
    Inserir o número de pessoas (valor numérico) com as quais o inquirido vive

    .....

17. **13 - Quais as actividades que você e as pessoas que vivem consigo geram dinheiro para a sua casa?** *
    Assinalar as opções em baixo (podem ser mais do que uma). É obrigatório o preenchimento das perguntas 13.1 e 13.2
    Marcar tudo o que for aplicável.

    - [ ] Pesca
    - [ ] Colecta de productos da machamba
    - [ ] Aquacultura
    - [ ] Venda de mariscos e peixe
    - [ ] Agricultura
    - [ ] Culturas de rendimento
    - [ ] Assalariado
    - [ ] Turismo
    - [ ] Actividades Económicas Informais
    - [ ] Outra: .....

18. **13.1 - Quantas das pessoas que vivem em sua casa contribuem para as actividades que gera dinheiro para a sua casa?** *
Assinalar o número de pessoas que vivem na casa do inquirido que contribuem para as actividades que geram dinheiro para a sua casa, com base nas opções escolhidas na pergunta 13. Se a pergunta não for aplicável escolher N/A na linha e coluna correspondente
Marcar apenas uma oval por linha.

	Mais 1 pessoa	Mais 2 pessoas	Mais 3 pessoas	Mais 4 pessoas	Mais 5 pessoas	Mais 6 pessoas	Mais 7 pessoas	Mais 8 pessoas	Mais 9 pessoas	Mais 10 pessoas	Mais de 10 pessoas	N/A
Pesca												
Colecta de productos da machamba												
Aquacultura												
Venda de mariscos e peixe												
Agricultura												
Culturas de rendimento												
Assalariado												
Turismo												
Actividades Económicas Informais												
Outra												
N/A												

19. **13.2 - Qual a ordem de importância das opções escolhidas anteriormente?** *
Assinalar a ordem de importância das opções escolhidas na pergunta 13
Marcar apenas uma oval por linha.

	1	2	3	4	5	6	7	8	9	10	N/A
Pesca											
Colecta de productos da machamba											
Aquacultura											
Venda de mariscos e peixe											
Agricultura											
Culturas de rendimento											
Assalariado											
Turismo											
Actividades Económicas Informais											
Outra											
N/A											

20. **14 - É pescador?** *
Seleccionar Sim ou Não consoante a resposta do inquirido
Marcar apenas uma oval.

- Sim
- Não

21. **14.1 - A que Associação ou entidade equivalente pertence?** *
Caso o inquirido tenha respondido Sim à pergunta 14 preencher o nome da Associação ou Entidade a que pertence. Se não pertencer a nenhuma Associação colocar a expressão N/A

.....

22. **15 - Qual o seu cargo/descrição das suas tarefas** *
Escolher na lista abaixo o cargo ou tarefas desempenhadas pelo Inquirido
Marcar apenas uma oval.

- ◯ Mestre da embarcação
- ◯ Tripulante (tempo inteiro)
- ◯ Tripulante (ocasional)
- ◯ N/A
- ◯ Outra: .....

23. **16. Que tipo de embarcação usa?** *
Assinalar as opções em baixo (podem ser mais do que uma). Se a pergunta não for aplicável colcoar a expressão N/A
Marcar tudo o que for aplicável.

- ☐ Bote
- ☐ Barco
- ☐ Dhow
- ☐ Jangada
- ☐ N/A
- ☐ Outra: .....

24. **17 - Qual o comprimento da sua embarcação?** *
Inserir o comprimento da embarcação em metros e em valor numérico. Se a pergunta não for aplicável colocar a expressão N/A

.....

25. **18 - Quantas pessoas, contando consigo, vão em média para a pesca?** *
Inserir o número de pessoas (em valor numérico) que vão em média para a pesca com o inquirido. Se a pergunta não for aplicável colocar a expressão N/A

.....

26. **19.1 - Quantos Homens possui a sua tripulação?** *
Colocar o número de Homens que o inquirido disser. Se a pergunta não for aplicável colocar a expressão N/A

.....

27. **19.2 - Quantas Mulheres possui a sua tripulação?** *
Colocar o número de Mulheres que o inquirido disser. Se a pergunta não for aplicável colocar a expressão N/A

.....

28. **20 - A pesca é a sua única fonte de trabalho?** *
Seleccionar Sim ou Não consoante a resposta do inquirido. Se responder Não, efectuar a pergunta 20.1. Se a pergunta não for aplicável colocar a expressão N/A
Marcar apenas uma oval.

- ◯ Sim
- ◯ Não
- ◯ N/A

29. **20.1 - Que outras fontes de rendimento possui para além da pesca?** *
Caso o inquirido tenha respondido Não à pergunta 21, dizer quais são as outras fontes de rendimento para além da pesca. Se a resposta tiver sido outra, colocar N/A

.....

30. **21 - Pesca atum?** *
Seleccionar Sim ou Não consoante a resposta do inquirido. Se responder Não, efectuar a pergunta 21.1. Se a pergunta não for aplicável colocar a expressão N/A
Marcar apenas uma oval.

- ◯ Sim
- ◯ Não
- ◯ N/A

31. **21.1 - Se não pesca atum, pode explicar porque razão não o faz?** *
Justificar porque razão não pesca atum. Se o inquirido não justifica colocar a expressão N/J

.....

.....

.....

.....

.....

32. **22 - Se pudesse pescaria atum?** *
Seleccionar Sim ou Não consoante a resposta do inquirido. Se a pergunta não for aplicável escolher a expressão N/A
Marcar apenas uma oval.

- ◯ Sim
- ◯ Não
- ◯ N/A

33. **23 - Quais são as espécies de atum frequentemente pescadas nesta área?** *
Mostrar as fotos e seleccionar as espécies da lista abaixo e escolher a opção. Escolher N/A se a pergunta não for aplicável
Marcar tudo o que for aplicável.

- ☐ Albacora (yellow-fin)
- ☐ Gaiado
- ☐ Patudo
- ☐ Merma
- ☐ N/A
- ☐ Outra: .....

34. **24 - A que distância da costa pesca o atum?** *
Escolher as opções da lista abaixo. Se a pergunta não for aplicável escolher a expressão N/A
Marcar tudo o que for aplicável.

- ☐ <3 mn
- ☐ 3-10 mn
- ☐ >10 mn
- ☐ N/A
- ☐ Outra: .....

35. **25 - Que quantidade de atum pesca normalmente? (escolher uma opção)** *
Se o inquirido pescar atum seleccionar de acordo com a matriz apresentada abaixo, ou seja, a unidade deve ser por semana, por mês ou por ano. Uniformizar sempre para Kg. Se a pergunta não for aplicável colocar N/A
Marcar apenas uma oval por linha.

	Por semana	Por mês	Por ano	N/A
Mais de 1 (Kg/ton)	◯	◯	◯	◯
1-5 (Kg/ton)	◯	◯	◯	◯
5-10 (Kg/ton)	◯	◯	◯	◯
> 10 (Kg/ton)	◯	◯	◯	◯
N/A	◯	◯	◯	◯

36. **26 - Que métodos usa?** *
Escolher as opções da lista abaixo. Se a pergunta não for aplicável escolher a expressão N/A
Marcar tudo o que for aplicável.

- [ ] Linha-de-mão
- [ ] Palangre
- [ ] Corrico
- [ ] Rede de cerco
- [ ] N/A
- [ ] Outra: .....

37. **27 - Qual é o número de horas por semana que ocupa a pescar?** *
Inserir o número de horas. Se a resposta tiver sido outra, colocar N/A

.....

38. **28 - Que processo de conservação do peixe utiliza?** *
Escolher as opções da lista abaixo. Se a pergunta não for aplicável escolher a expressão N/A
Marcar tudo o que for aplicável.

- [ ] Nenhum
- [ ] Sangramento
- [ ] Estripagem
- [ ] N/A
- [ ] Outra: .....

39. **29 - Na embarcação tem capacidade de conservar o peixe com frio?** *
Seleccionar Sim ou Não consoante a resposta do inquirido. Se seleccionar Sim ir para a pergunta 29.1. Se a pergunta não for aplicável escolher a expressão N/A
Marcar apenas uma oval.

- ◯ Sim
- ◯ Não
- ◯ N/A

40. **29.1 - Qual o método de conservação do peixe que utiliza?** *
Caso tenha respondido Sim à pergunta 29, escolher as opções da lista abaixo. Se a pergunta não for aplicável escolher a expressão N/A
Marcar tudo o que for aplicável.

- [ ] Blocos de gelo
- [ ] Pasta de gelo
- [ ] Congelador
- [ ] N/A
- [ ] Outra: .....

41. **30 - O atum que pesca é para?** *
Escolher as opções da lista abaixo. Se a pergunta não for aplicável escolher a expressão N/A
Marcar tudo o que for aplicável.

- [ ] Vender
- [ ] Para a sua família
- [ ] Ambas
- [ ] N/A
- [ ] Outra: .....

42. **30.1 - Se é vendido quem compra o atum?** *
Escolher as opções da lista abaixo. Se responder outra, indicar para quem vende. Se a pergunta não for aplicável escolher a expressão N/A
Marcar tudo o que for aplicável.

- [ ] Restaurantes
- [ ] Revendedores
- [ ] Mercado
- [ ] N/A
- [ ] Outra: .....

43. **31 - Qual o preço a que vende o Kg de atum (MZN)?**
Inserir sempre o valor em forma numérica em meticais. Caso o valor tenha sido dado em Dólares, converter para meticais à taxa do dia em que o inquérito foi realizado. Caso a pergunta não seja aplicável colocar a expressão N/A

.....

44. **32 - Qual a quantidade de atum que vende normalmente? (escolher uma opção)** *
Se o inquirido vender atum seleccionar de acordo com a matriz apresentada abaixo, ou seja, a unidade deve ser por semana, por mês ou por ano. Uniformizar sempre para Kg. Se a pergunta não for aplicável colocar N/A
Marcar apenas uma oval por linha.

	Por semana	Por mês	Por ano	N/A
Mais de 1 (Kg/ton)	◯	◯	◯	◯
1-5 (Kg/ton)	◯	◯	◯	◯
5-10 (Kg/ton)	◯	◯	◯	◯
> 10 (Kg/ton)	◯	◯	◯	◯
N/A	◯	◯	◯	◯

45. **33 - Com que regularidade é abordado pelas autoridades fiscalizadoras?** *
Seleccionar uma das opções consoante a resposta do inquirido. Se a pergunta não for aplicável escolher a expressão N/A
Marcar apenas uma oval.

- ◯ Nunca
- ◯ Raramente (1x por ano)
- ◯ Frequentemente (3 em 3 meses)
- ◯ Muito frequentemente (todos os meses)
- ◯ N/A
- ◯ Outra: .....

46. **34 - Pertence a alguma organização comunitária?** *
Seleccionar Sim ou Não consoante a resposta do inquirido. Se seleccionar Sim ir para a pergunta 34.1. Se a pergunta não for aplicável escolher a expressão N/A
Marcar apenas uma oval.

- ◯ Sim
- ◯ Não
- ◯ N/A

47. **34.1 - Qual a organização comunitária a que pertence?** *
Caso tenha respondido SIm à pergunta anterior, inserir o nome da organização comunitária a que pertence. Se tiver respondido Não ou N/A à pergunta anterior colocar a expressão N/A

.....

48. **35 - Está envolvido em algum grupo de pesca ou preservação da pesca?** *
Seleccionar Sim ou Não consoante a resposta do inquirido. Se seleccionar Sim ir para a pergunta 35.1. Se a pergunta não for aplicável escolher a expressão N/A
Marcar apenas uma oval.

- ◯ Sim
- ◯ Não
- ◯ N/A

49. **35.1 - Qual o grupo de pesca a que pertence?** *
Caso tenha respondido SIm à pergunta anterior, inserir o nome da organização comunitária a que pertence. Se tiver respondido Não ou N/A à pergunta anterior colocar a expressão N/A

.....

50. **36 - Envolve-se nas decisões sobre o uso e gestão dos recursos marinhos?** *
Seleccionar Sim ou Não consoante a resposta do inquirido. Se seleccionar Sim ir para a pergunta 36.1. Se a pergunta não for aplicável escolher a expressão N/A
Marcar apenas uma oval.

- ◯ Sim
- ◯ Não
- ◯ N/A

51. **36.1 - Se se envolve nas decisões sobre o uso e gestão dos recursos marinhos, de que modo?** *
Caso tenha respondido SIm à pergunta anterior, justificar. Se o inquirido não justificar inserir a expressão N/J

.....

Annex II – List of contacted stakeholders and interviews undertaken

Name of stakeholder	Role played in the sector	Location	Type of questionnaire	Interview undertaken	Date of interview
Governmental Institutions					
Instituto Nacional de Investigação Pesqueira (IIP)	Research, monitoring	Maputo	Institutions	Yes	19/07/13
Administração Nacional da Pescas	Management, enforcement	Maputo	Institutions	Yes	22/07/13
Direcção Nacional de Fiscalização da Pesca	Enforcement	Maputo	Institutions	No	
Instituto de Desenvolvimento de Pesca de Pequena Escala (IDPPE)	Monitoring, extension, development	Maputo	Institutions	NO	
Fundo de Fomento Pesqueiro (FFP)	Funding	Maputo	Institutions	Yes	08/07/13
Instituto Nacional de Inspecção do Pescado	Quality control	Maputo	Institutions	Yes	09/08/13
Porto de Pesca de Maputo	Processing, storage	Maputo	Institutions	Yes	23/07/13
Direcção Provincial de Pescas de Cabo Delgado	Monitoring, management	Pemba	Institutions	No	
Direcção Provincial de Pescas de Maputo	Monitoring, management	Maputo	Institutions	No	
Delegação Provincial do IIP de Maputo	Research, monitoring, management	Maputo	Institutions	No	
Delegação Provincial do IIP de Cabo Delgado	Research, monitoring	Pemba	Institutions	Yes	08/08/13
Escola de Pesca	Teaching, develpment	Matola	Institutions	Yes	24/07/13
CEPAM - MICOA	Research, monitoring	Pemba	Institutions	Yes	09/08/13
Universities					
Universidade Eduardo Mondlane (UEM)	Research	Maputo	Institutions	No	
UniLúrio	Research	Pemba	Institutions	Yes	08/08/13
NGOs					
WWF	Research, advocacy	Tanzania	Institutions	Yes	22/08/13
Centro Terra Viva (CTV)	Research, advocacy	Maputo	Institutions	No	
Private Sector					
	Fishing association	Maputo	Institutions	No	
Mar na Brasa	Restaurant	Maputo	Markets	No	
Waterfront	Restaurant	Maputo	Markets	No	

Name of stakeholder	Role played in the sector	Location	Type of questionnaire	Interview undertaken	Date of interview
Zambi	Restaurant	Maputo	Markets	Yes	21/07/13
Mercado do Peixe	Fish market	Maputo	Markets	Yes	21/07/13
Dock's	Restaurant	Maputo	Markets	Yes	21/07/13
Clube Marítimo	Restaurant	Maputo	Markets	Yes	21/07/13
Sagres	Restaurant	Maputo	Markets	No	
Raddisson Blue	Hotel	Maputo	Markets	No	
Hotel Polana	Hotel	Maputo	Markets	yes	19/07/13
Girassol	Hotel	Maputo	Markets	yes	30/07/13
Mar e Sol	Hotel	Katembe	Markets	Yes	30/07/13
Wilson's Wharf	Restaurant	Pemba	Markets	Yes	26/07/13
Clube Naútico	Restaurant	Pemba	Markets	No	
Procongel	Seafood trader	Maputo	Markets	Yes	10/07/13
Peixe da Mamã	Seafood trader	Matola	Markets	Yes	10/07/13
Armazém processamento pescas do Sul	Seafood trader	Maputo	Markets	yes	26/07/13
Porto de Pesca de Maputo	Seafood trader	Maputo	Markets	yes	23/07/13
Hotel Cardoso	Hotel	Maputo	Markets	Yes	30/07/13
Tchova-Thai Restaurant	Restaurant	Maputo	Markets	Yes	30/07/13
Porto de Pesca de Maputo	Seafood trader	Maputo	Markets	Yes	23/07/13
Pemba Beach Hotel	Hotel	Pemba	Markets	Yes	08/08/13
Peter´s Place	Restaurant	Pemba	Markets	Yes	08/08/13
Restaurante a Marisqueira(Nacala-Porto)	Restaurant	Nacala-Porto	Markets	Yes	02/08/79
Restaurante Sara (Ilha de Moçambique)	Restaurant	Ilha de Moçambique	Markets	Yes	29/07/13
Restaurante Jardim dos Mariscos	Restaurant	Maputo	Markets	Yes	21/07/13
International Cooperation Agencies					
NORAD	Funding, development	Maputo	Instuições	No	
AFD	Funding, development	Maputo	Instuições	No	
União Europeia	Funding, development	Maputo	Instuições	yes	31/07/13
Others					
Centros Comunitários de Pesca de Maputo	Local fishing centre	Maputo	Fishermen	Yes	04 to 31/07/2013
Centros Comunitários de Pesca de Pemba	Local fishing centre	Pemba	Fishermen	Yes	09 to 10/08/2013
Clube Naval de Maputo	Sport fishing	Maputo	Fishermen	No	

Name of stakeholder	Role played in the sector	Location	Type of questionnaire	Interview undertaken	Date of interview
Clube Marítimo	Sport fishing	Maputo	Fishermen	yes	08/08/13
Conselho Comunitário de Pesca de Ilha de Moçambique	Local fishing centre	Ilha de Moçambique	Fishermen	Yes	29/07/13
Conselho Comunitário de Pesca de Nacala Porto	Local fishing centre	Nacala-Porto	Fishermen	Yes	02/08/13
Conselho Comunitário de Pesca da Praia fernão Veloso	Local fishing centre	Praia Fernão Veloso	Fishermen	Yes	03/08/13

Annex III – Most relevant graphs and tables obtained by the statistical analysis

Annex III.1 – Outputs from the questionnaires to Institutions

N =11

N/A= Não Aplicável

Local de trabalho

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Maputo	7	63.6	63.6	63.6
	Pemba	4	36.4	36.4	100.0
	Total	11	100.0	100.0	

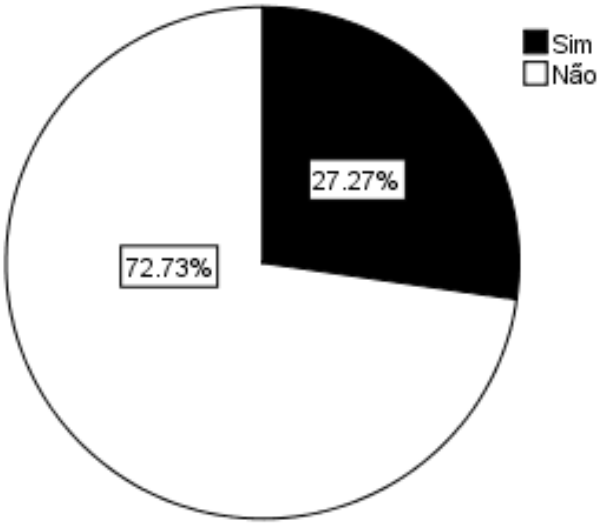
Instituição onde exerce o trabalho

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Administração Nacional Pesqueira	1	9.1	9.1	9.1
	Agência Francesa de Desenvolvimento	1	9.1	9.1	18.2
	CEPAM-MICOA	1	9.1	9.1	27.3
	Delegação da União Europeia em Moçambique	1	9.1	9.1	36.4

	Escola de Pesca	1	9.1	9.1	45.5
	Fundo de Fomento Pesqueiro	1	9.1	9.1	54.5
	IIP-Instituto de Investigação Pesqueira	2	18.2	18.2	72.7
	Instituto Nacional de Inspeccão do Pescado	1	9.1	9.1	81.8
	Universidade do Lúrio	1	9.1	9.1	90.9
	WWF Coastal East Africa Initiative	1	9.1	9.1	100.0
	Total	11	100.0	100.0	

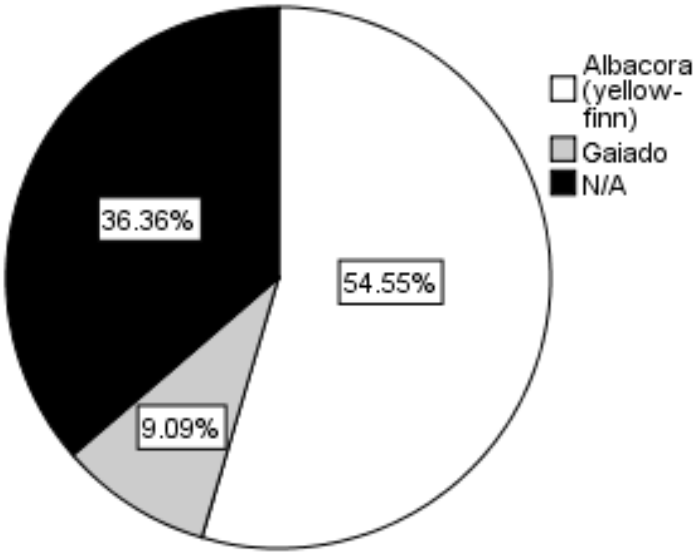
Sabe qual é o estado actual dos stocks de atum (<10 mn)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sim	3	27.3	27.3	27.3
	Não	8	72.7	72.7	100.0
	Total	11	100.0	100.0	


Sim
Não
27.27%
72.73%

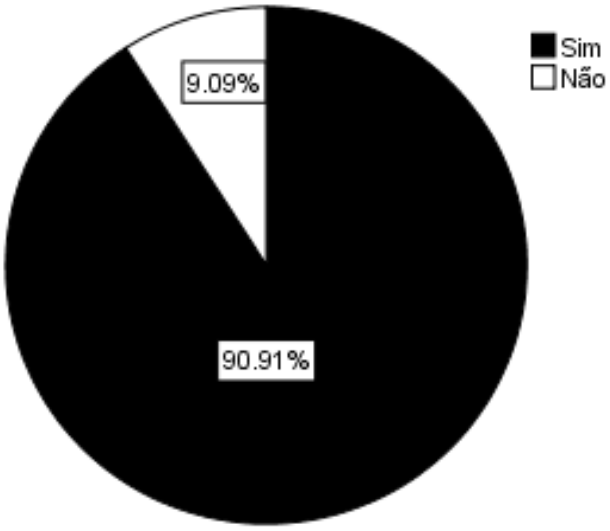
Quais as espécies que são potencialmente interessantes para serem exploradas pelo sector artesanal?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Albacora(yellow-finn)	6	54.5	54.5	54.5
	Gaiado	1	9.1	9.1	63.6
	N/A	4	36.4	36.4	100.0
	Total	11	100.0	100.0	



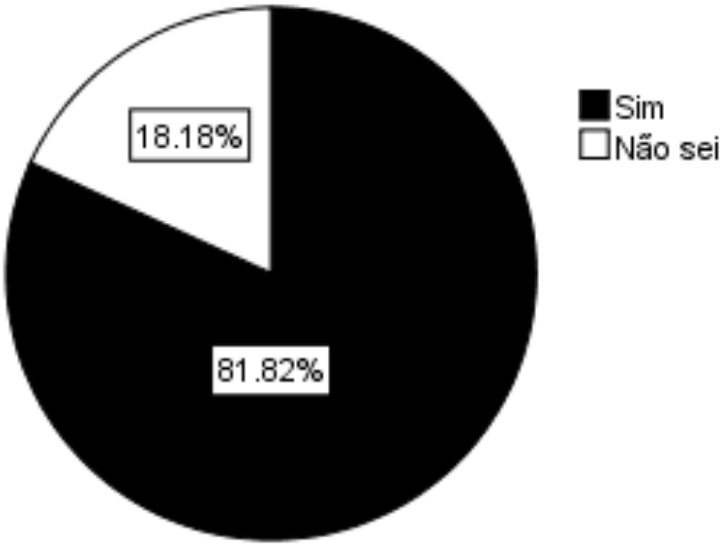
Acha que há potencialidade para o desenvolvimento da pesca artesanal de atum em Moçambique?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sim	10	90.9	90.9	90.9
	Não	1	9.1	9.1	100.0
	Total	11	100.0	100.0	



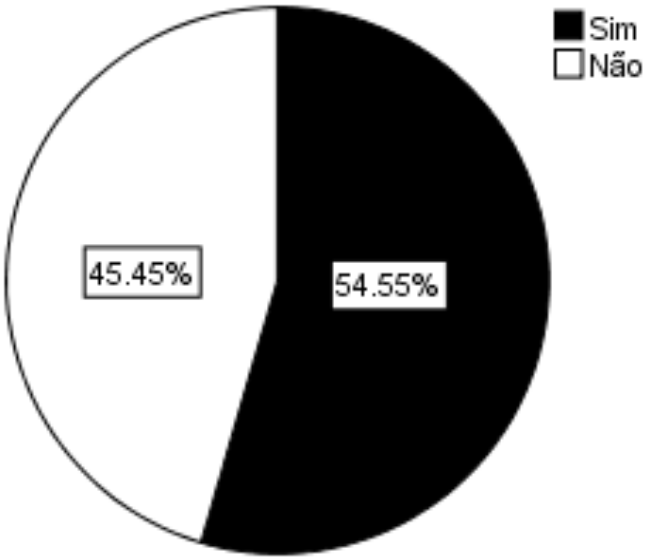
Pensa que o Ministro das Pescas planeia promover a pesca artesanal do atum?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sim	9	81.8	81.8	81.8
	Não sei	2	18.2	18.2	100.0
	Total	11	100.0	100.0	



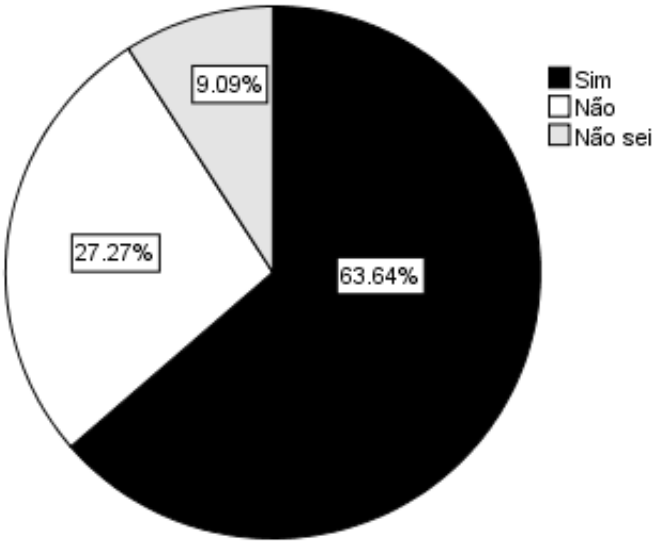
Acha que existe capacidade local para suportar a pesca artesanal de atum?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sim	6	54.5	54.5	54.5
	Não	5	45.5	45.5	100.0
	Total	11	100.0	100.0	



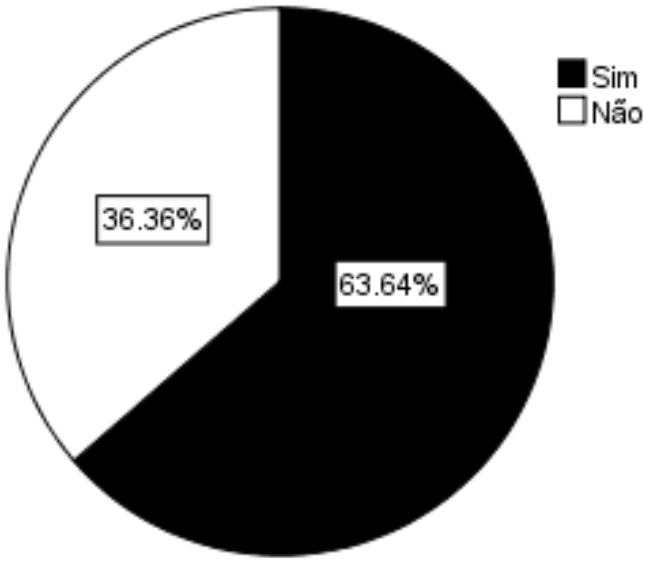
Acha que existe capacidade local para regular esta actividade?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sim	7	63.6	63.6	63.6
	Não	3	27.3	27.3	90.9
	Não sei	1	9.1	9.1	100.0
	Total	11	100.0	100.0	



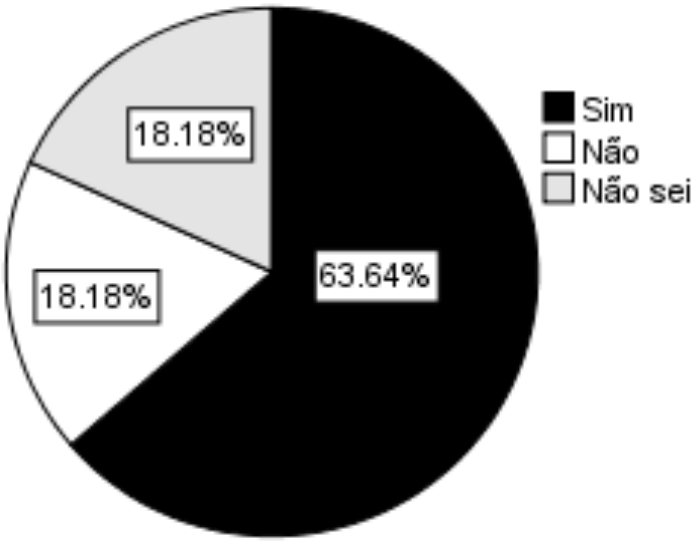
Acha que existe capacidade local para gerir a pesca artesanal de atum?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sim	7	63.6	63.6	63.6
	Não	4	36.4	36.4	100.0
	Total	11	100.0	100.0	



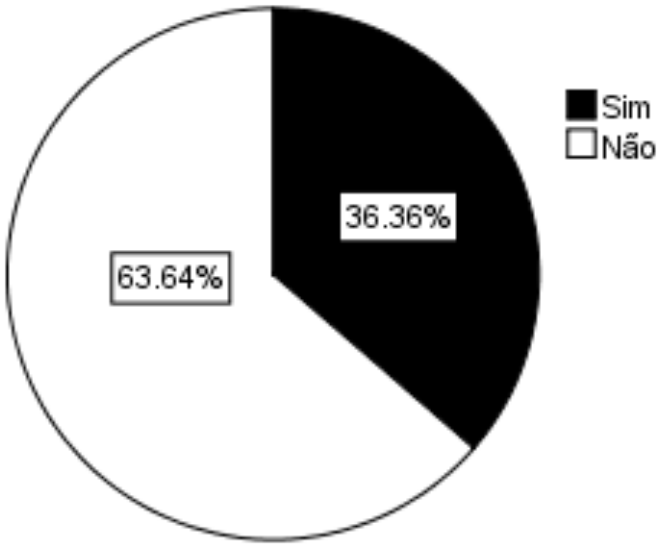
Acha que existe capacidade local para monitorar esta actividade?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sim	7	63.6	63.6	63.6
	Não	2	18.2	18.2	81.8
	Não sei	2	18.2	18.2	100.0
	Total	11	100.0	100.0	



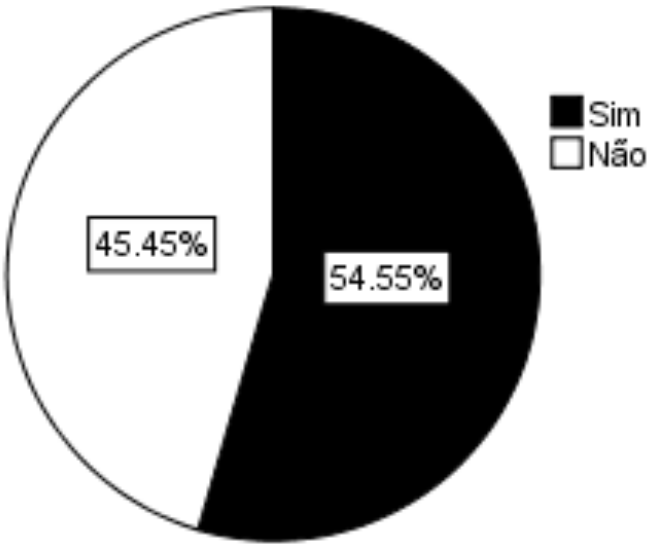
Existem nesta região meios e capacidade para armazenar atum?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sim	4	36.4	36.4	36.4
	Não	7	63.6	63.6	100.0
	Total	11	100.0	100.0	



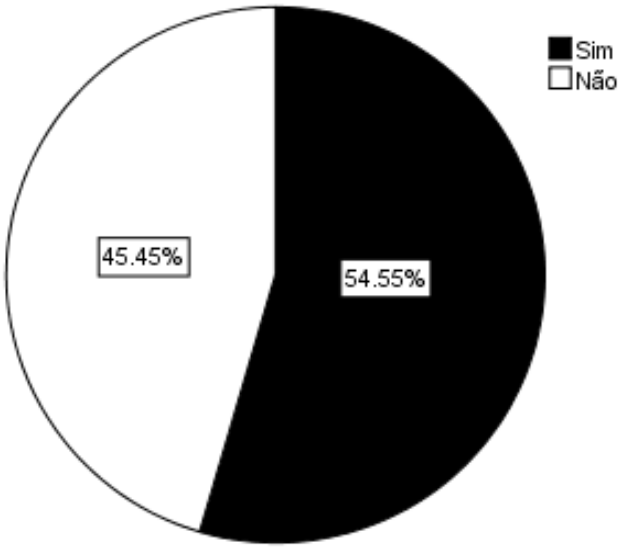
Existem nesta região meios para transportar o atum?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sim	6	54.5	54.5	54.5
	Não	5	45.5	45.5	100.0
	Total	11	100.0	100.0	



Existem nesta região meios de distribuição do atum ao consumidor final?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sim	6	54.5	54.5	54.5
	Não	5	45.5	45.5	100.0
	Total	11	100.0	100.0	



Annex III.2 –Outputs from the questionnaires to the Markets

N=19

N/A= Não se aplica

Qual o local onde nasceu (País)?

Nacionalidade dos inquiridos

Statistics

Nacionalidade

N	Valid	19
	Missing	0

Nacionalidade

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	África do Sul	1	5.3	5.3	5.3
	França	1	5.3	5.3	10.5
	Moçambique	13	68.4	68.4	78.9
	Portugal	2	10.5	10.5	89.5

	R.S.A	1	5.3	5.3	94.7
	Tailândia	1	5.3	5.3	100.0
	Total	19	100.0	100.0	

10-Qual o seu local de trabalho?

Local de trabalho

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Maputo	15	78.9	78.9	78.9
	Nacala/Ilha de Moçambique	2	10.5	10.5	89.5
	Pemba	2	10.5	10.5	100.0
	Total	19	100.0	100.0	

11 -- Qual a instituição ou organização onde exerce o seu trabalho?

Organização onde exerce o trabalho

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hotel Girassol	1	5.3	5.3	5.3
	Hotel Polana	1	5.3	5.3	10.5

Marisol/Catembe Gallery Hotel	1	5.3	5.3	15.8
Mercado do Peixe	1	5.3	5.3	21.1
Orbis Campo Di Mare	1	5.3	5.3	26.3
Peixe da Mamã	1	5.3	5.3	31.6
Pemba Beach Hotel	1	5.3	5.3	36.8
Pieter´s place	1	5.3	5.3	42.1
Porto de Pesca de Maputo	1	5.3	5.3	47.4
Procongel Ltda	1	5.3	5.3	52.6
Restaurante a Marisqueira	1	5.3	5.3	57.9
Restaurante Docks	1	5.3	5.3	63.2
Restaurante Fiama	1	5.3	5.3	68.4
Restaurante Marisqueira Jardim dos Maris	1	5.3	5.3	73.7
Restaurante Sara	1	5.3	5.3	78.9
Restaurante Zambi	1	5.3	5.3	84.2
Revendedor de peixe no mercado	1	5.3	5.3	89.5
Shanaia Restaurante	1	5.3	5.3	94.7
Tchova-Thai Cuisine restaurant	1	5.3	5.3	100.0
Total	19	100.0	100.0	

12 -- É pescador?

É pescador

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Não	19	100.0	100.0	100.0

13 -- Cargo/Descrição das suas tarefas

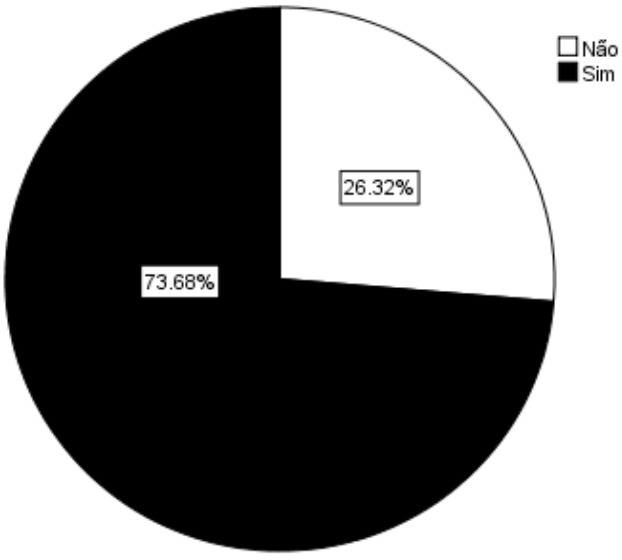
Cargo que ocupa

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Chefe de cozinha	1	5.3	5.3	5.3
	Cozinheiro	1	5.3	5.3	10.5
	Director (Armazém/Geral)	2	10.5	10.5	21.1
	Funcionário	3	15.8	15.8	36.8
	Gerente	3	15.8	15.8	52.6
	Gestor de stocks	2	10.5	10.5	63.2
	Proprietário	5	26.3	26.3	89.5
	Sócio-gerente	1	5.3	5.3	94.7
	Vendedor	1	5.3	5.3	100.0
	Total	19	100.0	100.0	

14 -- O atum fresco faz parte da sua lista de produtos /menu?

Atum faz parte da lista

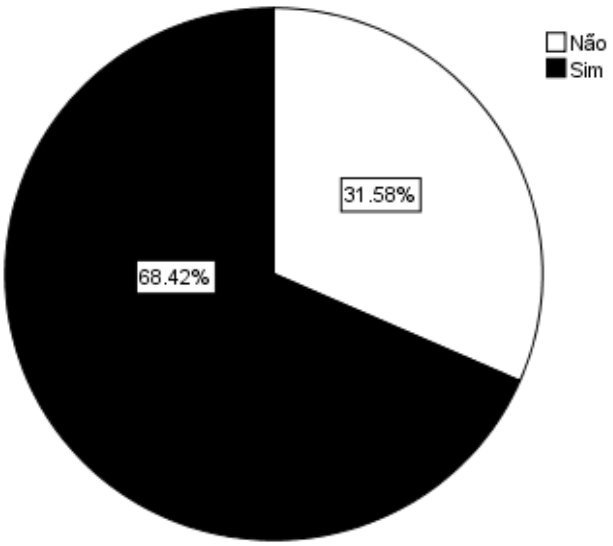
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Não	5	26.3	26.3	26.3
	Sim	14	73.7	73.7	100.0
	Total	19	100.0	100.0	



15- Pedem--lhe ou já lhe pediram no passado atum com frequência?

Pedir atum com frequência

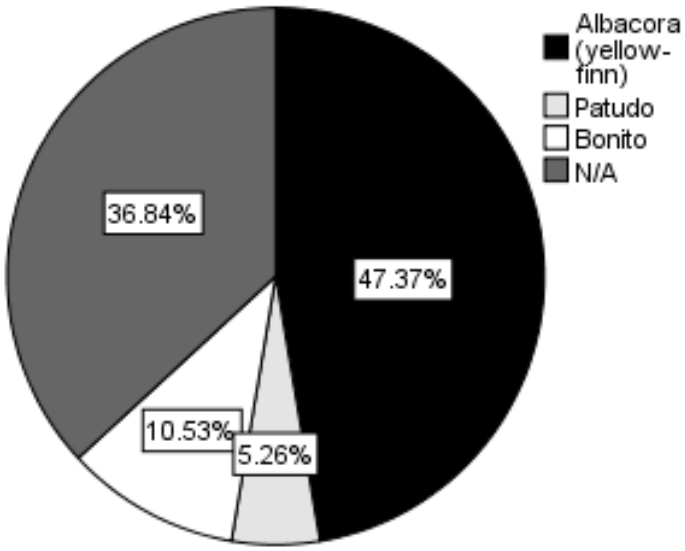
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Não	6	31.6	31.6	31.6
	Sim	13	68.4	68.4	100.0
	Total	19	100.0	100.0	



15.1 -- Se lhe pedem ou já pediram atum, quais as espécies?

Espécies pescadas

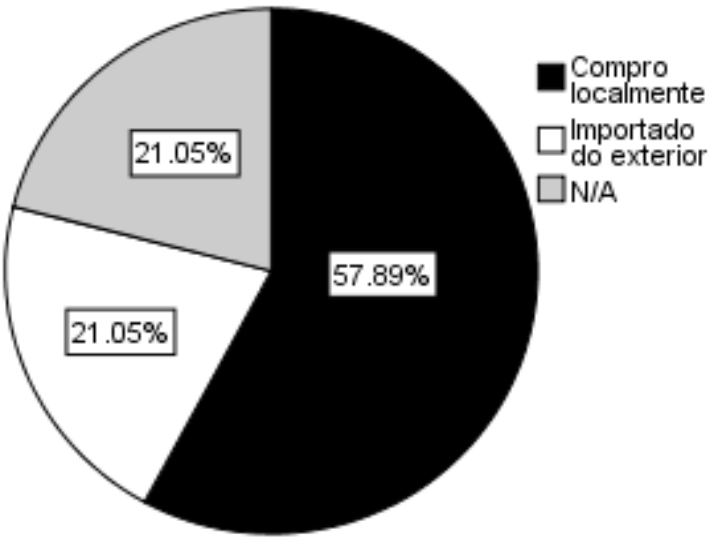
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Albacora(yellow-finn)	9	47.4	47.4	47.4
	Patudo	1	5.3	5.3	52.6
	Bonito	2	10.5	10.5	63.2
	N/A	7	36.8	36.8	100.0
	Total	19	100.0	100.0	



16 -- Onde obtém o atum?

Onde obtém o atum

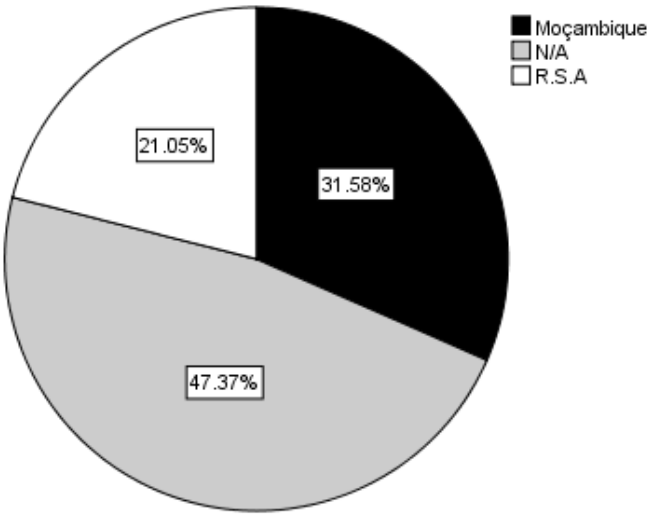
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Compro localmente	11	57.9	57.9	57.9
	Importado do exterior	4	21.1	21.1	78.9
	N/A	4	21.1	21.1	100.0
	Total	19	100.0	100.0	



16.1 -- Em que país?

País onde é obtido o atum

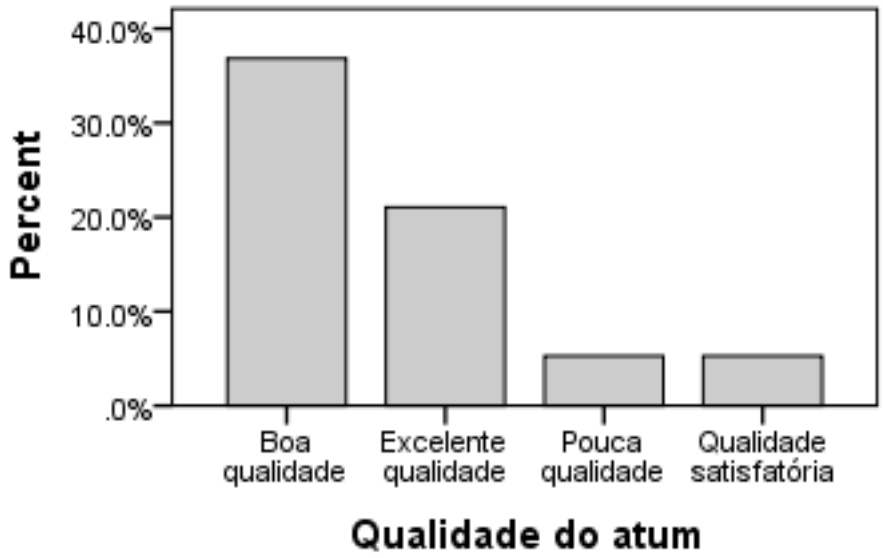
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Moçambique	6	31.6	31.6	31.6
	N/A	9	47.4	47.4	78.9
	R.S.A	4	21.1	21.1	100.0
	Total	19	100.0	100.0	



17 -- Se comprado localmente, como avalia a sua qualidade?

Qualidade do atum

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Boa qualidade	7	36.8	36.8	36.8
	Excelente qualidade	4	21.1	21.1	57.9
	N/A	6	31.6	31.6	89.5
	Pouca qualidade	1	5.3	5.3	94.7
	Qualidade satisfatória	1	5.3	5.3	100.0
	Total	19	100.0	100.0	



18 -- Quanto paga por kg de atum (MZN)?

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Preço do quilograma de atum em meticais	15	90.00	500.00	259.6667	148.44993
Valid N (listwise)	15				

Preço do quilograma de atum de acordo com o local de trabalho (Maputo n=12; Nacala n=1; Pemba n=2).

Nota, uma vez que em Nacala há dois inquéritos mas apenas um tem dados relativos ao preço não é possível obter o valor da média.

Local do inquérito vs Preço

Descriptives[a]

	Local de trabalho			Statistic	Std. Error
Preço do kilograma de atum em meticais	Maputo	Mean		261.2500	40.53676
		95% Confidence Interval for Mean	Lower Bound	172.0292	
			Upper Bound	350.4708	
		5% Trimmed Mean		260.2778	
		Median		210.0000	

		Variance		19718.750	
		Std. Deviation		140.42347	
		Minimum		90.00	
		Maximum		450.00	
		Range		360.00	
		Interquartile Range		286.25	
		Skewness		.247	.637
		Kurtosis		-1.749	1.232
	Pemba	Mean		130.0000	10.00000
		95% Confidence Interval for Mean	Lower Bound	2.9380	
			Upper Bound	257.0620	
		5% Trimmed Mean		.	
		Median		130.0000	
		Variance		200.000	
		Std. Deviation		14.14214	
		Minimum		120.00	
		Maximum		140.00	
		Range		20.00	
		Interquartile Range		.	
		Skewness		.	.
		Kurtosis		.	.

a. Preço do kilograma de atum em meticais is constant when Local de trabalho = Nacala/Ilha de Moçambique . It has been omitted.

Proveniência do atum vs Preço

N localmente =11

N Importado = 4 (todos em Maputo)

Descriptives[a]

	Onde obtém o atum			Statistic	Std. Error
Preço do kilograma de atum em meticais	Compro localmente	Mean		201.8182	38.58446
		95% Confidence Interval for Mean	Lower Bound	115.8467	
			Upper Bound	287.7897	
		5% Trimmed Mean		191.4646	
		Median		150.0000	
		Variance		16376.364	
		Std. Deviation		127.97017	
		Minimum		90.00	
		Maximum		500.00	
		Range		410.00	
		Interquartile Range		100.00	
		Skewness		1.648	.661
		Kurtosis		2.183	1.279
	Importado	Mean		418.7500	23.66212
		95% Confidence Interval for	Lower Bound	343.4466	

	Mean	Upper Bound	494.0534
	5% Trimmed Mean		420.8333
	Median		437.5000
	Variance		2239.583
	Std. Deviation		47.32424
	Minimum		350.00
	Maximum		450.00
	Range		100.00
	Interquartile Range		81.25
	Skewness		-1.659
	Kurtosis		2.615

		1.014
		2.619

19 -- Quantos kg de atum vende em média?

Statistics

Qtdadevendida

N	Valid	12
	Missing	7

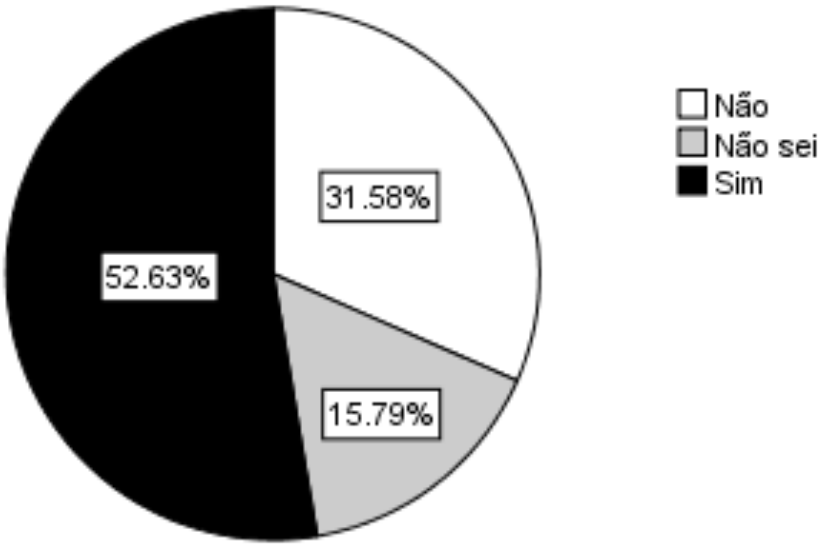
Quantidade média vendida

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1 Kg	1	5.3	8.3	8.3
	1-5 Kg	5	26.3	41.7	50.0
	>10 Kg	6	31.6	50.0	100.0
	Total	12	63.2	100.0	
Missing	System	7	36.8		
Total		19	100.0		

22 -- Nesta região existem meios para armazenar atum?

Existem nesta região meios e capacidade para armazenar atum?

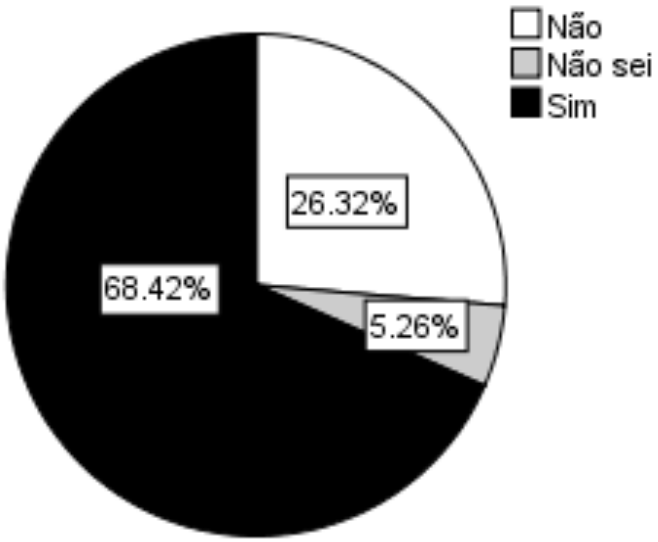
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Não	6	31.6	31.6	31.6
	Não sei	3	15.8	15.8	47.4
	Sim	10	52.6	52.6	100.0
	Total	19	100.0	100.0	



23 -- Nesta região existem meios para transportar atum?

Existem nesta região meios para transportar o atum?

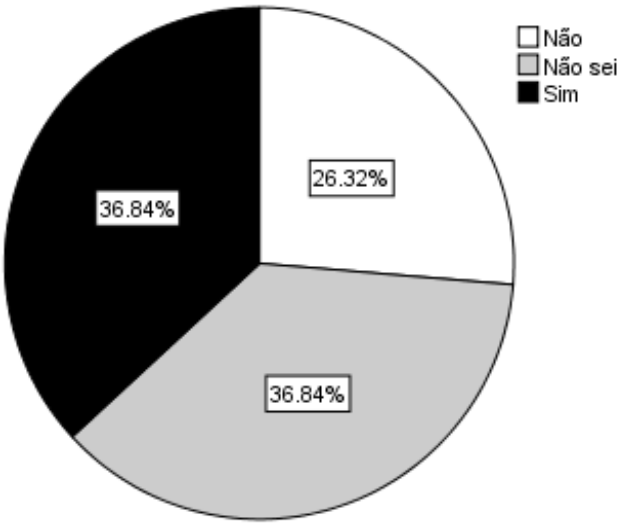
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Não	5	26.3	26.3	26.3
	Não sei	1	5.3	5.3	31.6
	Sim	13	68.4	68.4	100.0
	Total	19	100.0	100.0	



24 -- Nesta região existem meios para distribuir atum?

Existem nesta região meios de distribuição do atum?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Não	5	26.3	26.3	26.3
	Não sei	7	36.8	36.8	63.2
	Sim	7	36.8	36.8	100.0
	Total	19	100.0	100.0	



Annex III.3 – Outputs from the questionnaires to Fishermen

N=47

Visão global das principais variáveis socioeconómicas dos inquiridos

Nacionalidade

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Moçambique	47	100,0	100,0	100,0

Grupo etário

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	<20 anos	8	17,0	17,0	17,0
	20-30	18	38,3	38,3	55,3
	30-40	12	25,5	25,5	80,9
	40-50	7	14,9	14,9	95,7
	>60 anos	2	4,3	4,3	100,0
	Total	47	100,0	100,0	

Age group (years)	Frequency (N)	Percentage	Cumulative percentage
< 20	8	17,0	17,0
20-30	18	38,3	55,3
30-40	12	25,5	80,9
40-50	7	14,9	95,7
> 60	2	4,3	100,0
Total	47	100,0	

Local de trabalho

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Maputo	21	44,7	44,7	44,7
	Nacala/Ilha de Moçambique	8	17,0	17,0	61,7
	Pemba	18	38,3	38,3	100,0
	Total	47	100,0	100,0	

12 - Com quantas pessoas vive, contando consigo? (Agregado familiar)

Número de pessoas que habitam a casa

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	1	3	6,4	6,4	6,4
	2	1	2,1	2,1	8,5

3	4	8,5	8,5	17,0
4	7	14,9	14,9	31,9
5	8	17,0	17,0	48,9
6	5	10,6	10,6	59,6
7	3	6,4	6,4	66,0
8	6	12,8	12,8	78,7
9	1	2,1	2,1	80,9
10	3	6,4	6,4	87,2
11	3	6,4	6,4	93,6
15	1	2,1	2,1	95,7
18	2	4,3	4,3	100,0
Total	47	100,0	100,0	

	Número de pessoas que contribuem para o orçamento familiar						
Actividade	Mais de 1	Mais de 2	Mais de 3	Mais de 4	Mais de 5	Mais de 7	Mais de 10
Pesca	**29(61,7%)**	6(12,8%)	1(2,1%)	3(6,4%)		2(4,2%)	1(2,1%)
Machamba	1(2,1%)	1(2,1%)		1(2,1%)	1(2,1%)		
Aquacultura							
Venda de Mariscos e Peixe	6(12,8%)	2(4,3%)		1(2,1%)			
Agricultura		1(2,1%)		1(2,1%)			
Culturas de rendimento							

Salario	2(4,3%)						
Turismo							
Actividades Económicas Informais		1(2,1%)					
Outras		1(2,1%)					

Ordem de importância das actividades que contribuem para o orçamento familiar

Actividade	Primeira	Segunda	Terceira	Quarta	Quinta
Pesca	**42(89,4%)**				
Machamba		2(4,3%)		1(2,1%)	1(2,1%)
Aquacultura					
Venda de Mariscos e Peixe	5(10,6%)	6(12,8%)			
Agricultura					
Culturas de rendimento					
Salário		1(2,1%)	1(2,1%)		
Turismo					
Actividades Económicas Informais	2(4,3%)	8(17%)	1(2,1%)		
Outras	1(2,1%)				

Variável	Categoria	N	%
Pesca	Sim	47	100
Colecta de produtos da machamba	Sim	4	8,5
	Não	43	91,5
Aquacultura	Não	47	100
Venda de mariscos e peixe	Sim	11	23,4
	Não	36	76,6
Agricultura	Sim	2	4,3
	Não	45	95,7
Culturas de rendimento	Não	47	100
Assalariado	Sim	3	6,4
	Não	44	93,6
Turismo	Não	47	100
Actividades Económicas Informais	Sim	11	23,4
	Não	36	76,6
Outras	Sim	3	6,4
	Não	44	93,6

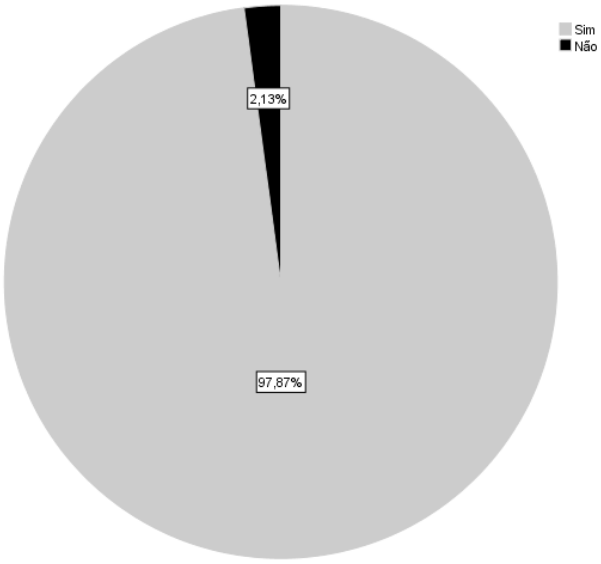
Breakdown da categoria “Outras”:

		Frequência	Percentagem	Percentagem Valida
Valida	Sem resposta	44	93.6	93.8
	Militar/Pedreiro	1	2.1	2.1
	Pintor/Pedreiro	1	2.1	2.1
	Mecânica	1	2.1	2.1
	Total	47	100.0	100.0

Questões relacionadas com a pesca

É pescador

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Sim	46	97,9	97,9	97,9
	Não	1	2,1	2,1	100,0
	Total	47	100,0	100,0	



Associação a que pertence

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Ahmiland	1	2,1	2,1	2,1
	ASOPIMO	2	4,3	4,3	6,4
	Associação de pescadores da Costa do Sol	11	23,4	23,4	29,8
	Conselho Comunirário de Pesca	5	10,6	10,6	40,4
	Hali Ya	1	2,1	2,1	42,6
	N/A	25	53,2	53,2	95,7
	Ussikisa	1	2,1	2,1	97,9
	Wiwanama	1	2,1	2,1	100,0
	Total	47	100,0	100,0	

Cargo que ocupa na tripulação da frota

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Marinheiro	2	4,3	4,3	4,3
	Maquinista	3	6,4	6,4	10,6
	Pescador	2	4,3	4,3	14,9

	Proprietário do barco	4	8,5	8,5	23,4
	Ajudante	2	4,3	4,3	27,7
	Tripulante	11	23,4	23,4	51,1
	Mestre da embarcação	18	38,3	38,3	89,4
	Mergulhador	3	6,4	6,4	95,7
	Armador	1	2,1	2,1	97,9
	Mecânico	1	2,1	2,1	100,0
	Total	47	100,0	100,0	

Tipo de embarcação que usa

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Barco	25	53,2	54,3	54,3
	Bote	5	10,6	10,9	65,2
	Chata	4	8,5	8,7	73,9
	Canoa	6	12,8	13,0	87,0
	Casquinha	4	8,5	8,7	95,7
	Barco à vela	1	2,1	2,2	97,8
	Barco a remo	1	2,1	2,2	100,0
	Total	46	97,9	100,0	
Ausente	Sistema	1	2,1		
Total		47	100,0		

Comprimento da sua embarcação

Estatísticas descritivas

	N	Mínimo	Máximo	Média	Desvio Padrão
Comprimento da embarcação em metros	47	2,50	17,00	7,1362	3,50014
N válido (de lista)	47				

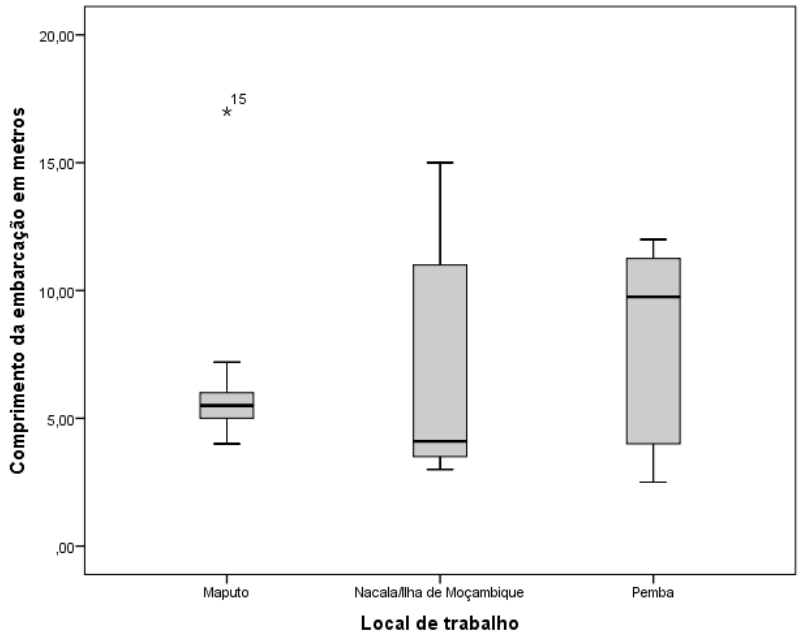
Particularização por zona

Descritivos

	Local de trabalho			Estatística	Erro Padrão
Comprimento da embarcação em metros	Maputo	Média		6,0714	,58453
		95% Intervalo de Confiança para Média	Limite inferior	4,8521	
			Limite superior	7,2907	
		5% da média aparada		5,6053	
		Mediana		5,5000	
		Variância		7,175	
		Desvio Padrão		2,67865	
		Mínimo		4,00	
		Máximo		17,00	

	Intervalo		13,00	
	Intervalo interquartil		1,30	
	Assimetria		3,661	,501
	Curtose		15,294	,972
Nacala/Ilha de Moçambique	Média		6,9000	1,66776
	95% Intervalo de Confiança para Média	Limite inferior	2,9564	
		Limite superior	10,8436	
	5% da média aparada		6,6667	
	Mediana		4,1000	
	Variância		22,251	
	Desvio Padrão		4,71714	
	Mínimo		3,00	
	Máximo		15,00	
	Intervalo		12,00	
	Intervalo interquartil		8,25	
	Assimetria		,920	,752
	Curtose		-,932	1,481
Pemba	Média		8,4833	,82319
	95% Intervalo de Confiança para Média	Limite inferior	6,7465	
		Limite superior	10,2201	
	5% da média aparada		8,6204	

Mediana	9,7500	
Variância	12,198	
Desvio Padrão	3,49251	
Mínimo	2,50	
Máximo	12,00	
Intervalo	9,50	
Intervalo interquartil	7,31	
Assimetria	-,650	,536
Curtose	-1,272	1,038



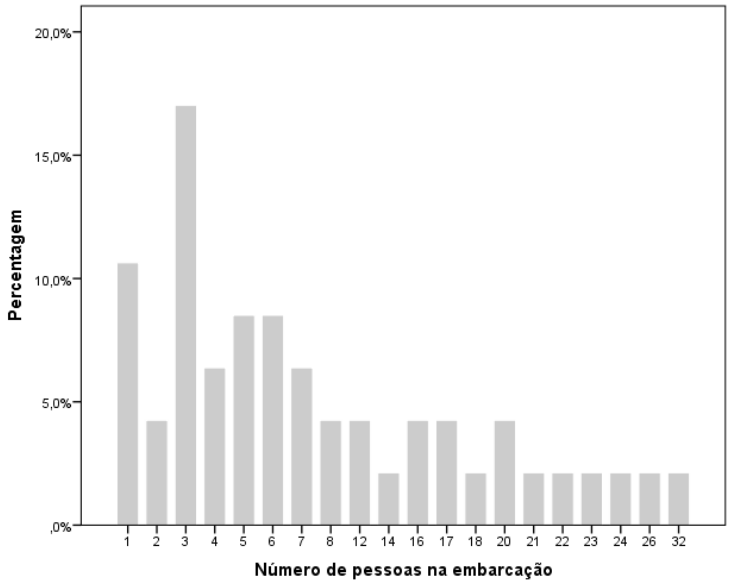
Número de pessoas, contando com o próprio, vão em média para a Pesca

Número de pessoas na embarcação

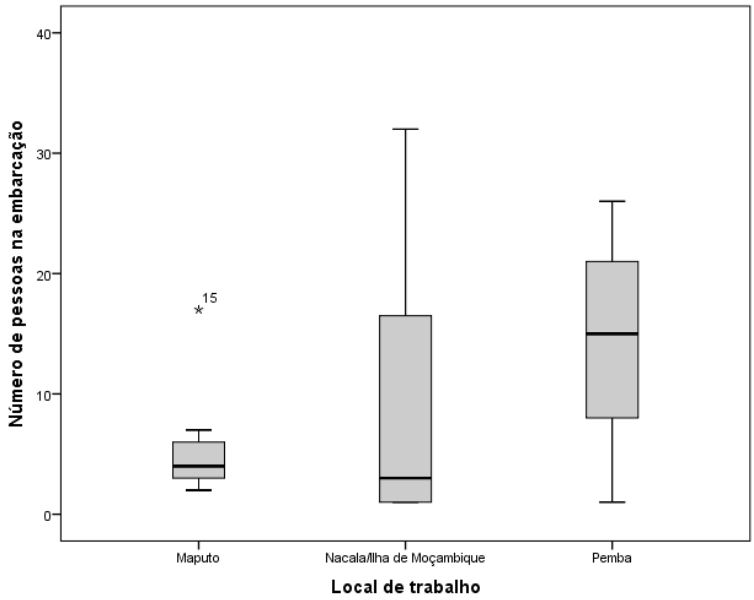
		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	1	5	10,6	10,6	10,6
	2	2	4,3	4,3	14,9
	3	8	17,0	17,0	31,9
	4	3	6,4	6,4	38,3
	5	4	8,5	8,5	46,8
	6	4	8,5	8,5	55,3
	7	3	6,4	6,4	61,7
	8	2	4,3	4,3	66,0
	12	2	4,3	4,3	70,2
	14	1	2,1	2,1	72,3
	16	2	4,3	4,3	76,6
	17	2	4,3	4,3	80,9
	18	1	2,1	2,1	83,0
	20	2	4,3	4,3	87,2
	21	1	2,1	2,1	89,4
	22	1	2,1	2,1	91,5
	23	1	2,1	2,1	93,6
	24	1	2,1	2,1	95,7
	26	1	2,1	2,1	97,9

32	1	2,1	2,1	100,0
Total	47	100,0	100,0	

Nos 47 Inquiridos



Particularização por zona



Homens da tripulação

Número de indivíduos do sexo masculino que fazem parte da tripulação

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	1	4	8,5	8,5	8,5
	2	3	6,4	6,4	14,9
	3	8	17,0	17,0	31,9
	4	3	6,4	6,4	38,3
	5	4	8,5	8,5	46,8
	6	5	10,6	10,6	57,4
	7	3	6,4	6,4	63,8
	8	1	2,1	2,1	66,0
	12	2	4,3	4,3	70,2
	16	2	4,3	4,3	74,5
	17	2	4,3	4,3	78,7
	18	1	2,1	2,1	80,9
	20	2	4,3	4,3	85,1
	21	1	2,1	2,1	87,2
	22	1	2,1	2,1	89,4
	23	1	2,1	2,1	91,5
	25	1	2,1	2,1	93,6
	26	1	2,1	2,1	95,7
	30	1	2,1	2,1	97,9

	32	1	2,1	2,1	100,0
	Total	47	100,0	100,0	

Mulheres na tripulação

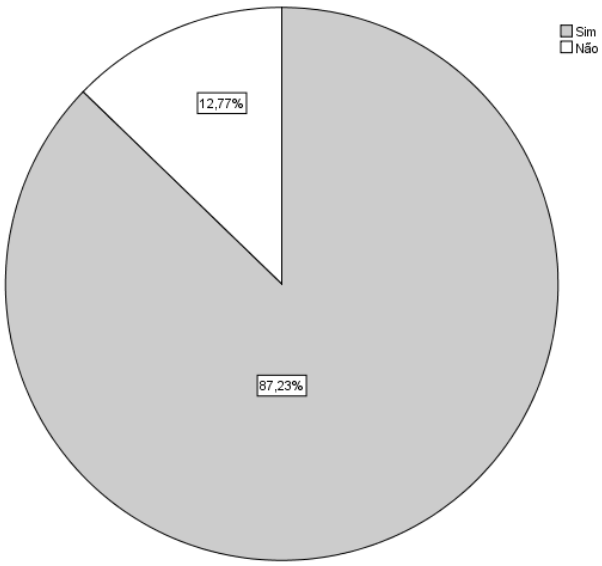
Número de indivíduos do sexo feminino que fazem parte da tripulação

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	0	47	100,0	100,0	100,0

A pesca como única fonte de trabalho

Pesca como única fonte de rendimento

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Sim	41	87,2	87,2	87,2
	Não	6	12,8	12,8	100,0
	Total	47	100,0	100,0	



Outras fontes de rendimento que possui para além da pesca

Fontes de rendimento

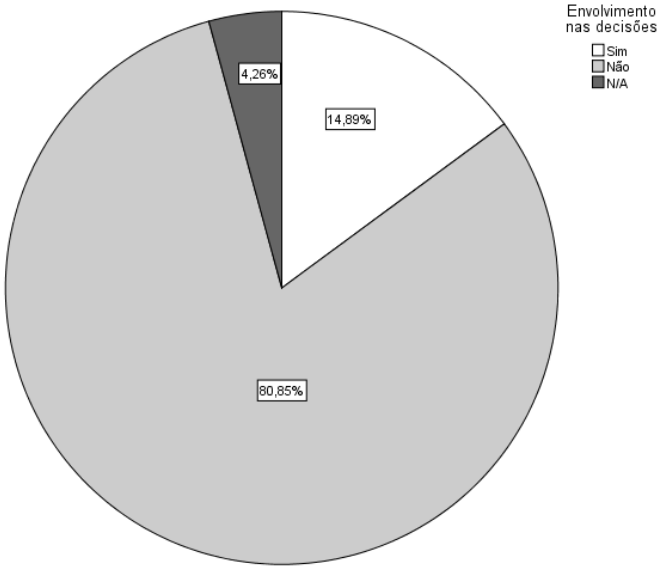
		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Agricultura	1	2,1	2,1	2,1

	Machamba	2	4,3	4,3	6,4
	Mecânica	1	2,1	2,1	8,5
	N/A	41	87,2	87,2	95,7
	Venda de	1	2,1	2,1	97,9
	Vendedor	1	2,1	2,1	100,0
	Total	47	100,0	100,0	

Questões relacionadas com o atum

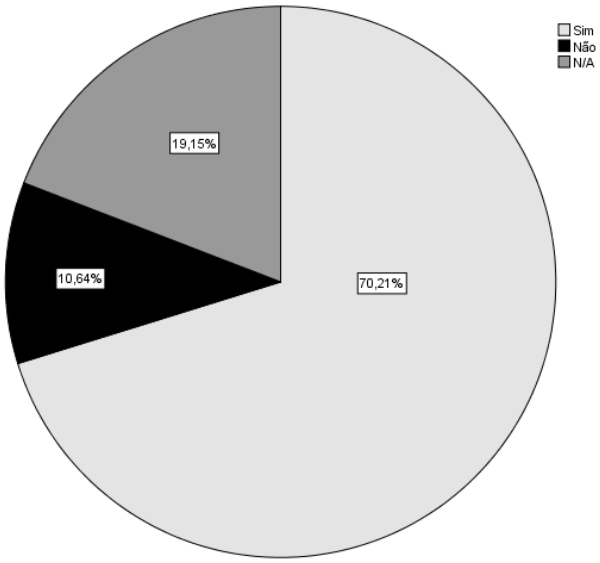
É pescador de atum

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Sim	24	51,1	51,1	51,1
	Não	22	46,8	46,8	97,9
	N/A	1	2,1	2,1	100,0
	Total	47	100,0	100,0	



Se pudesse pescaria atum

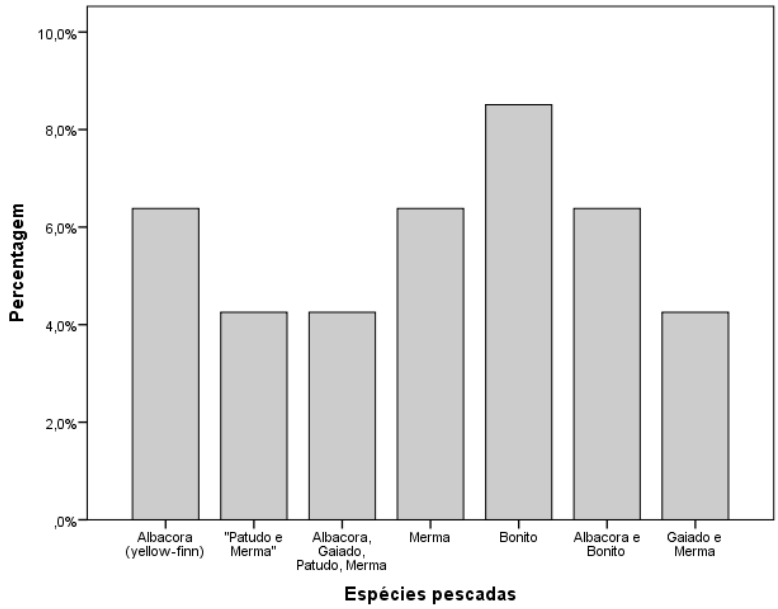
		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Sim	33	70,2	70,2	70,2
	Não	5	10,6	10,6	80,9
	N/A	9	19,1	19,1	100,0
	Total	47	100,0	100,0	



Espécies de atum frequentemente pescadas nesta área

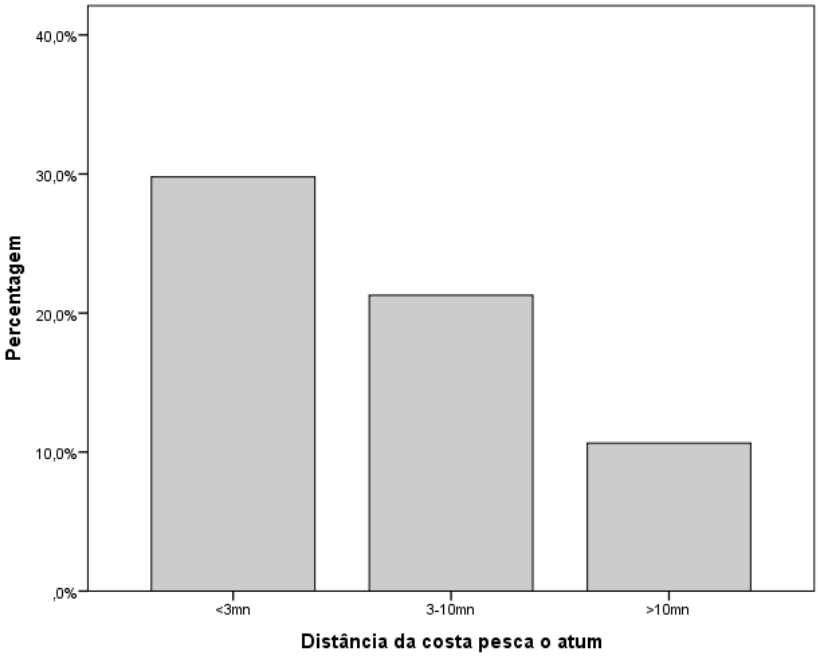
Espécies pescadas

	Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	28	59,6	59,6	59,6
Albacora(yellow-finn)	3	6,4	6,4	66,0
"Patudo e Merma"	2	4,3	4,3	70,2
Albacora, Gaiado, Patudo, Merma	2	4,3	4,3	74,5
Merma	3	6,4	6,4	80,9
Bonito	4	8,5	8,5	89,4
Albacora e Bonito	3	6,4	6,4	95,7
Gaiado e Merma	2	4,3	4,3	100,0
Total	47	100,0	100,0	



Distância da costa a que pesca o atum

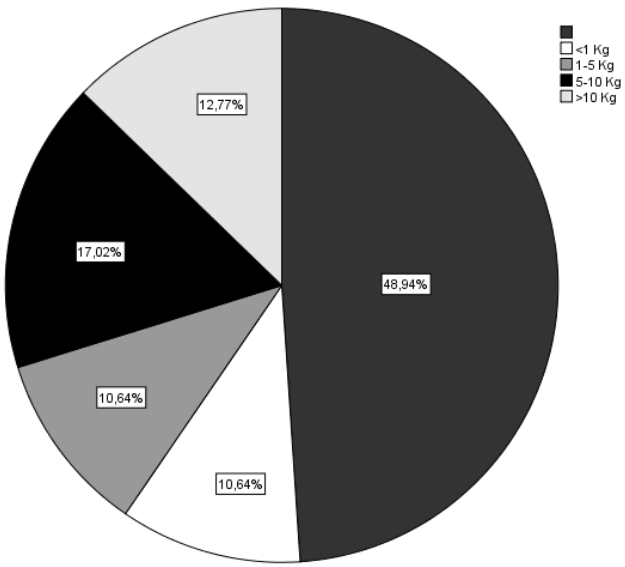
		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	<3mn	14	29,8	29,8	29,8
	3-10mn	10	21,3	21,3	51,1
	>10mn	5	10,6	10,6	61,7
	N/A	18	38,3	38,3	100,0
	Total	47	100,0	100,0	



Quantidade de atum pescado normalmente

Quantidade de atum pescada por semana

	Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	23	48,9	48,9	48,9
<1 Kg	5	10,6	10,6	59,6
1-5 Kg	5	10,6	10,6	70,2
5-10 Kg	8	17,0	17,0	87,2
>10 Kg	6	12,8	12,8	100,0
Total	47	100,0	100,0	



Métodos

Métodos usados na pesca

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Rede de arrasto	9	19,1	19,1	19,1
	Rede de Cerco	15	31,9	31,9	51,1
	Linha de mão	18	38,3	38,3	89,4
	Rede de emalhar	2	4,3	4,3	93,6
	Rede de anzol	1	2,1	2,1	95,7
	Malha e rede de arrasto	1	2,1	2,1	97,9
	N/A	1	2,1	2,1	100,0
	Total	47	100,0	100,0	

Número de horas por semana que ocupa a pescar nos 47 inquiridos:

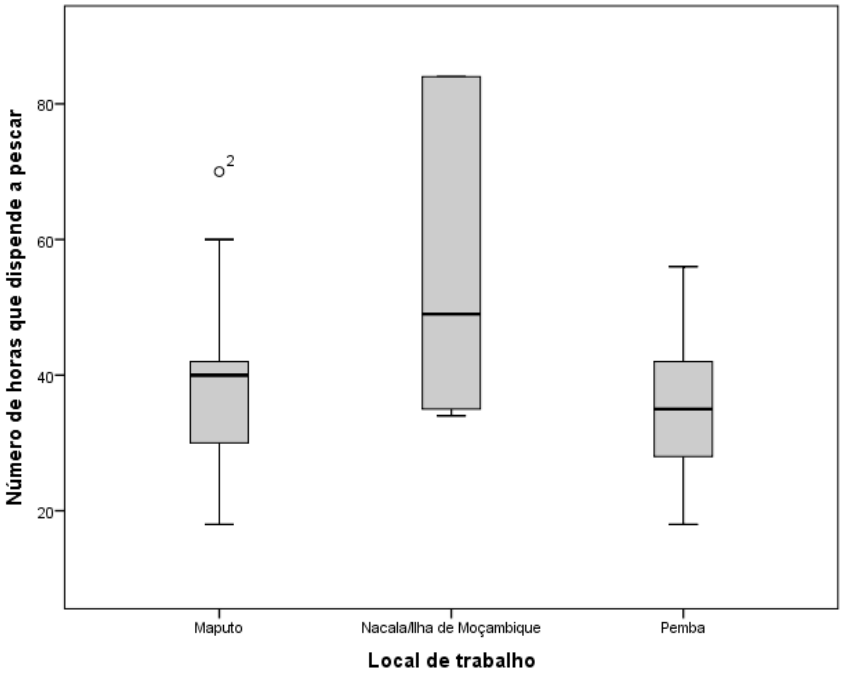
Estatísticas descritivas

	N	Mínimo	Máximo	Média	Desvio Padrão
Número de horas que despende a pescar	47	18	84	41,32	16,485
N válido (de lista)	47				

Descritivos

	Local de trabalho			Estatística	Erro Padrão
Número de horas que despende a pescar	Maputo	Média		39,57	3,066
		95% Intervalo de Confiança para Média	Limite inferior	33,18	
			Limite superior	45,97	
		5% da média aparada		39,10	
		Mediana		40,00	
		Variância		197,457	
		Desvio Padrão		14,052	
		Mínimo		18	
		Máximo		70	
		Intervalo		52	
		Intervalo interquartil		20	
		Assimetria		,407	,501
		Curtose		-,245	,972
	Nacala/Ilha de Moçambique	Média		56,75	8,250
		95% Intervalo de Confiança para Média	Limite inferior	37,24	
			Limite superior	76,26	
		5% da média aparada		56,50	
		Mediana		49,00	

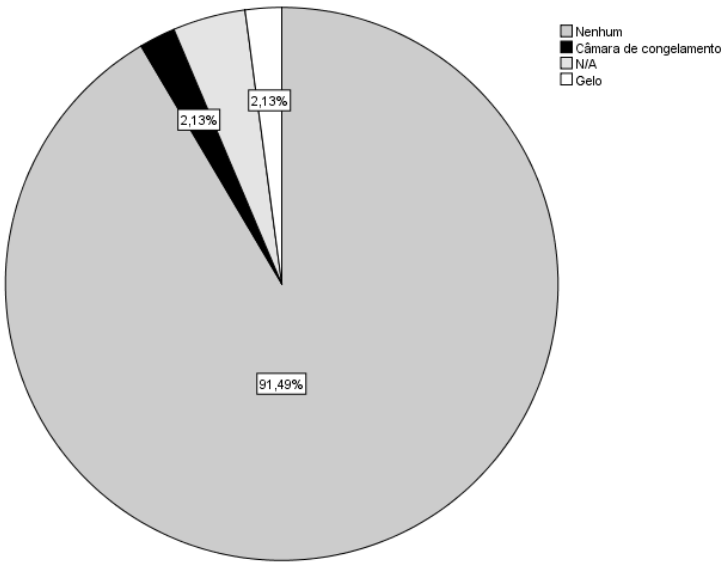
		Variância	544,500	
		Desvio Padrão	23,335	
		Mínimo	34	
		Máximo	84	
		Intervalo	50	
		Intervalo interquartil	49	
		Assimetria	,411	,752
		Curtose	-2,151	1,481
	Pemba	Média	36,50	2,773
		95% Intervalo de Confiança para Média — Limite inferior	30,65	
		95% Intervalo de Confiança para Média — Limite superior	42,35	
		5% da média aparada	36,44	
		Mediana	35,00	
		Variância	138,382	
		Desvio Padrão	11,764	
		Mínimo	18	
		Máximo	56	
		Intervalo	38	
		Intervalo interquartil	14	
		Assimetria	,265	,536
		Curtose	-,538	1,038


Número de horas que dispende a pescar
80
60
40
20
2
Maputo
Nacala/Ilha de Moçambique
Pemba
Local de trabalho

Processo de conservação do peixe que é utilizado

Processo de conservação do peixe

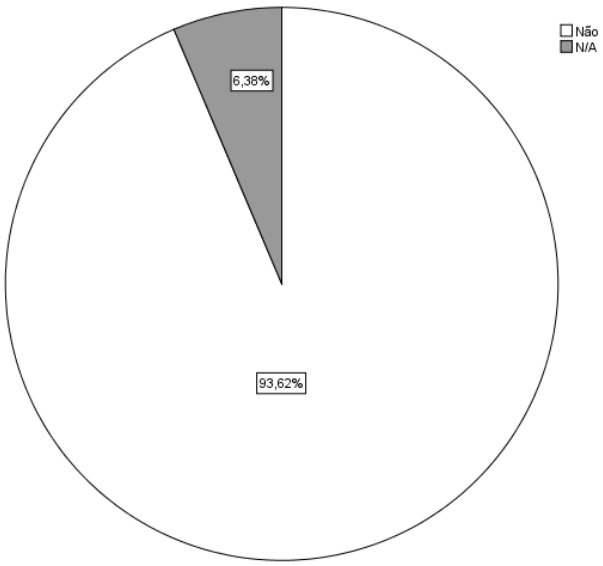
		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Nenhum	43	91,5	91,5	91,5
	Câmara de congelamento	1	2,1	2,1	93,6
	N/A	2	4,3	4,3	97,9
	Gelo	1	2,1	2,1	100,0
	Total	47	100,0	100,0	



Capacidade de conservar o peixe com frio na embarcação

Conservar com frio

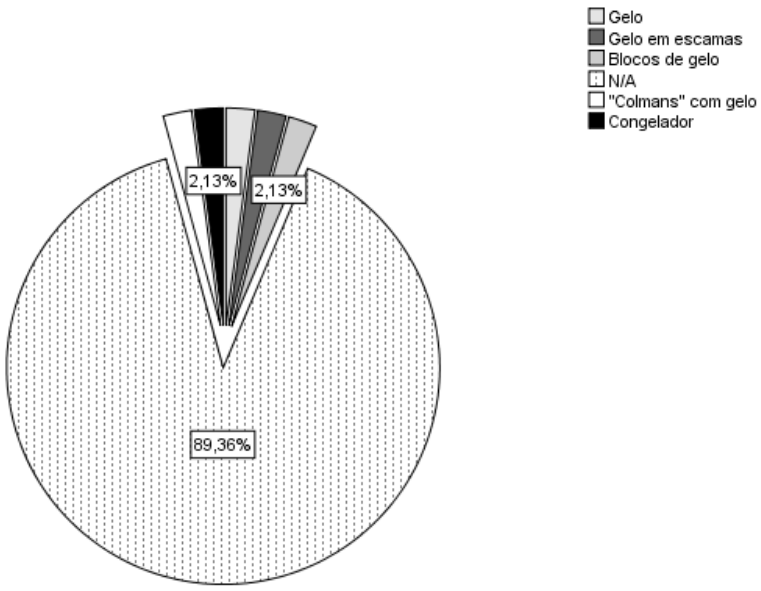
		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Não	44	93,6	93,6	93,6
	N/A	3	6,4	6,4	100,0
	Total	47	100,0	100,0	



Método de conservação do peixe que é utilizado

Método de conservação que utiliza

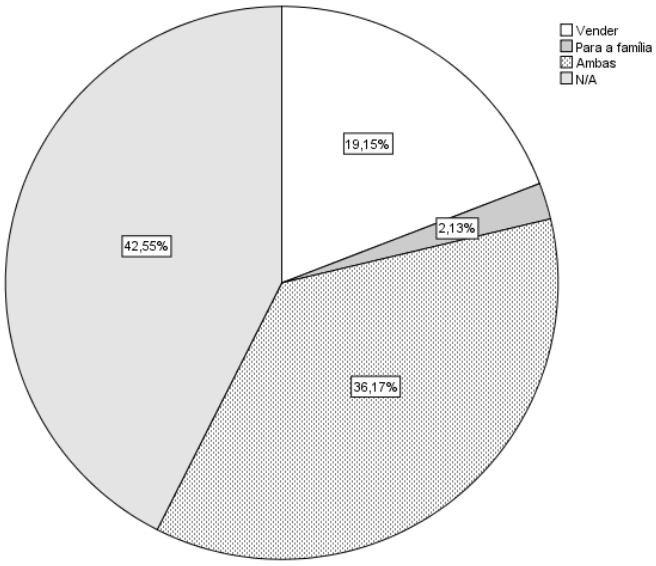
		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Gelo	1	2,1	2,1	2,1
	Gelo em escamas	1	2,1	2,1	4,3
	Blocos de gelo	1	2,1	2,1	6,4
	N/A	42	89,4	89,4	95,7
	"Colmans" com gelo	1	2,1	2,1	97,9
	Congelador	1	2,1	2,1	100,0
	Total	47	100,0	100,0	



Finalidade do atum que é pescado

Destino do atum

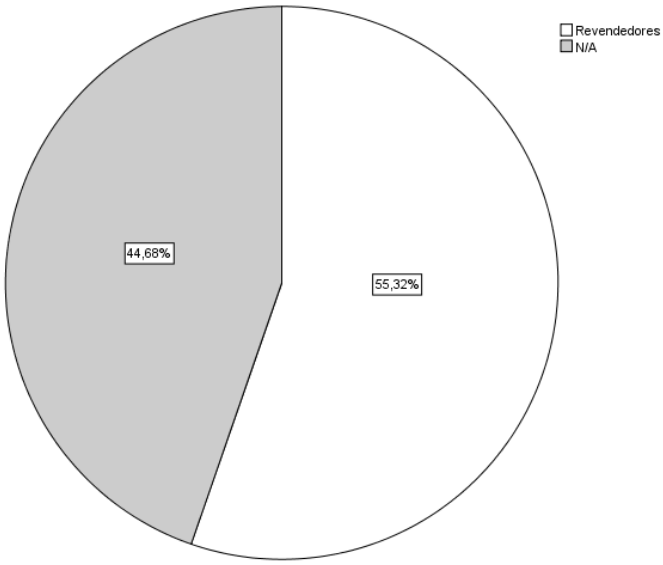
		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Vender	9	19,1	19,1	19,1
	Para a família	1	2,1	2,1	21,3
	Ambas	17	36,2	36,2	57,4
	N/A	20	42,6	42,6	100,0
	Total	47	100,0	100,0	



Se o atum é vendido, quem o compra

A quem é vendido o atum

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Revendedores	26	55,3	55,3	55,3
	N/A	21	44,7	44,7	100,0
	Total	47	100,0	100,0	



Qual o preço a que o Kg de atum é vendido(MZN)

Estatísticas descritivas

	N	Mínimo	Máximo	Média	Desvio Padrão
Preço do kilograma de atum em meticais	28	37,50	350,00	100,8429	69,89173
N válido (de lista)	28				

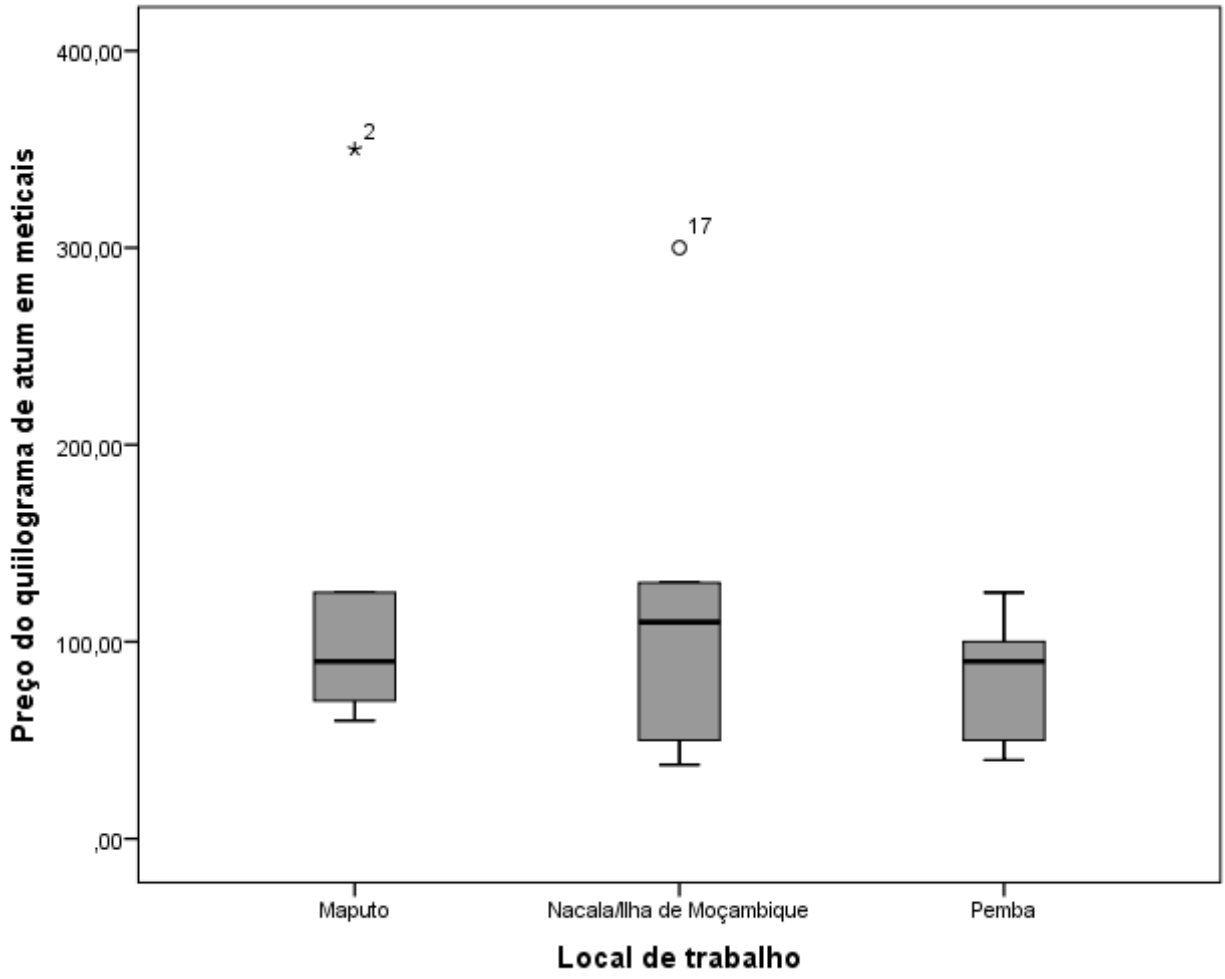
Particularização por zona

Descritivos

	Local de trabalho			Estatística	Erro Padrão
Preço do quilograma de atum em meticais	Maputo	Média		130,8333	44,84077
		95% Intervalo de Confiança para Média	Limite inferior	15,5665	
			Limite superior	246,1002	
		5% da média aparada		122,5926	
		Mediana		90,0000	
		Variância		12064,167	
		Desvio Padrão		109,83700	
		Mínimo		60,00	
		Máximo		350,00	
		Intervalo		290,00	

	Intervalo interquartil		113,75	
	Assimetria		2,216	,845
	Curtose		5,070	1,741
Nacala/Ilha de Moçambique	Média		122,9167	38,53795
	95% Intervalo de Confiança para Média	Limite inferior	23,8517	
		Limite superior	221,9816	
	5% da média aparada		117,8241	
	Mediana		110,0000	
	Variância		8911,042	
	Desvio Padrão		94,39831	
	Mínimo		37,50	
	Máximo		300,00	
	Intervalo		262,50	
	Intervalo interquartil		125,63	
	Assimetria		1,616	,845
	Curtose		3,140	1,741
Pemba	Média		81,3188	7,24450
	95% Intervalo de Confiança para Média	Limite inferior	65,8775	
		Limite superior	96,7600	
	5% da média aparada		81,1875	
	Mediana		90,0000	
	Variância		839,724	
	Desvio Padrão		28,97799	

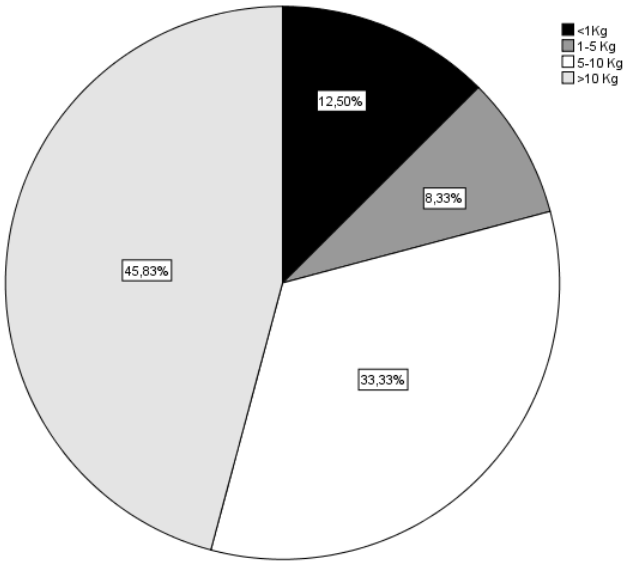
Mínimo	40,00	
Máximo	125,00	
Intervalo	85,00	
Intervalo interquartil	50,00	
Assimetria	-,086	,564
Curtose	-1,401	1,091



Qual a quantidade de atum que é vendida normalmente?

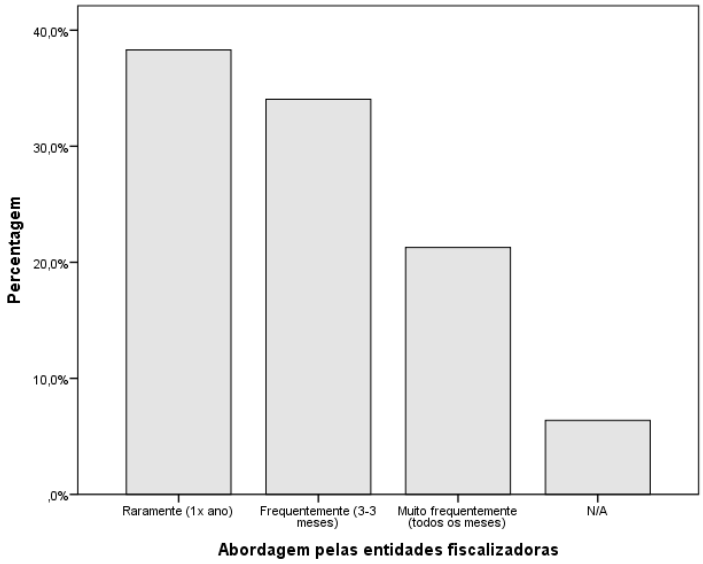
Quantidade de atum em kilogramas vendida por semana

		Frequência	Porcentagem	Porcentagem válida	Porcentagem acumulativa
Válido	<1Kg	3	6,4	12,5	12,5
	1-5 Kg	2	4,3	8,3	20,8
	5-10 Kg	8	17,0	33,3	54,2
	>10 Kg	11	23,4	45,8	100,0
	Total	24	51,1	100,0	
Ausente	Sistema	23	48,9		
Total		47	100,0		



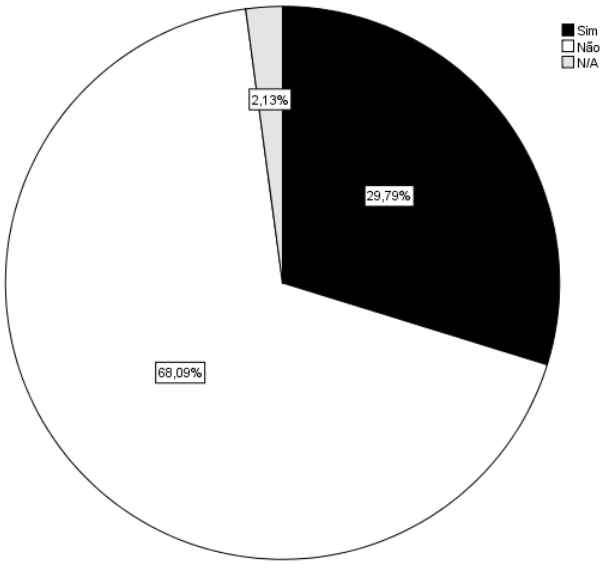
Abordagem pelas entidades fiscalizadoras

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Raramente (1x ano)	18	38,3	38,3	38,3
	Frequentemente (3-3 meses)	16	34,0	34,0	72,3
	Muito frequentemente (todos os meses)	10	21,3	21,3	93,6
	N/A	3	6,4	6,4	100,0
	Total	47	100,0	100,0	



Pertence a alguma organização comunitária

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Sim	14	29,8	29,8	29,8
	Não	32	68,1	68,1	97,9
	N/A	1	2,1	2,1	100,0
	Total	47	100,0	100,0	

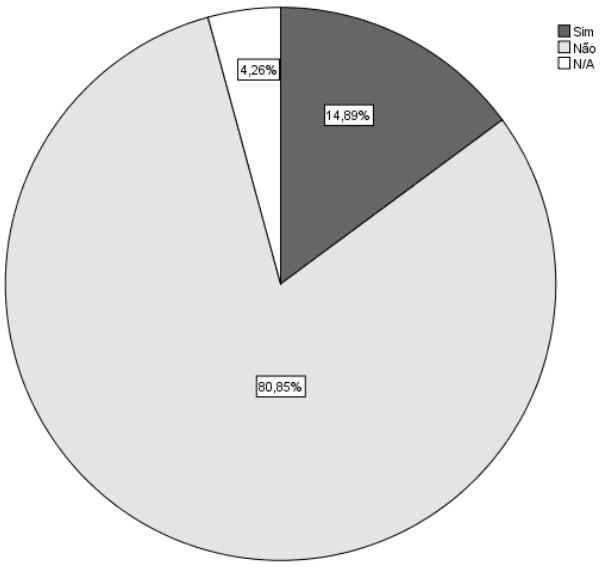


Qual a organização comunitária a que pertence

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	APIMO	1	2,1	2,1	2,1
	ASOPIMO	1	2,1	2,1	4,3
	Associação Pescadores Wiwanana	2	4,3	4,3	8,5
	Associação Wianana	1	2,1	2,1	10,6
	Circulo comunitario da poloa caniço	1	2,1	2,1	12,8
	Conselho Comunitário de Pesca da Costa do Sol	8	17,0	17,0	29,8
	Estique	1	2,1	2,1	31,9
	N/A	30	63,8	63,8	95,7
	Não Deixa Para Amanhã	1	2,1	2,1	97,9
	Poupança de Crédito Rotativo	1	2,1	2,1	100,0
	Total	47	100,0	100,0	

Envolvimento em algum grupo de pesca

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Sim	8	17,0	17,0	17,0
	Não	38	80,9	80,9	97,9
	N/A	1	2,1	2,1	100,0
	Total	47	100,0	100,0	

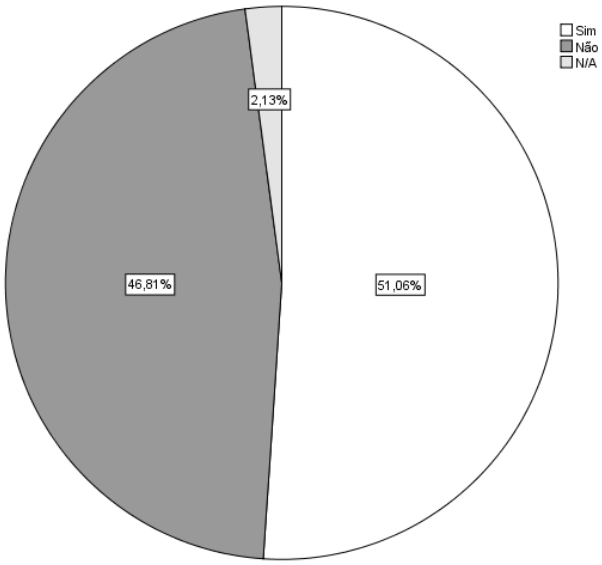


Grupo de pesca a que pertence

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	APIMO	1	2,1	2,1	2,1
	Conselho Comunitário de Pesca	4	8,5	8,5	10,6
	Grupo dos Pescadores da Costa do Sol	1	2,1	2,1	12,8
	N/A	37	78,7	78,7	91,5
	Tanzanianos	1	2,1	2,1	93,6
	Uphela	2	4,3	4,3	97,9
	Ussikisana	1	2,1	2,1	100,0
	Total	47	100,0	100,0	

Envolvimento nas decisões

		Frequência	Percentagem	Percentagem válida	Percentagem acumulativa
Válido	Sim	7	14,9	14,9	14,9
	Não	38	80,9	80,9	95,7
	N/A	2	4,3	4,3	100,0
	Total	47	100,0	100,0	



Annex IV – Summary of the answers that demanded a justification or an opinion

IV.1 – Institutions

13 - Do you know what is the current status of tuna stocks (<10 min)?

Eight of the institutions interviewed were not aware of the current stocks of tuna in Mozambique. Reference was made to poor data, although one mentioned an annual catch of about one million tonnes. The fact that tuna displays highly migratory behaviour within the region was highlighted as a contributing factor for the poor knowledge of stocks in the region, despite the continuous monitoring effort by the Indian Ocean Tuna Commission. A potential over-exploitation of the resource was also brought up.

14 - What are the species that are potentially interesting to be harvested by the artisanal fishery industry?

Of the institutions surveyed, Only four were not aware of the species being caught by the tuna artisanal sector in Mozambique. On the other hand, yellowfin, bigeye and skipjack were the most cited species, followed by kawakawa, which occurs in the northern region of the country.

15 - Do you think there is potential for the development of tuna fishing in Mozambique?

All institutions were in agreement that it is possible to develop a successful artisanal tuna fishery in Mozambique, as long as a sound feasibility study is conducted. Such study should thoroughly address issues such as species seasonality, fishing gear to be licensed and, above all, building capacity within the fishermen and promote associativism in order to channel governmental support. The need for improved fishing gear and boats was raised as a way to efficiently exploit the resource. The development of processing infrastructures was also highlighted as a pressing need.

Some institutions based in Maputo, noted that tuna is captured by the artisanal fishery, although not as the main target (accounting for only 2-3% of the reported catches between January-June). Only the industrial sector targets tunas directly. It was mentioned that large

schools of "coastal" tuna pass by in certain seasons and is thus accessible to the artisanal fishery (mainly skipjack) in addition to the "oceanic" tuna, which is accessible to the industrial fishery. The case of Cabo Delgado, where large catches of tuna have been reported, was emphasized, thus there is a large potential for the introduction of improved techniques, which would increase productivity, especially in Pemba and Nacala. Memba on the other hand, was rejected as no preservation conditions are in place. One interviewee declared that the tuna fishery in Mozambique is currently inefficient given the inadequate boats and fishing gear used.

16 - Do you think the Minister of Fisheries plans to promote artisanal tuna fishing?

When asked about the Ministry of Fisheries' plans with regards to the tuna artisanal fishery in Mozambique, nine of the respondents answered positively. They knew that a strategic plan was being drafted by the National Fisheries Administration – ADNAP (it was eventually approved by the Council of Ministers on 9 July 2013). Also a consultative meeting had been held recently on the issue. In terms of its integration within the region it was regarded as a must given its availability and the fact that it is currently under-exploited in Mozambique.

17 - Do you think there local is capacity to support artisanal tuna fishing?

The question about the local capacity to support the artisanal tuna fishery in Mozambique raised the cultural "dietary" issue, as tuna is not part of the typical dietary culture of Mozambicans. Therefore several challenges lie ahead. In addition, the technical aspects of the fishery (gear, boats, processing, transport, storing and trade) were also highlighted as difficulties. It was clearly identified by several respondents, the need for improvement of tuna fishing by promoting the best fishing techniques, conservation, processing, marketing, network, transport infrastructure and landing, as well as management stocks and market to purchase tuna. The need to build local capacity amongst the fishermen was again mentioned by several respondents. Attracting foreign investors was also proposed.

18 - What about the regulation of this activity?

Six institutions argued that regulating the tuna fishery in the country would not be problematic as the country would adopt the management principles put forward by the IOTC, not only because it is a common shared resource but also due to the fact that Mozambique has adhered to the IOTC as a full member. Additionally, the current fisheries legal framework is perceived as adequate and introducing the tuna fishery would not constitute a problem. However, there is a need to improve and strengthen the intervention of the community fisheries councils (CCPs).

19 - And with regard to the management of tuna fishing?

Six institutions consider being possible to manage the tuna fishery in Mozambique. For this new fishery management to be effective it is necessary to mobilize resources and means, including the licensing of fleets, fishing gear, mesh sizes and, in general, the implementation of the existing legal framework. It was mentioned that the sector would have to prepare human resources to manage tuna from licensing to the implementation of strategies for highly migratory resource that can cross country borders.

Currently, fisheries management has been done by the Fisheries Research Institute (IIP) in partnership with the Institute for Development of Small-scale Fisheries (IDPPE), which has counted with the help of local people.

20 - And regarding the monitoring of this activity?

According to 7 of the interviewees, a good monitoring of the tuna fishery will be possible to undertake. But this requires that this activity covers all the fish landing centres, and the basic legislation for artisanal fisheries is applied. One of the respondents questioned why aren't there consistent data on tuna fishing. That can occur because the sampling method used in artisanal fisheries (random sampling) is not effective for this fishery due to their specificities.

21 – Are there means and storage capacities to support tuna fishing in this region?

Most of the interviewees shared the opinion that Mozambique has no means for storing fish. There is consensus on the need to develop infrastructure for storage and processing tuna in the country. This is considered in the strategy for tuna fishery recently approved by the government. An assessment to determine the magnitude of the infrastructure to develop must be undertaken. One hypothesis may be associating with other related infrastructures (commercial ports or factory ships).

Some respondents reported that there are no conditions for storing in Mozambique, but there are in other countries of the region, such as South Africa, Seychelles, Mauritius, Madagascar and Kenya.

22- Are there any means to transport tuna in this region?

There were two types of opinions. Some of the respondents think that it is possible to transport tuna using the current means that are used to transport the shrimp and shellfish caught by artisanal means. On the other hand, others have argued that there is no means for transporting the tuna, and inclusively questioned the feasibility of having an efficient refrigeration system in Mozambique. The current cooling system is only efficient in the industrial and semi-industrial fishing. Additionally, road quality is poor and long distances separate consumers from the fishing centres. The bottom line consists in helping fishermen to develop and obtain resources to transport tuna efficiently. It was also said that currently it is possible that there are good means to transport tuna outside the country. These could be used if there was a requirement to transfer and process tuna in Mozambique.

23 – Are there any means to distribute the tuna to the final consumer in this region?

As in the previous question the opinions are divided. Everything must be done in what concerns the tuna distribution and marketing in the Mozambican market. However, the first step is to assess where the tuna will be sent to (if domestic or foreign markets), to determine

the adequate resources (e.g. refrigerated trucks and aircraft). Especially in the North it is not considered feasible at this stage, because the market is not prepared for commercializing fresh tuna. It is currently sold in the beaches.

IV.2 – Markets

14 – Is fresh tuna included in your products / menu?

Of the 19 interviewees, 14 said that tuna is part of the list of the products they sell or menus due to the following reasons: i) tuna is a product that is highly appreciated by the customers of restaurants and / or luxury hotels in Mozambique; ii) it is compared to the salmon because of its excellent quality and iii) it is included in the diet of the Asian community residing in Mozambique. On the other hand, some respondents find tuna a product with low abundance and low availability in markets and fish distributors and is not accessible to the majority of the community, which has a low income.

20 - What is your capacity to transport tuna?

According to the interviewees who transport tuna, in Mozambique refrigerated truck suppliers or private carriers who rent their trucks to suppliers undertake this activity.

21 - What is your capacity to store tuna?

About half of the respondents reported that they have means for preserving tuna that range from freezers, colmans and ice blocks.

22 – Are there means to store tuna in this region?

The interviewees who answered positively to this question refer the existence of refrigerated trucks in Mozambique, others from South Africa, fish processing warehouses both on land and on the islands and also the good status of refrigeration chambers that exist in the fish processing centres. They also report that Maputo Fishing Harbour is equipped with means to store and retain large amounts of fish and that they are in perfect working condition.

However, some are more sceptical and say that the few existing warehouses have no adequate cooling chambers, as many of them have malfunctions and there are no maintenance conditions. They also argue that there are private freezers but not for preserving tuna and also that there is a lack of knowledge on how to in store tuna. In the northern region of the country, some respondents do not find adequate the allocation of resources for tuna preserving as is sold directly in the fishing centres when it is still fresh.

23 – Are there means to transport tuna in this region?

Thirteen respondents claim to be able to transport tuna because there are refrigerated trucks in the region that belong to national and foreign carriers and that are prepared to transport tuna efficiently. They also stressed the efforts made by the Mozambican government to construct and improve existing roads.

Others consider that the lack of government support to privates for purchasing vehicles equipped for an efficient transport as one of the barriers they face to a profitable tuna commercialization.

24 – Are there means to distribute tuna in this region?

Some of the respondents believe in the existence of efficient means for transporting and distributing tuna, because some economic agents operating in the touristic sector need this product. Respondents who sell tuna also indicate that the distribution cycle to the final consumer relatively is short, since the starting and ending points are geographically close to each other.

On the other hand, some consider two other reasons to justify the low investment in modern means to support tuna distribution: i) the low quality of the national tuna to be used in the canning industry; ii) Mozambicans do not have a tuna consumption culture.

IV.3 – Fishermen

26 - What methods of fishing gears do you use?

From the analysis, the dominant fishing gears in the fishing centres of Maputo (Costa do Sol Sol and Clube Maritimo) are hand lines and purse seine nets, while the purse seine nets are more used in the northern region of the country (Cabo Delgado).

36 – Are you involved in decisions about the use and management of marine resources?

Regarding the capacity of being affiliated to fishing associations, it is clear that much of the coastal community of fishermen (39) is not connected to associations that make decisions regarding the management of marine resources. This situation differs in some fishing centres in the northern region of the country, where some fishermen are connected to some community associations, whose tasks range from the resolution of conflicts between fishermen to the selection of areas suitable for fishing.