

OVERVIEW OF NERITIC TUNA FISHERY IN MADAGASCAR

Marolova Antoine RASOLOMAMPIONONA
Tuna Fishery Manager, Madagascar Fisheries Department
Email : lovastat.mrhp@gmail.com Tel : +261 34 66 721 95

ABSTRACT

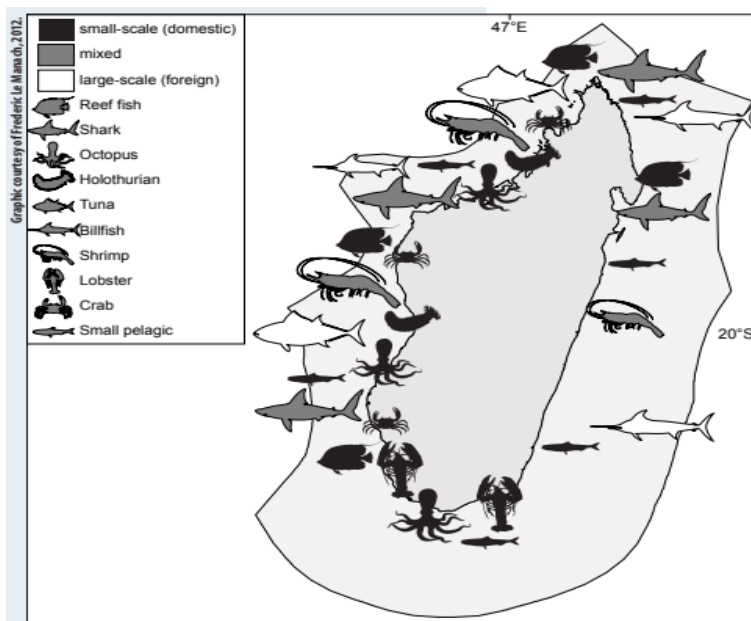
Neritic tunas are the main tuna species caught in Madagascar's coastal fishery. The big island has a total of 48,538 traditional canoes (ECN, 2013), less than 7 meters, used by small scale fishermen, all of which are non-motorized boats and which use very rudimentary and traditional fishing gear. Data collections on neritic tuna in Madagascar are very recent. The collection of data for coastal fishery was initiated in 2017 but only in landing sites sampled in the northern part of Madagascar, given the extent of the Malagasy coast. As a result of this data collection, the main species of neritic tunas, under IOTC mandate, caught in Madagascar are Narrow barred Spanish mackerel (*Scomberomorus commerson*) (46.29%), Kawakawa (*Euthynnus affinis*) (29.61%), Kingfish (*Scomberomorus guttatus*) (17.78%), Auxide (*Auxis thazard*) (5.81%) and Bonitou (*Auxis rochei*) (0.51%). Other types of neritic tuna such as Wahoo (*Acanthocybium solandri*), striped and bigeye bonito are also caught by our coastal fisheries. The main fishing gears are the gillnet (63.55%), the line (31.1%), the longline (4.35%) and the harpoon (1%). Our research aims initially to provide an overview of data on neritic tunas in Madagascar and subsequently to identify other potential fishing areas for neritic tuna fishery through literature reviews as well as traceability of the internal trade.

Keywords: Neritic tuna, small-scale fishery, statistics, Madagascar, coastal fishery

INTRODUCTION

Madagascar has an extensive fishing zone with a coastline of 5,600 km and a continental shelf of 117,000 km². Its exclusive economic zone (EEZ) extends over 1,140,000 km² and includes rich marine biodiversity and abundant and varied fishery resources. In Madagascar, commercial fishery is divided into three types depending on the power of the boat's engine: industrial fishing (characterized by the use of motorized boats with more than 50 horsepower (HP) of engine), artisanal fishing (recognized by the deployment of motorized boats with a engine power between 15 to 50 HP) and small-scale fishery (non-motorized or motorized boats less than 15 HP). Tuna and associated species are among the most important fishery resources in the Indian Ocean and the world. These fish are large migratory species that travel long distances, crossing international borders and exclusive economic zones, in search of prey and suitable temperatures. Annual tuna catches in Madagascar's EEZ are around 21,000 tonnes¹ (foreign and national fleet). They are mainly fished in the waters of the northwest and the Mozambique Channel beyond the territorial sea, from December to June. However, tuna and related species occur in almost all regions of Madagascar, as shown in Figure 1.

Figure 1: Distribution of major target species by type of fishery in Madagascar²



¹ Average from IOTC catch estimation

² Source: Le Manach, 2012 (WAVES on Natural capital accounting and management of the Malagasy fisheries Sector, 2012)

It is worth mentioning that although the passage of schools of tropical tuna on the west coast of Madagascar oscillates between the months of December and June, Madagascar does not currently have a fishing fleet to take advantage of this passage. These are all foreign fleets made up of purse seiners and longliners coming from Seychelles, Japan, the European Union, Korea among others. Madagascar's only fleet, made up of 05 longliners, operates in the East Coast. However, foreign fleets operate beyond 20 nautical miles from the coast.

More than 98% of neritic tuna in Madagascar are caught by the small-scale fishery in according to a comparison made in 2019 (table 1) even if the small-scale fishery catch data comes from a few landing sites.

TABLE 1 : TUNA CATCH BY TYPE OF FISHERY IN 2019				
SPECIES	INDUSTRIAL FISHERY	ARTISANAL FISHERY	SMALL-SCALE FISHERY	TOTAL (MT)
Tropical tuna (IOTC)	92,36	2,47	29,55	124,40
Neritic tuna (IOTC)	0	9,67	503	512,68
Swordfish	22,63	0,15	11,927	34,70
Striped marlin	3,71	0	0,595	4,31
Sailfish	1,11	0	0,644	1,75
Blue shark	25,09	2,83	0,314	28,23
Mixed tuna species	0	80,89	719,24	790,93
Others sharks	0	4,68	82,48	83,68
Others species	16,58	304,88	4388,41	4709,87
TOTAL	161,49	405,58	5736,17	6290,58

Thus, our research consists of providing a general overview of neritic tuna fishery carried out by the small-scale fishery segment in landing sites in the North of Madagascar, and subsequently identifying others potential areas for this fishery in the southern part.

MATERIALS AND METHODS

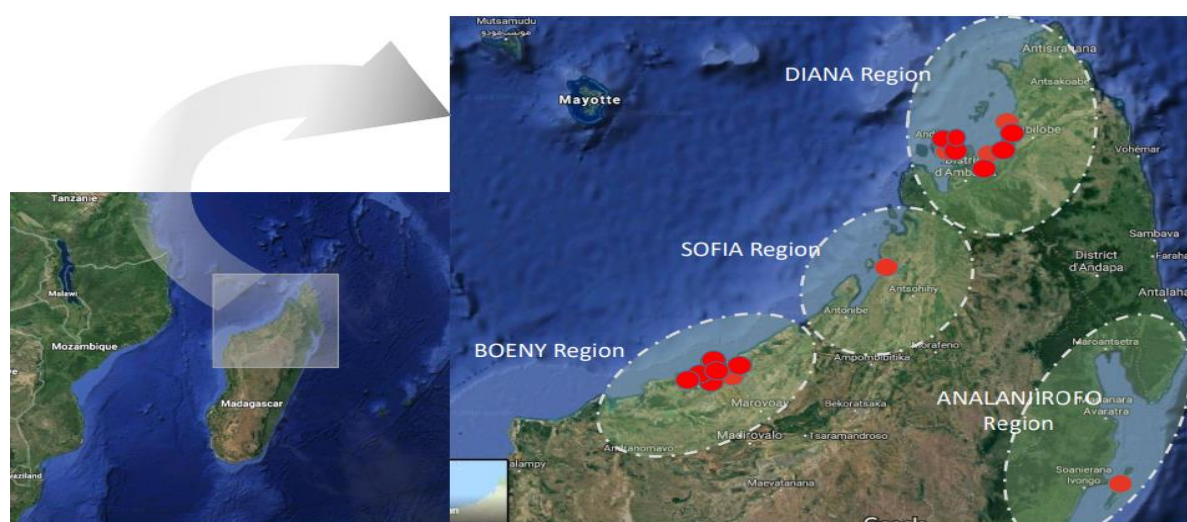
The data used in our research was the results of data collection carried out by the Antsiranana Tuna Statistical Unit (USTA)³ of Madagascar for the small-scale fishery between the years 2017 to 2019 in 18 landing sites, including 7 sites in Boeny region, 1 in Sofia region, 1 in Analanjirofo region and 9 others in Diana region (Figure 2). The number of sites chosen varies depending on the region. Data collection and processing during the Covid period (2020 and 2021) were affected due to health restrictions. In addition, the Antsiranana Tuna Statistical Unit was dissolved at the beginning of the year 2022. This is the justification for the choice of data between the years 2017 and 2019.

We will also analyze sport fishing catch data in Nosy Be (Diana region) in 2019, which is the main center of this activity on the Big Island.

Finally, based on internal marketing data at the national level and previous surveys which will justify the presence of tuna or not in other regions, particularly in the southern part of Madagascar, we will try to identify if possible other landing sites. potential who must be among the next elected to carry out the data collection on tuna fishery.

Data processing and graphs were done using Excel. The geographic maps were made by Google Earth.

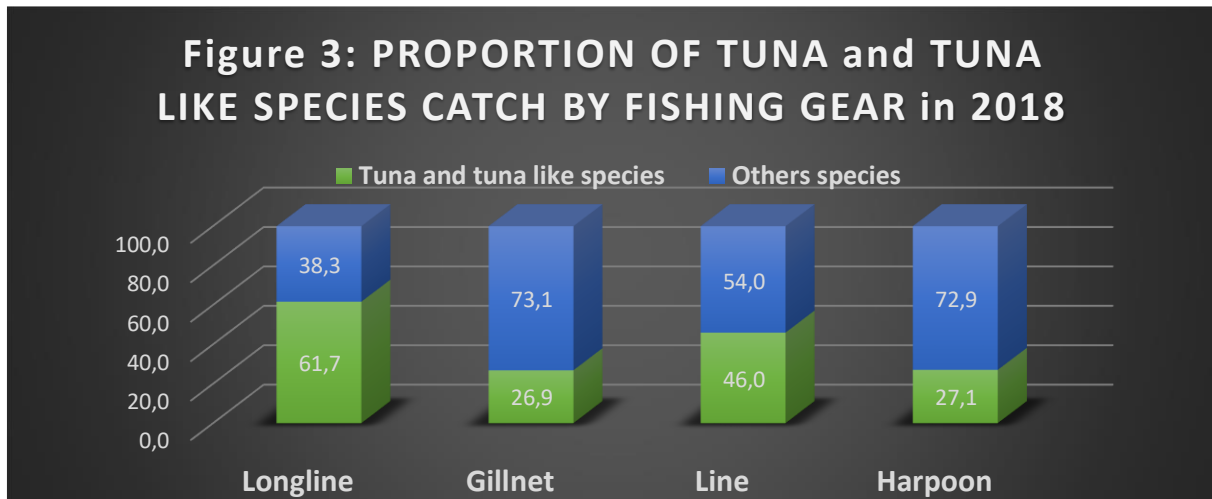
Figure 2: 18 sampled landing sites located in the North of Madagascar



³The USTA was an organization attached to the Ministry of Fisheries of Madagascar, responsible for ensuring data collection and statistics on tuna fishery, but which was dissolved in February 2022.

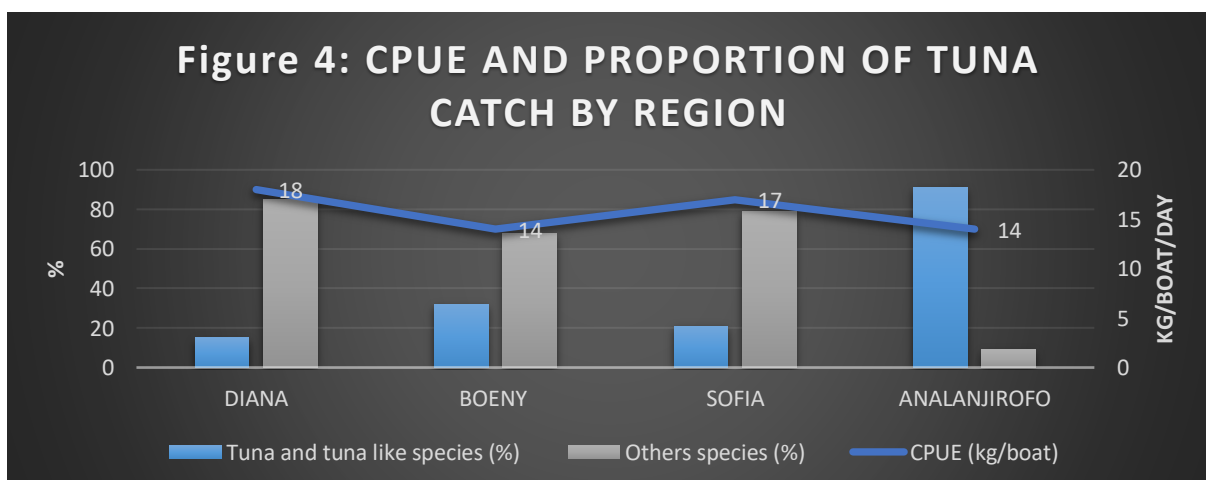
RESULTS AND DISCUSSIONS

The catch of tuna and related species averages around 23% of the total catches of the small-scale fishery in our study area. The longline is the fishing gear with the highest percentage of tuna catches with 61.7%, and the line 46% (Figure 3).

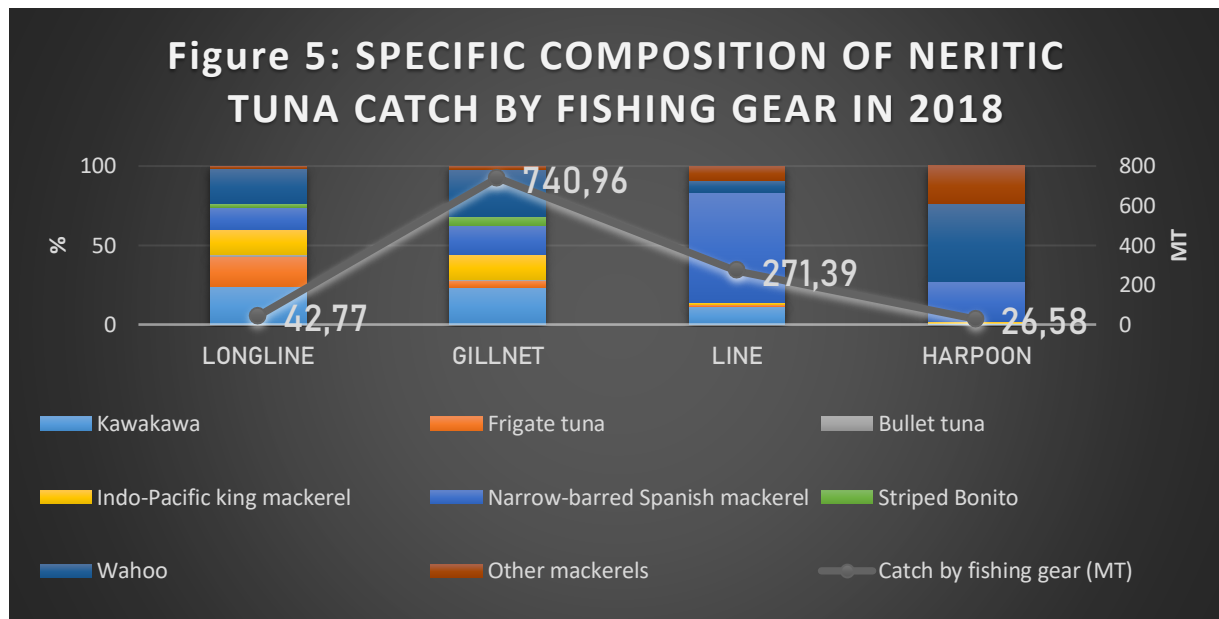


It should be noted that shark species are already included in the tuna and tuna like species in the table below. The gillnet is the fishing gear most used by small-scale fishermen, so in terms of quantity, it is also the one that catches the most tuna.

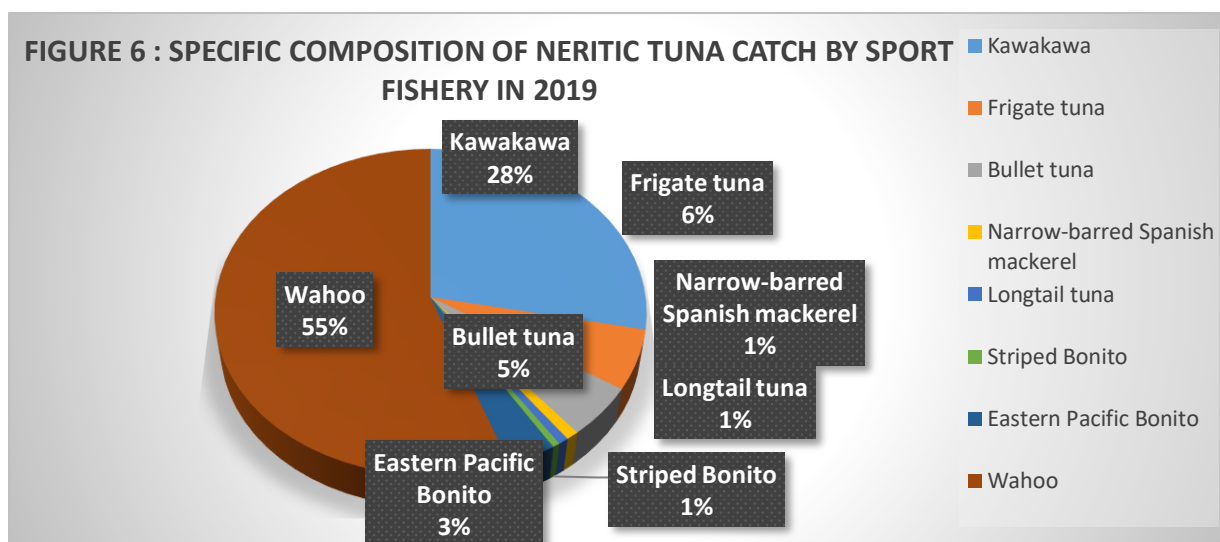
The CPUE ranges between 14 kg and 18 kg/boat/day (Figure 4). Given that the canoes are non-motorized; the tide does not exceed one day for the majority of the segment of small-scale fishery in Madagascar. Some large sailing boats can sometimes have tides of 02 or 03 days. The proportion of capture of tuna and related species is very different for each region studied, between 15 and 91%.



Neritic tunas are present in the west and east coast of Madagascar. For the six IOTC target neritic tuna species, only longtail tuna was not recorded in our study area during the surveys. The species most caught by the coastal fishery are Narrow barred Spanish mackerel (*Scomberomorus commerson*) (46.29%) and Kawakawa (*Euthynnus affinis*) (29.61%). It is important to emphasize that a significant catch of wahoo (*Acanthocybium solandri*) was identified on the sites (Figure 5). The catch data were not extrapolated to the national level, but only to the level of the landing sites sampled.



In addition, during surveys carried out on sport and recreational fishery in Nosy-be, we have observed a longtail tuna catch, but in small quantities (Figure 6). Catches from recreational and sport fishery are either released immediately after catching, or intended for the use of the person who caught them for personal or family consumption. All fishing techniques are present, for sport fishing, according to the tastes of users such as pooper, jig, classic trolling and longline. But the fishing gear most used for sport fishing is the handline.



In terms of size, Narrow-barred spanish mackerel and wahoo are the species that have longer average sizes between the intervals of 80-93 cm (Table 2). The average size of species captured is generally stable or increasing over the 3 years studied. The most individuals captured are the kawakawa and the narrow-barred Spanish mackerel. The increase in the number of individuals captured is from the gradual increase in sample landing sites during this period.

TABLE 2 : NUMBER AND AVERAGE SIZE OF NERITIC TUNA CAUGHT BY SMALL-SCALE FISHERY						
SPECIES	2017		2018		2019	
	Number	Average size (cm)	Number	Average size (cm)	Number	Average size (cm)
Kawakawa	2,912	58	4,361	60	6,039	61
Narrow-barred Spanish mackerel	1,232	80	3,596	72	11,239	95
Frigate tuna	36	36	103	43	1,344	43
Indo-Pacific king mackerel	57	73	322	76	ND	ND
Wahoo	1,339	93	1,789	90	3,000	93

As previously stated, Madagascar is full of different types of fishery resources, and small-scale fishermen diversify their catches periodically throughout the year. Also, there is no fixed port of disembarkation for the small-scale fishery in Madagascar. The catches are landed directly in

the fishing villages. According to the national framework survey⁴, the number of fishing villages in Madagascar is 2,531 villages, including 1,645 maritime fishing villages (65%) and the rest on continental waters. This makes data collection very difficult for this fishery segment. We can find in Figure 7 below the conditions for carrying out field surveys in the fishing villages.

Figure 7: Survey at the landing site



Furthermore, as our study area is located only in the northern part of Madagascar, it is essential to identify other regions that can be considered potential for the collection of tuna catch data in the future. According to national marketing data between 2018 and 2022 (Table 3), Atsinanana, Anosy, Atsimo Atsinanana, Menabe, Vatovavy Fitovinany and Atsimo Andrefana regions are regions that market tuna to other regions or other districts. Tuna sold nationally comes almost entirely from small-scale fishery. A large part of the catch is generally consumed locally. Thus, in our opinion, localities that can market to others could be considered potential region for tuna fishery.

⁴ A national framework survey in 2012-2013 was carried out to exhaustively enumerate all fishing units including fishing villages, fishermen, boats and fishing gear.

TABLE 3: INTERNAL MARKET OF TUNA BY REGION IN MADAGASCAR (MT)						
Région	2018	2019	2020	2021	2022	2023
Analanjirifo	71,92	123,77	91,42		1364,52	
Anosy	108,42	42,23				
Atsimo Atsinanana	3,01	0,85	5,14	7,25		6,78
Atsinanana	6,20	5,26	2,36			
Boeny	4,88	0,17			107,55	20,77
Diana	0,00	0,00			1001,39	
Menabe	9,86	3,59				3,3
Vatovavy Fitovinany	1216,42	5,65				54,31
Atsimo Andrefana			1,78			

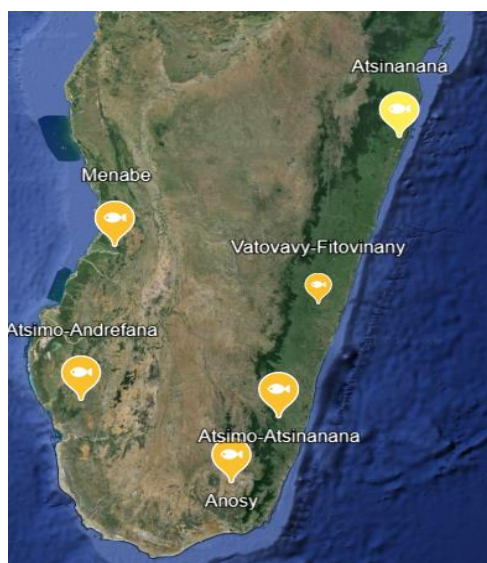
In addition, according to the results of the pilot catch assessment survey carried out in the Atsimo Andrefana region in 2011, it is also detected neritic tuna resources⁵.

With the surveys carried out between 2017 and 2019 in the northern part of Madagascar, it is impossible in our opinion to extrapolate the data at the national level, because the CPUE as well as the seasonality of tuna fishing vary for each region. The estimation of neritic tuna catches in Madagascar must be carried out by expanding the survey sites firstly in some potential regions that have been identified in southern part of Madagascar. The problem of data collection in Madagascar has always been of financial origin. There are numerous catch estimation and sampling methodologies for small-scale fishery, like Madagascar. Moreover, two types of sampling and catch estimation methodology such as ARTFish and FAO OPENARTFish have already been used in Madagascar.

Knowledge of these potential regions (Figure 8) for tuna data collection is just indicative. In each region, there are still several landing sites requiring an adapted sampling system depending on the collection and estimation methodology used. However, we know that tuna catches are abundant on the east coast of Madagascar.

⁵ Consulted in « Enquête pilote d'évaluation de capture. Zone d'intervention PACPT 2011/2012. Page 20»

Figure 8: Proposed Potential Regions for tuna data collection in the southern part of Madagascar



CONCLUSION

Coastal fishery in Madagascar is a multi-species fishery, and fishermen can use several fishing gears throughout the year, depending on the resources available and the management measures in force, like fishing closures. The Kawakawa, Frigate tuna, Bullet tuna, Indo-Pacific king mackerel, and Narrow-barred Spanish mackerel are the most commonly caught for neritic tuna species under the mandate of IOTC. A large quantity of Wahoo capture was noted during this research. The catch per unit effort (CPUE) fluctuates between 14kg and 18kg/day/boat. In terms of quantity, the gillnet is the fishing gear that catches the most tuna. However, in terms of percentage, longline and line are the first fishing gears in terms of tuna catches, 61.7% and 46% of the total catch respectively. The proportion of tuna catch also varies depending on the regions studied, ranging from 15 to 91%.

From all of the above, it is not yet possible to estimate national catches at this level because our study area is limited only to the landing sites in the northern part of Madagascar. As far as possible, landing sites in the Atsinanana, Anosy, Atsimo Atsinanana, Menabe, Vatovavy Fitovinany and Atsimo Andrefana regions must be part of the sites to be sampled for survey in order to estimate neritic tuna catch at the national level in Madagascar.

REFERENCES

1. Annuaire statistique de la Pêche et de l'Aquaculture 2016-2018. Ministère de la Pêche et de l'Economie Bleue. <https://www.mpeb.mg/wp-content/uploads/2024/03/Annuaire-statistiques-de-la-peche-et-de-laquaculture-2016-2018.pdf>
2. Annuaire statistique de la Pêche et de l'Aquaculture 2019-2022. Ministère de la Pêche et de l'Economie Bleue. <https://www.mpeb.mg/wp-content/uploads/2024/03/Annuaire-statistique-de-la-peche-et-de-laquaculture-2019-2022-1.pdf>
3. Enquête cadre nationale de Madagascar sur la pêche. 2012-2013. <https://www.instat.mg/documents/upload/main/Enquête%20cadre%20nationale%202012-2013.pdf>
4. Enquête pilote d'évaluation de capture. Zone d'intervention PACPT 2011/2012. https://www.ipcinfo.org/fileadmin/user_upload/countrystat_fenix/congo/docs/rapport_epp_Peche.pdf
5. J, Gaillod. R, Yacinthe. Implementation of the monitoring system for small-scale and artisanal fisheries of pelagic fishes in northern regions of Madagascar. 2018. https://iotc.org/sites/default/files/documents/2018/11/IOTC-2018-WPDCS14-13_0.pdf
6. Le Manach, 2012. WAVES on Natural capital accounting and management of the Malagasy fisheries Sector. <https://www.wavespartnership.org/sites/waves/files/images/Madagascar-fisheries-FINAL-1.pdf>
7. Madagascar national scientific report to the IOTC in 2019. <https://iotc.org/sites/default/files/documents/2019/11/IOTC-2019-SC22-NR14.pdf>
8. Madagascar national scientific report to the IOTC in 2020. https://iotc.org/sites/default/files/documents/2020/11/IOTC-2020-SC23-NR11_Madagascar.pdf