



# **« Methodology of data collection (OPENARTFISH) and estimation of small-scale fisheries catches in Madagascar »**

INDE, MUMBAI  
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28/11/2023 au 02/12/2023

## **SUMMARY**

### Introduction

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2-Note on fisheries

3-OPENARTFISH survey system:

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.How to collect data (Strategies)

4-Methodological approach

5-OPENARTFISH results for the year 2020-2022

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## Introduction

*An island country located in the southwest of the Indian Ocean, Madagascar, the fourth largest island in the world with an area of 587,000 km<sup>2</sup>, is located to the east of the African continent from which it is separated by the Mozambique Channel. The latest statistical estimates put its population at around 27 million inhabitants. With more than 5,600 km of coastline, 117,000 km<sup>2</sup> of continental shelf, more than 113,000 km<sup>2</sup> of territorial waters and an Exclusive Economic Zone (EEZ) extending over 1,140,000 km<sup>2</sup>, Madagascar has immense resources fisheries. Furthermore, the surface area of lakes, lagoons and other bodies of water favorable to inland fishing, and therefore of obvious fishing interest, is estimated at around 1,500 km<sup>2</sup>.*

### *Tunas*

*- tunas and associated species which cross the Malagasy EEZ during their migration.*

*The main species targeted in the western Indian Ocean are skipjack, yellowfin, bigeye tuna and swordfish. Their potential in Malagasy waters is estimated at 51,600 t by the Indian Ocean Tuna Commission (CTOI) which supervises their exploitation. This is an indicative and unpredictable estimate due to the highly migratory nature of these species.*

*The potential for sensitive species (sharks and rays) is unknown for the ministry in 2021. Shark and ray species are mainly caught by industrial tuna fishing (longline and purse seine fishing), industrial shrimp fishing, artisanal fishing and small fishing*

## 1-Fisheries data collection system in Madagascar

### -The framework surveys (ECN)

These were carried out during the period two thousand twelve to two thousand thirteen (2012-2013), twenty-four years after that of nineteen hundred and twenty eight (1988) for marine waters traditional and continental. Updated national framework survey (ECN 2022-2023) currently undergoing final validation.

### -Catch Evaluation Survey (CEE) or CAS

These data are not available since 1991-1997. Partials (1998-2005)

### -Routine data collection

This is a daily data collection carried out by fisheries staff and management unit members. Mainly, it deals with the collection of data on catch weight and value of fish by species and fishing vessel

## 2-Note on fisheries

In Madagascar, there are 3 types of fisheries:

### -Industrial fishing;



**Industrial Fishing**

### -Artisanal fishing ;



**Artisanal Fishing**

-Small fishing or ex traditional or small scale fishing.



**Small scale Fishing**

**Definition Small fishing:**

Fishing activity reserved for natural persons of Malagasy nationality, practiced in waters under Malagasy jurisdiction using motorized boats, the total engine power of which is less than fifteen (15) horsepower (HP), non-motorized boats or foot.

**REFERENCE IN AFRICA AND REGIONAL COUNTRIES:**

- Small-scale fishing: Artisanal fishing (+7 to 13m)
- Artisanal fishing: Semi-industrial

### 3-OPENARTFISH survey system:

#### .Context

[DOCUMENTS](#): [National strategy on improving the collection, analysis and dissemination of fisheries and aquaculture data](#)

The new strategy takes into consideration the Pan-African policy defined by the Policy Framework and Strategy for Fisheries and Aquaculture Reform in Africa.

At the national level, this strategy aligns with the MPEB Policy through its statement by promoting transparent and responsible governance by highlighting the implementation of reliable decision-making tools through the establishment of a centralized statistical system, reliable and usable in real time for the entire sector

-The last estimate of Malagasy small-scale fishing catches was in nineteen hundred and ninety (1990) (with the assistance of project MAG/85/014, Food and Agriculture Organization of the United Nations, Madagascar, October 1991), during the period from nineteen hundred and forty twenty-one to two thousand and eleven (1991-2011), no collection of information at the fishermen level, due to lack of resources (financial, human, material, etc.) and production remains still from a first estimate by the FAO in 1990.

From the year two thousand and twelve (2012) until today, the fisheries administration with the person responsible for fishing and aquaculture statistics has been decided to estimate the production of small-scale fishing from marketing data

- In two thousand fifteen to two thousand sixteen (2015-2016), the SWIOFISH2 project, at the level of the three (3) priority regions (Diana, Analanjirifo and Melaky) allowed the establishment of production data collection, with the support FAO of OPENARTFISH or (Approaches, Rules and Techniques for FISHeries statistical monitoring) systems with mobile phone application (ODK or IONIC) including an appropriate sampling strategy

**Bienvenue à ARTFISH ouvert MADAGASCAR**

1-Mise à jour les strates majeur, les strates mineures, les sites de débarquement et les associations

2-Mise à jour table de référence enquêteurs

3-Mise à jour table de référence espèces

4-Mise à jour table de référence unités de pêche

5-Mise à jour nombre maximal de jours de pêche mensuels pour BAC

6-Mise à jour enquête cadre

Faites votre formulaire pour le téléphone mobile

Définir les paramètres de la base des données

Saisissez les données de capture (PAB)

L'analyse des données avec PAB

Saisissez les données de capture (BAC)

Saisissez les données d'activité de pêche (BAC)

L'analyse des données avec BAC

Importer des données à partir de l'application de téléphone mobile

## CONVERT OPENARTFISH MADAGASCAR INTO A WEB APPLICATION BASED DATABASE


-In two thousand and nineteen (2019): it is strongly recommended (FAO statistics expert « M.GERTJAN Degraaf » in Madagascar) to convert the OPENARTFISH database to the WEB application to have a decentralized system.

The use of this software in general is divided into two categories including:

- Entry or consultation of data on the web application (decentralized statistical manager)
- Entering and sending data via mobile to server (data collectors or Investigators)

**Link** : (google chrome ou Microsoft edge)

**154.126.93.188/peche\_ext**



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**WEB application interface:**



The screenshot displays the user interface of the 'Open Artfish Madagascar' web application. On the left, a dark sidebar contains a 'MENU PRINCIPALE' with the following items: Accueil, Administration, Données de Bases, Validation des données, Données validées, Reporting/Analyses, and Importer BDD Access. The main content area features a blue header with a home icon and 'Accueil', and a large blue banner with the text 'Bienvenue dans Open Artfish Madagascar'. Below the banner is a large image showing two fishermen in traditional wooden boats on the water, handling a large green fishing net.

✓ FICHE ECHANTILLONNAGE CAPTURE — 2 ECHANTILLON — 3 ESPECE CAPTURE

ETAPE 1

FILTRE

Rechercher:

Code ^	Enqueteur ↕	Region District Site de débarquement ↕	latitude Longitude Altitude ↕	Date ↕	Date creation Date modification ↕	User ↕
Diana-Ankazomborona-2017-06-10-5	CYNTHIA	-Diana - -Ankazomborona		10-6-2017	10-6-2017	
Diana-Ankazomborona-2017-06-10-6	Esperancia	-Diana - -Ankazomborona		10-6-2017	10-6-2017	
Diana-Ankazomborona-2017-06-10-9	JOSETTE	-Diana - -Ankazomborona		10-6-2017	10-6-2017	
Diana-Ankazomborona-2017-06-11-22	FLORIA	-Diana - -Ankazomborona		11-6-2017	11-6-2017	

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✓ FICHE ECHANTILLONNAGE CAPTURE — 2 ECHANTILLON — 3 ESPECE CAPTURE

ETAPE 2

PAB    CAB

Rechercher:

Code ^	Effort de pêche ↕	Pêche hier Pêche avant hier ↕	Total capture Nbr jrs dernier sem ↕	Unite peche ↕	Date creation Date modification ↕	User ↕
Diana-Ankazomborona-10/06/2017-486- monoxyle mousti	PAB	Non Oui	(kg) 4 jrs	monoxyle moustiquaire	10-6-2017	
Diana-Ankazomborona-10/06/2017-487- monoxyle Valaki	PAB	Oui Oui	(kg) 7 jrs	monoxyle Valakira/barrage	10-6-2017	
Diana-Ankazomborona-10/06/2017-488- monoxyle mousti	PAB	Oui Non	(kg) 3 jrs	monoxyle moustiquaire	10-6-2017	
Diana-Ankazomborona-10/06/2017-498- monoxyle periky	PAB	Oui Oui	(kg) 7 jrs	monoxyle periky	10-6-2017	
Diana-Ankazomborona-10/06/2017-499- monoxyle periky	PAB	Oui Oui	(kg) 7 jrs	monoxyle periky	10-6-2017	
Diana-Ankazomborona-10/06/2017-500- monoxyle periky	PAB	Non Oui	(kg) 3 jrs	monoxyle periky	10-6-2017	

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✓ FICHE ECHANTILLONNAGE CAPTURE — ✓ ECHANTILLON — 3 ESPECE CAPTURE

ETAPE 3

Rechercher:

Espece ^	Capture ↕	Prix ↕	User ↕	Date creation ↕	Date modification ↕
Patsa fotsy	12 (kg)	4000 (Ar/kg)		2017-06-10	
Varilavabe	10 (kg)	4000 (Ar/kg)		2017-06-10	

Afficher  entrées      Affichage 1 à 2 sur 2 entrées

..



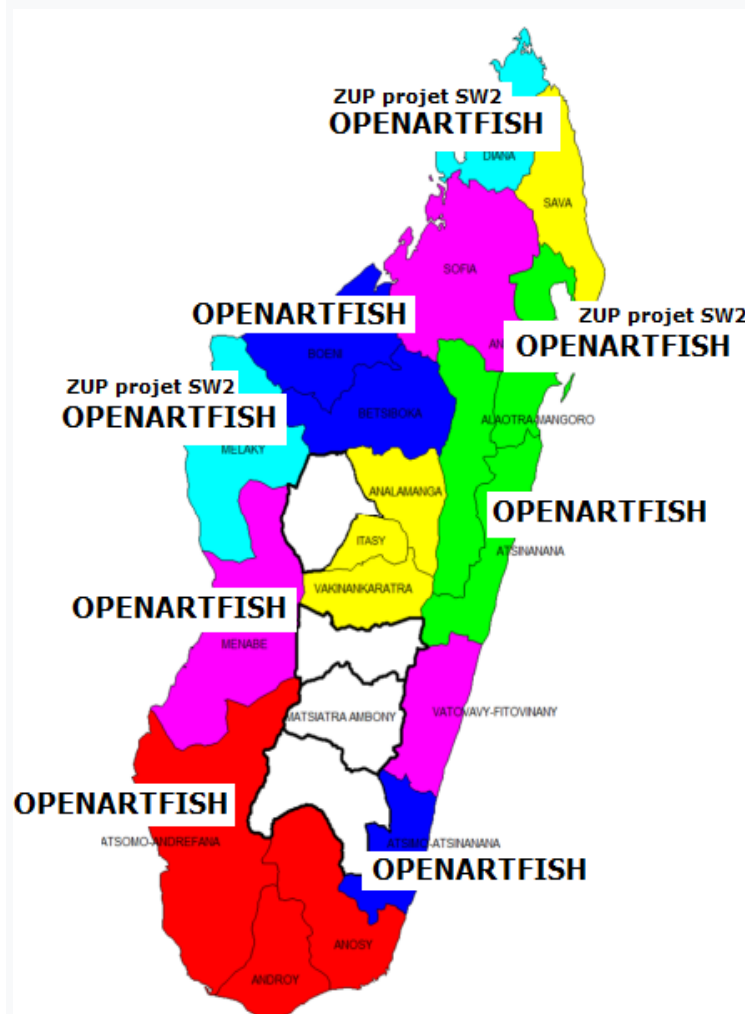
-After the dissolution of the Antsiranana Tuna Statistical Unit or (Ex USTA) at the beginning of the year two thousand and twenty two (2022), the fisheries administration with the Directorate of Studies, Statistics and planning (DESP) was decided to estimate the production of small-scale tuna fishing and assimilated species from the OPENARTFISH system and software at the level of thirteen (13) coastal regions.

### Why?

-No coastal fishing data and declaration of statistical data following the IOTC requirement from July 2021 until today.

### -OPENARTFISH coverage area since 2019-2023

SMALL FISHING: Estimated small-scale fishing catches  
 Branches of activity: Maritime and continental  
 Products: all species combined



## .How to collect data (Strategies)

- Evaluate existing data sets;
- Describe the operating characteristics of the sector or sub-sector (e.g.: fishing, market, fleet, community, etc.), also known as census, framework survey;
- Decide which approach to take: complete enumeration or sampling
- Design collection methods based on the approach taken, including the form of stratification to be used in sampling;
- Implement a test phase to validate the method (pilot phase) including the participation of other stakeholders;
- Establish a continuous feedback mechanism between data sources and data users

## 4-Methodological approach

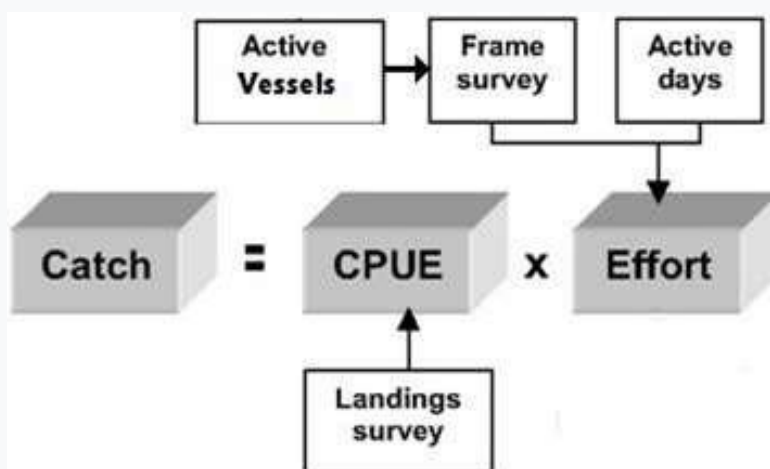
Data collection is carried out by full-time data collectors residing throughout the duration of the survey in the fishing village.

The OPENARTFISH system estimation procedure is summarized schematically as follows:

-NEED FOR DATA COLLECTORS (INVESTIGATORS) The aim is to collect sample data on total catch and species composition, associated effort, and other secondary data such as prices/values

-APPROACHES: by sampling, where only a portion of the members of the total population are assessed

-CALCULATION (sample, estimate) :



- CPUE sample (catches per unit of effort)

CATCHES/ESTIMATED DAILY VALUES = total sample X extrapolation factor

FISHING UNIT

Extrapolation factor = Number of landings for the same boat-gear combination on the Number of samples of the same boat-gear combination

The quantity [TOTAL EFFORT] is not directly observable. It is therefore developed in the following form.

[TOTAL EFFORT] = [TOTAL UNIT] x [PAB] x [NUMBER OF FISHING DAYS]

[TOTAL UNIT] is the total number of fishing units. It is known during the framework investigation.

[PAB] is the abbreviation for "Probability of Boat Activity".

Total fishing effort =  $F \times PAB \times D$

Or:

F is the total number of canoes in the frame survey;

PAB is coefficient of boat activity or fishing activity;

D is the total number of days in a month for PAB.

$PAB = (\text{Fishing yesterday (yes = 1 or no = 0)} + \text{Fishing before yesterday (yes = 1 or no = 0)} + \text{number of fishing days last week (1 to 7, 0 if no activity)}) / \text{number of fishing days in a month}$

-PAB system: Direct interviews with fishermen (system adopted in Madagascar after the pilot survey in 2018)

-As the total number of units of the site is already known during the framework survey, it is enough to observe the "number of units released" per day and take the average to obtain the PAB of a site at course of one month. PAB SURVEY OR EFFORT SURVEY

**-EFFORTsample**

MONTHLY CATCHES/VALUES/FISHING EFFORT = total sampling days X  
Extrapolation factor

Extrapolation factor = number of fishing days in the month for the boat-gear combination over the number of sampling days in the month for the same boat-gear combination

**-STRATAL ESTIMATION**

ESTIMATED CATCHES/VALUES/TOTAL EFFORT = total sample in  
stratum X extrapolation factor

Extrapolation factor = total number of boats in the stratum  
(on the total boats in survey sites)

Data on the number of boats must come from the framework survey

**So, after extrapolation, the estimated total catches are:**

**Estimated TOTAL CATCHES: (Number of fishing units X  
Average PAB X Monthly Days X Average CPUE) / 1000  
(tons)**

**-EXISTENCE OF FRAMEWORK SURVEY DATA**

The objective being to exhaustively enumerate fishing units in the entire study area, the work carried out in the field for data collection is of two types, namely the identification and enumeration of fishing villages. then the survey of fishing households.

**-Definition of fishing unit:**

Characteristic of canoes with their main gear or combination of boat / gear  
example: monoxyl canoe + gill line  
canoe plank + line

**-TECHNIQUES:**

In Madagascar there are two (2) fishing techniques:

- a- Canoe fishermen
- b- Fishermen on foot

-Design collection **methods** based on the approach taken, including the form of **stratification** to be used in sampling

-In principle, there are three sampling methods and their application depends on the availability of staff and budget.

Sampling in space and time is more or less the real situation

*Important: to remember*

*-on certain sites, boats are sampled (space)*

*-sampling is carried out on certain days only (times)*

-There are two main types of stratification in a data collection program:

- Major strata: done for administrative classification, e.g. region, district

- Minor strata: to improve sampling for greater precision and to reduce costs, e.g.

boat types, gear types

A minor stratum must be a geographical partition of homogeneous climate

Homogeneity is essential because it is at the level of the minor stratum that the estimation and extrapolation will be made.

Stratification reduces error in sample estimates by systematically eliminating as much of the data variability as possible through the sampling design. This result is obtained by dividing the sample population into homogeneous groups or strata.

The major practical objective of stratification is to reduce the variability of sampled data, which will improve the reliability of the collected data

Example stratification :

.Major stratum: Madagascar

.Minor stratum: Region

.Survey site

**-CHOICE OF SITES**

The criteria for choosing sites are:

Representativeness with regard to the fishing techniques identified in the framework survey (all fishing units);

Representativeness with respect to the resources of the stratum;

The viability of the locality (accessibility, security in all areas)

Number of fishermen in the survey site

Existence of the telephone network (telma, orange, airtel)



## **-DATA INPUT AND PROCESSING**

The data to be compiled is obtained from a sample survey.

The entry and processing of data from the small-scale fishing effort/catch survey were carried out over time with the OPENARTFISH software.

## **-DISTRIBUTION OF THE SAMPLE**

To obtain a relative error of fifteen to twenty percent (15 to 20%) for P.U.E at a 90% probability level, from approximately 50 to 75 samples, an average of 60 per month should be taken for each fishing unit and for each minor stratum

## **5-OPENARTFISH results for the year 2020-2022**

Since two thousand and fifteen (2015), the statistics officer in charge of fishing with the SWIOFish2 project assistant has been trying to set up a statistical system for Malagasy small-scale fishing. Preparing such a system requires prior knowledge of the structural characteristics of the fishery. These types of information were obtained thanks to the results of the framework survey on the entire island in both the marine and continental environments (national framework survey report 2012-2013/PACP project).

The field phase of the pilot survey (field report no. 01) of small-scale fishing catches could only start between June and November 2018 for maritime fishing. The results of the 2019-2022 survey have already been processed and are the subject of an initial estimate of Malagasy small-scale fishing production (field report n°02).

### **1-a-Number of samples/month and number of data collectors per survey site-Diana**

Region	district	Survey site	number of data collectors	Fishing unit		number of sample		
DIANA	Ambilobe	ANKAZOMBORONA SUD	2	Monoxyl canoe/pirogue	gill net	20		
				Monoxyl canoe/pirogue	kaokobe	30		
				Monoxyl canoe/pirogue	poto harato	30		
				Monoxyl canoe/pirogue	poto horoba	15		
				Monoxyl canoe/pirogue	sihitry	60		
				Monoxyl canoe/pirogue	valakira	10		
		ANKAZOMBORONA NORD	1	Monoxyl canoe/pirogue	gill net	10		
				Monoxyl canoe/pirogue	poto horoba	35		
				Monoxyl canoe/pirogue	valakira	30		
				ANTSATRANA	1	Monoxyl canoe/pirogue	garigary	60
						Monoxyl canoe/pirogue	poto horoba	10
						Monoxyl canoe/pirogue	valakira	20
	Monoxyl canoe/pirogue	Longline	20					
	Ambanja	AMPAMPAMENA	1	Monoxyl canoe/pirogue	gill net	15		
				Monoxyl canoe/pirogue	kaokobe	30		
				Monoxyl canoe/pirogue	Snorkel	10		
		ANKIGNY	1	Monoxyl canoe/pirogue	gill net	10		
				Monoxyl canoe/pirogue	line	10		
				Monoxyl canoe/pirogue	Longline	20		
	Diego II	AMBOLOBOZOKELY	1	Monoxyl canoe/pirogue	gill net	10		
				Monoxyl canoe/pirogue	line	10		
				Monoxyl canoe/pirogue	fusil à poissons	60		
				Monoxyl canoe/pirogue	Snorkel	10		
		AMPASINDAVA	1	Monoxyl canoe/pirogue	line	15		
				Monoxyl canoe/pirogue	Longline	10		
	Nosy Be	AMBATOZAVAVY	1	Canoe board/plank	gill net	60		
Canoe board/plank				line	60			
DZAMANDZAR AMPASY		2	Monoxyl canoe/pirogue	line	35			
			Monoxyl canoe/pirogue	nasse	60			
			Monoxyl canoe/pirogue	Turlute	60			
			Monoxyl canoe/pirogue	Snorkel	20			
Monoxyl canoe/pirogue	Longline	30						



**1-b-Number of samples/month and number of data collectors per survey site-  
ANALANJIROFO**

Region	district	Survey site	number of data collectors	Fishing unit		number of sample
ANALANJIROFO	Maroantsetra	NAVANA	2	Monoxyl canoe/pirogue	Longline	15
				Monoxyl canoe/pirogue	line	15
				Monoxyl canoe/pirogue	jarifa	40
				Monoxyl canoe/pirogue	moustiquaire	50
		MASINDRANO	1	Monoxyl canoe/pirogue	jarifa	20
				Monoxyl canoe/pirogue	gill net	10
				Monoxyl canoe/pirogue	moustiquaire	10
		RANTOHELY	1	Monoxyl canoe/pirogue	Longline	15
				Monoxyl canoe/pirogue	gill net	10
		AMBODIPAKA	1	Monoxyl canoe/pirogue	line	15
				Monoxyl canoe/pirogue	gill net	10
		Mananara Nord	ANTANAMBE	1	Monoxyl canoe/pirogue	gill net
	Monoxyl canoe/pirogue				Snorkel	60
	Monoxyl canoe/pirogue				nasse	30
	FONTSIMARO		1	Monoxyl canoe/pirogue	Longline	60
				Monoxyl canoe/pirogue	gill net	10
				Monoxyl canoe/pirogue	line	15
	AGNIRIBE	1	Monoxyl canoe/pirogue	Longline	30	
Monoxyl canoe/pirogue			line	15		
Monoxyl canoe/pirogue			gill net	25		

## 1-c-Number of samples/month and number of data collectors per survey site-MELAKY

Region	district	Survey site	number of data collectors	Fishing unit	number of sample
MELAKY	MAINTIRANO	Ampasimandroro Sud	1	Canoe board/plank + longline	15
				Planché+Filet maillant	7
				Planché+Jarifa	7
				Planché+Moustiquaire	10
		Ampasimandroro Sud	1	Canoe board/plank + longline	15
				Canoe board/plank + Gillnet	7
				Planché+Jarifa	7
				Planché+Moustiquaire	10
		Maro-Antaly	1	Planché+Jarifa	10
				Planché+Filet zz	10
		Ambalahonko	1	Canoe board/plank + longline	5
				Canoe board/plank + Gillnet	10
				Planché+Moustiquaire	20
		Nosy- lava	1	Planché+Jarifa	6
	Planché+Palme masque tuba			60	
	MASOARIVO	Mozambiky	1	Monoxyl canoe/pirogue+Gillnet	12
				Monoxyl canoe/pirogue+longline	10
				Monoxyle+Moustiquaire	8
		Antsingilo	1	Monoxyl canoe/pirogue+Gillnet	4
				Monoxyl canoe/pirogue+longline	5
				Monoxyle+Moustiquaire	6
				Monoxyle+Garigary	15
		Ankelilaly	1	Monoxyl canoe/pirogue+Gillnet	4
				Monoxyl canoe/pirogue+longline	5
				Monoxyle+Moustiquaire	6
				Monoxyle+Garigary	15
		BESALAMPY	Ampongobe	1	Canoe board/plank + longline
Canoe board/plank + Gillnet	10				
Beloba	1		Canoe board/plank + Gillnet	15	
			Planché+Filetzz	15	

## 2-Number of sample per fishing unit per month per minor stratum : case of the DIANA-2020 Region

Fishing unit	Number of fishing units in the framework survey	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Monoxyl canoe/pirogue +fusil à poissons	95	60	35	12	14	0	0	0	0	0	0	0	18
Monoxyl canoe/pirogue+ garigary	56	2	0	0	0	0	0	0	0	0	0	0	0
Monoxyl canoe/pirogue+ harato poto	58	0	0	15	15	15	15	15	16	15	0	30	12
Monoxyl canoe/pirogue+ horoba	88	9	10	10	11	15	10	45	32	16	34	33	24
Monoxyl canoe/pirogue+ kaokobe	83	30	30	30	30	15	30	30	30	28	30	56	29
Monoxyl canoe/pirogue + line	207	66	70	39	72	70	35	35	35	40	61	57	55
Monoxyl canoe/pirogue+moustiquaire	459	31	31	30	29	31	24	30	30	31	26	57	30
Monoxyl canoe/pirogue +nasse	251	59	60	0	60	60	0	0	0	60	60	53	53
Monoxyl canoe/pirogue + longline	402	0	0	2	0	0	0	0	0	2	3	10	10
Monoxyl canoe/pirogue+snorkel	97	30	30	30	32	36	30	30	30	28	42	52	65
Monoxyl canoe/pirogue+Gill net	2511	42	45	44	45	45	45	94	52	45	33	36	44
Monoxyl canoe/pirogue +turlute	89	60	60	58	58	60	60	58	60	59	60	60	59
Monoxyl canoe/pirogue+ valakira	280	0	0	10	9	22	10	37	11	10	24	14	0
Canoe board/plank + Line	64	59	58	56	51	60	60	60	60	58	58	52	60
Canoe board/plank + Gillnet	425	0	1	0	60	59	55	12	53	57	54	49	59

Orange color: OK

Red color: Insufficient sample number

Green color: Error

Color white: No sending to the server

### 3-a-Catches by fishing unit and by species (Unit: Tons): case of the DIANA Region 2020

Fishing unit	squid	chubs	Congress	crabs	shrimp	rays	fish	octopuses	sharks	tunas nca	blue marlin	bigeye tuna	king mackerel	sea cucumber	varilava	
Monoxyl canoe/pirogue +fusil à poissons							151,47			8,29						
Monoxyl canoe/pirogue+ garigary				31,41												
Monoxyl canoe/pirogue+ harato poto				0,16	33,03		6,36								1,29	
Monoxyl canoe/pirogue+ horoba		160,19		3,48	70,42		37,18								16,22	
Monoxyl canoe/pirogue+ kaokobe	1,92		0,65		27,77	9,53	1 147,22	1,65	8,01	6,28		5,52	7,06			
Monoxyl canoe/pirogue + line	0,25			1,56		1,42	697,05		2,97	15,80	13,56	2,71	29,82			
Monoxyl canoe/pirogue+moustiquaire		938,62		27,50	373,31		535,08								117,46	
Monoxyl canoe/pirogue +nasse							517,59									
Monoxyl canoe/pirogue + longline						10,44	391,46		54,54	1,49			0,79			
Monoxyl canoe/pirogue+snorkel	0,51							56,35						333,74		
Monoxyl canoe/pirogue+Gill net	27,06	9,31		25,72	900,20	287,58	7 996,70	27,20	48,39	34,44		118,03	235,00	235,59		
Monoxyl canoe/pirogue +turlute	317,82													1,66		
Monoxyl canoe/pirogue+ valakira		0,95	0,95	15,35	207,26	20,91	310,21		39,52						35,29	
Canoe board/plank + Line						2,32	258,66						15,24			
Canoe board/plank + Gillnet							1 690,74									
<b>grand total</b>	<b>347,56</b>	<b>1 109,07</b>	<b>1,60</b>	<b>105,18</b>	<b>1 611,99</b>	<b>332,20</b>	<b>13 739,72</b>	<b>85,20</b>	<b>153,43</b>	<b>66,30</b>	<b>13,56</b>	<b>126,26</b>	<b>287,91</b>	<b>570,99</b>	<b>170,26</b>	<b>18 721,23</b>

### 3-b-Catches by fishing unit and by species (Unit: Tons): case of the ANALANJIROFO Region 2020

products	Monoxyl canoe/pirogue + line	monoxyle nasse	Monoxyl canoe/pirogue + longline	Monoxyl canoe/pirogue+snorkel	Monoxyl canoe/pirogue+Gill net	
squid				0,85		
Congress	3,29			0,43		
shells				74,82		
crabs		2,30		0,63	33,12	
shrimp					117,83	
lobsters		8,01		6,38		
rays	6,58			29,99		
fish	950,49	1 724,26	27,68	100,45	6 485,83	
octopuses				35,43		
sharks	3,84				41,84	
tunas nca	87,75		30,20			
blue marlin			22,65			
bigeye tuna	331,12		352,63		701,78	
king mackerel	4,39		16,36			
sea cucumber	4,39			37,42	12,80	
varilava					0,43	
<b>Grand total</b>	<b>1 391,85</b>	<b>1 734,57</b>	<b>449,51</b>	<b>286,41</b>	<b>7 393,63</b>	<b>11 255,96</b>

### 3-c-Catches by fishing unit and by species (Unit: Tons): case of the MELAKY Region 2020

Fishing unit	chubs	Congress	crabs	shrimp	rays	fish	sharks	tunas nca	Yellofin Tuna	common dolphinfish	Bigeye Tuna	sea cucumber	
Monoxyl canoe/pirogue+Gill net	47,60	1,00	14,50	49,40	35,70	1 750,70	229,80	43,10		1,70	113,50		
Monoxyl canoe/pirogue+ Filet ZZ					76,90	407,00	160,70	657,60			38,20		
Monoxyl canoe/pirogue+ garigary			11,90										
Monoxyl canoe/pirogue+ Jarifa					507,90	268,70	1 259,90					10,10	
Monoxyl canoe/pirogue+snorkel						0,60						247,20	
Monoxyl canoe/pirogue+moustiquaire	954,70				41,90	990,00	146,50						
Monoxyl canoe/pirogue + longline		39,40	1,80	0,10	220,10	1 259,50	94,40	17,00	1,80		1,80		
<b>Grand Total</b>	<b>1 002,30</b>	<b>40,40</b>	<b>28,20</b>	<b>49,50</b>	<b>882,50</b>	<b>4 676,50</b>	<b>1 891,30</b>	<b>717,70</b>	<b>1,80</b>	<b>1,70</b>	<b>153,50</b>	<b>257,30</b>	<b>9 702,70</b>

## 4-Catches by fishing unit and by species (Unit: in Tons): case of the ANALANJIROFO Region 2020

Products	Fishing unit				
	Monoxyl canoe/pirogue + line	monoxyle nasse	Monoxyl canoe/pirogue + longline	Monoxyl canoe/pirogue+snorkel	Monoxyl canoe/pirogue+Gill net
squid				0,09	
Congress	0,19			0,37	
shells				5,39	
crabs		0,33		0,18	0,37
shrimp					1,23
lobsters		1,12		0,92	
rays	0,39			2,60	
fish	42,53	33,98	2,64	9,19	50,10
octopuses				3,06	
sharks	0,23				1,40
tunas nca	2,99		2,88		
blue marlin			2,16		
bigeye tuna	7,52		17,63		4,13
king mackerel	0,26		1,56		
sea cucumber	0,26			6,92	0,20
varilava					0,01

### 5-Estimates of catches/values by minor stratum and species and local name and the relative error in CPUE and catches at the 90% probability level (Unit: Tons): case of the DIANA Region 2020

Famille	Espèces	Nom local	Nom scientifique	Capures totales (tonnes)	composition espèces (%)	Prix/Kg en Ar	Valeurs totales (Ar)
Echneidae	Poissons	Samakeboana	Echeneis naucrates	53,256	0,28	4 049	215 612
Echneidae	Poissons	Sampatra	Valamugil spp	1,767	0,01	3 538	6 251
Lethrinidae	Poissons	Senta, Ambitryfo	Lethrinus harak	695,092	3,71	5 623	3 908 720
Drepaneidae	Poissons	Takropa	Drepane longimana	517,625	2,76	3	1 656
Drepaneidae	Poissons	Takropa	Drepane africana	525,51	2,81	3	1 682
Sparidae	Poissons	Tsiboraina	Acanthopagrus berda	20,112	0,11	3 829	77 001
Psettodidae	Poissons	Tsimananila	Psettodes erumei	25,449	0,14	3 537	90 018
Serranidae	Poissons	Tsivaravarabe, kikiantany, alovo, gabamainty	Serranidae	121,064	0,65	3 666	443 769
Lethrinidae	Poissons	Vahô, Zavotrohy	Lethrinidae	322,718	1,72	5 961	1 923 729
Chanidae	Poissons	Vano	Chanos chanos	125,504	0,67	2 018	253 289
Clupeides	Poissons	Vatritra	Amblygaster sirm	120,815	0,65	3 586	433 213
Lethrinidae	Poissons	Vôtro	Gymnocranius grandoculis	11,585	0,06	2 784	32 248
	Poissons	Zoho	Lutjanus argentimaculatus	65,979	0,35	3 027	199 714
Octopodidae	Poulpes	Orita	Octopodidae	85,2	0,45	3 818	325 252
	Requins	Ankio	Selachimorpha (Pleurotremata)	112,821	0,60	2 873	324 169
	Requins	Maroalala (Ankio)	Ariidae	40,616	0,22	2 017	81 925
Scombridae	Thons	Bepakitsy	Lutjanus sebae	14,1	0,08	2 709	38 194
Scombridae	Thons	jaodary, lamatra	Thunnus obesus	33,149	0,18	3 628	120 268
Scombridae	Thons	jaodary, lamatra	Thunnus albacares	8,772	0,05	4 000	35 090
Scombridae	Thons	Tabaka, lamatra	Katsuwonus pelamis	10,269	0,05	3 161	32 464
Scombridae	Thons (Makaire bleu)	Androaro	Makaira nigricans	11,277	0,06	2 767	31 203
Scombridae	Thons (Makaire bleu)	Ndoaro, androaro	Istiophorus platypterus	2,285	0,01	3 000	6 854
Scombridae	Thons (Patudo, thon obèse)	jaodary, angoho, belonary, diodary	Euthynnus affinis	126,263	0,67	4 024	508 038
Scombridae	Thons (thazard)	Ango, variagnavo, angoho, lamatra	Acanthocybium solandri	287,757	1,54	4 064	1 169 381

Famille	Espèces	Nom local	Nom scientifique	Capures totales (tonnes)	composition espèces (%)	Prix/Kg en Ar	Valeurs totales (Ar)
Echneidae	Poissons	Samakeboana	Echeneis naucrates	53,256	0,28	4 049	215 612
Echneidae	Poissons	Sampatra	Valamugil spp	1,767	0,01	3 538	6 251
Lethrinidae	Poissons	Senta, Ambitryfo	Lethrinus harak	695,092	3,71	5 623	3 908 720
Drepaneidae	Poissons	Takropa	Drepane longimana	517,625	2,76	3	1 656
Drepaneidae	Poissons	Takropa	Drepane africana	525,51	2,81	3	1 682
Sparidae	Poissons	Tsiboraina	Acanthopagrus berda	20,112	0,11	3 829	77 001
Psettodidae	Poissons	Tsimananila	Psettodes erumei	25,449	0,14	3 537	90 018
Serranidae	Poissons	Tsivaravarabe, kikiantany, alovo, gabamainty	Serranidae	121,064	0,65	3 666	443 769
Lethrinidae	Poissons	Vahô, Zavotrohy	Lethrinidae	322,718	1,72	5 961	1 923 729
Chanidae	Poissons	Vano	Chanos chanos	125,504	0,67	2 018	253 289
Clupeides	Poissons	Vatritra	Amblygaster sirm	120,815	0,65	3 586	433 213
Lethrinidae	Poissons	Vôtro	Gymnocranius grandoculis	11,585	0,06	2 784	32 248
	Poissons	Zoho	Lutjanus argentimaculatus	65,979	0,35	3 027	199 714
Octopodidae	Poulpes	Orita	Octopodidae	85,2	0,45	3 818	325 252
	Requins	Ankio	Selachimorpha (Pleurotremata)	112,821	0,60	2 873	324 169
	Requins	Maroalala (Ankio)	Ariidae	40,616	0,22	2 017	81 925

Unite de pêche	Famille	Espèces	Nom local	Nom scientifique	Capures totales	Composition espèces (%)	Prix/kg en Ar	Valeurs totales	Moy Erreur Relative PUE 90%	Moy Erreur Relative Capture 90%
monoxyle periky		Requins	Ankio	Selachimorpha (Pleurotremata)	48,393	0,26	3 775,96	182 730	24	31
monoxyle ligne		Requins	Ankio	Selachimorpha (Pleurotremata)	2,972	0,02	2 217,36	6 590	16	22
monoxyle kaokobe		Requins	Ankio	Selachimorpha (Pleurotremata)	6,912	0,04	3 727,00	25 761	22	27
monoxyle palangre		Requins	Ankio	Selachimorpha (Pleurotremata)	54,544	0,29	1 999,98	109 087	97	97
monoxyle kaokobe		Requins	Maroalala (Ankio)	Ariidae	1,101	0,01	2 628,52	2 894	23	28
monoxyle valakira		Requins	Maroalala (Ankio)	Ariidae	39,516	0,21	1 999,97	79 031	23	37
monoxyle ligne	Scombridae	Thons	Bepakitsy	Lutjanus sebae	12,613	0,07	2 674,62	33 735	18	25
monoxyle palangre	Scombridae	Thons	Bepakitsy	Lutjanus sebae	1,486	0,01	3 000,67	4 459	21	21
monoxyle periky	Scombridae	Thons	jaodary, lamatra	Thunnus obesus	26,075	0,14	3 408,63	88 880	54	64
monoxyle periky	Scombridae	Thons	Jaodary, lamatra	Thunnus albacares	8,361	0,04	4 000,00	33 444	29	38
monoxyle ligne	Scombridae	Thons	jaodary, lamatra	Thunnus obesus	3,188	0,02	4 631,12	14 764	11	17
monoxyle kaokobe	Scombridae	Thons	jaodary, lamatra	Thunnus obesus	3,886	0,02	4 277,92	16 624	25	30
monoxyle kaokobe	Scombridae	Thons	Jaodary, lamatra	Thunnus albacares	0,411	0,00	4 002,43	1 645	29	34
monoxyle fusil à poissons	Scombridae	Thons	Tabaka, lamatra	Katsuwonus pelamis	8,29	0,04	3 200,00	26 528	19	20
monoxyle kaokobe	Scombridae	Thons	Tabaka, lamatra	Katsuwonus pelamis	1,979	0,01	2 999,49	5 936	26	31
monoxyle ligne	Scombridae	Thons (Makaire bleu)	Androaro	Makaira nigricans	11,277	0,06	2 766,96	31 203	22	29
monoxyle ligne	Scombridae	Thons (Makaire bleu)	Ndoaro, androaro	Istiophorus platypterus	2,285	0,01	2 999,56	6 854	6	11
monoxyle periky	Scombridae	Thons (Patudo, thon obèse)	Jaodary, angoho, belonary, diodary	Euthynnus affinis	118,028	0,63	4 020,10	474 484	36	44
monoxyle ligne	Scombridae	Thons (Patudo, thon obèse)	Jaodary, angoho, belonary, diodary	Euthynnus affinis	2,713	0,01	4 586,07	12 442	19	27
monoxyle kaokobe	Scombridae	Thons (Patudo, thon obèse)	Jaodary, angoho, belonary, diodary	Euthynnus affinis	5,522	0,03	3 823,25	21 112	25	30
monoxyle periky	Scombridae	Thons (thazard)	Ango, variagnavo, angoho, lamatra	Acanthocybium solandri	235	1,25	3 843,95	903 329	30	37
monoxyle ligne	Scombridae	Thons (thazard)	Ango, variagnavo, angoho, lamatra	Acanthocybium solandri	28,939	0,15	4 871,56	140 978	18	25
plancheNM Ligne	Scombridae	Thons (thazard)	Ango, variagnavo, angoho, lamatra	Acanthocybium solandri	15,236	0,08	5 985,10	91 189	10	12
monoxyle kaokobe	Scombridae	Thons (thazard)	Ango, variagnavo, angoho, lamatra	Acanthocybium solandri	7,055	0,04	4 242,66	29 932	24	28
monoxyle palangre	Scombridae	Thons (thazard)	Ango, variagnavo, angoho, lamatra	Acanthocybium solandri	0,79	0,00	5 003,80	3 953	66	66
monoxyle ligne	Carangidae	Thons (thazard)	Tefo, ang	Elagatis bipinnulata	0,879	0,00	5 005,69	4 400	21	28



Unite de pêche	Espèces	Nom local	Nom scientifique	Jours de pêche annuelle	Captures totales	Valeurs totales en Ar	CPUE (Kg/jour)	Moy Erreur Rel PUE 90%	Moy Erreur Rel Capture 90%
monoxyle kaokobe	Raies	Makoba	Himantura uarnak	16 852	9,525 t	33 886 Ar	0,565	22	27
monoxyle ligne	Raies	Makoba	Himantura uarnak	11 648	1,422 t	2 165 Ar	0,122	18	25
monoxyle palangre	Raies	Makoba	Himantura uarnak	7 236	10,436 t	20 871 Ar	1,442	66	66
monoxyle periky	Raies	Makoba	Himantura uarnak	494 777	285,069 t	1 176 481 Ar	0,576	39	46
monoxyle valakira	Raies	Makoba	Himantura uarnak	19 125	20,911 t	41 822 Ar	1,093	40	60
plancheNM Ligne	Raies	Makoba	Himantura uarnak	4 356	2,320 t	4 853 Ar	0,533	9	12
monoxyle kaokobe	Requins	Ankio	Selachimorpha (Pleurotremata)	13 351	6,912 t	25 761 Ar	0,518	22	27
monoxyle kaokobe	requins	Maroalala (Ankio)	Ariidae	3 501	1,101 t	2 894 Ar	0,314	23	28
monoxyle ligne	Requins	Ankio	Selachimorpha (Pleurotremata)	15 550	2,972 t	6 590 Ar	0,191	16	22
monoxyle palangre	Requins	Ankio	Selachimorpha (Pleurotremata)	14 713	54,544 t	109 087 Ar	3,707	97	97
monoxyle periky	Requins	Ankio	Selachimorpha (Pleurotremata)	221 502	48,393 t	182 730 Ar	0,218	24	31
monoxyle valakira	requins	Maroalala (Ankio)	Ariidae	21 161	39,516 t	79 031 Ar	1,867	23	37
monoxyle fusil à poissons	Thons	Tabaka, lamatra	Katsuwonus pelamis	3 792	8,290 t	26 528 Ar	2,186	19	20
monoxyle kaokobe	Thons	jaodary, lamatra	Thunnus obesus	8 490	3,886 t	16 624 Ar	0,458	25	30
monoxyle kaokobe	Thons	Jaodary, lamatra	Thunnus albacares	1 630	0,41t	1 645 Ar	0,252	29	34
monoxyle kaokobe	Thons	Tabaka, lamatra	Katsuwonus pelamis	1 609	1,979 t	5 936 Ar	1,23	26	31
monoxyle ligne	Thons	Bepakitsy	Lutjanus sebae	47 578	12,613 t	33 735 Ar	0,265	18	25
monoxyle ligne	Thons	jaodary, lamatra	Thunnus obesus	15 530	3,188 t	14 764 Ar	0,205	11	17
monoxyle palangre	Thons	Bepakitsy	Lutjanus sebae	7 477	1,486 t	4 459 Ar	0,199	21	21
monoxyle periky	Thons	jaodary, lamatra	Thunnus obesus	169 992	26,075 t	88 880 Ar	0,153	54	64
monoxyle periky	Thons	Jaodary, lamatra	Thunnus albacares	55 124	8,361 t	33 444 Ar	0,152	29	38
monoxyle ligne	Thons (Makaire bleu)	Androaro	Makaira nigricans	23 624	11,277 t	31 203 Ar	0,477	22	29
monoxyle ligne	Thons (Makaire bleu)	Ndoaro, androaro	Istiophorus platypterus	3 886	2,285 t	6 854 Ar	0,588	6	11
monoxyle kaokobe	Thons (Patudo, thon obèse)	Jaodary, angoho, belonary, diodary	Euthynnus affinis	10 257	5,522 t	21 112 Ar	0,538	25	30
monoxyle ligne	Thons (Patudo, thon obèse)	Jaodary, angoho, belonary, diodary	Euthynnus affinis	11 619	2,713 t	12 442 Ar	0,233	19	27
monoxyle periky	Thons (Patudo, thon obèse)	Jaodary, angoho, belonary, diodary	Euthynnus affinis	272 136	118,028 t	474 484 Ar	0,434	36	44
monoxyle kaokobe	Thons (thazard)	Ango, variagnavo, angoho, lamatra	Acanthocybium solandri	8 325	7,055 t	29 932 Ar	0,847	24	28
monoxyle ligne	Thons (thazard)	Ango, variagnavo, angoho, lamatra	Acanthocybium solandri	47 578	28,939 t	140 978 Ar	0,608	18	25
monoxyle ligne	Thons (thazard)	Tefo, angoho	Elagatis bipinnulata	4 435	0,87t	4 400 Ar	0,198	21	28
monoxyle palangre	Thons (thazard)	Ango, variagnavo, angoho, lamatra	Acanthocybium solandri	7 236	0,79t	3 953 Ar	0,109	66	66
monoxyle periky	Thons (thazard)	Ango, variagnavo, angoho, lamatra	Acanthocybium solandri	436 638	0,23t	903 329 Ar	0,54	30	37
plancheNM Ligne	Thons (thazard)	Ango, variagnavo, angoho, lamatra	Acanthocybium solandri	17 175	15,236 t	91 189 Ar	0,887	10	12

**6- Catch/value estimates by minor stratum and species (Unit: Tons): DIANA, ANALANJIROFO and MELAKY regions for the year - 2020**

Products	Diana		Analanjirofo		Melaky	
	Quantity (t)	Values in MGA (000')	Quantity (t)	Values in MGA (000')	Quantity (t)	Values in MGA (000')
squid	347,55	4 562 613	0,85	5 660		
Chubs	1 109,07	7 176 365			1 002	1 002 282
Congress	1,60	2 568	3,73	22 967	40	74 261
crabs	105,19	377 290	36,05	114 162	28	47 285
shrimp	1 611,97	8 914 868	117,83	1 080 579	50	239 452
<b>rays</b>	<b>332,19</b>	<b>1 291 366</b>	<b>36,58</b>	<b>148 330</b>	<b>882</b>	<b>774 859</b>
octopuses	85,20	325 252	35,43	131 717		
sea cucumber	571,00	6 688 496	54,61	80 444	258	4 816 249
varilava	170,26	170 263	0,43	1 296		
shells			74,82	40 013		
lobsters			14,39	211 307		
fish	13 739,72	49 678 994	8 650,98	47 860 795	4 680	7 990 065
<b>tunas nca</b>	<b>494,01</b>	<b>1 945 891,00</b>	<b>1 546,86</b>	<b>12 041 794,00</b>	<b>875</b>	<b>5 037 762</b>
<b>sharks</b>	<b>153,44</b>	<b>406 093</b>	<b>45,68</b>	<b>186 573</b>	<b>1 891</b>	<b>3 616 279</b>
<b>Grand Total</b>	<b>18 721,20</b>	<b>81 540 065</b>	<b>10 618,23</b>	<b>61 925 637</b>	<b>9 706</b>	<b>23 598 494</b>

**7-Catch estimates/values at level 14 Coastal regions by species after reconstitution (Unit: in Tonnes): For the year 2021-2022**

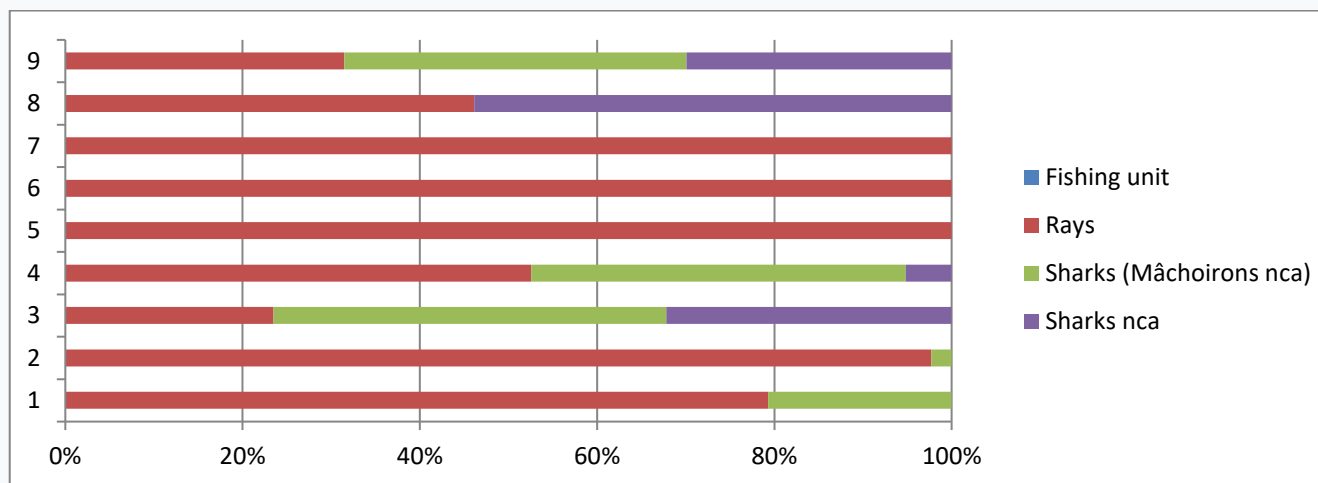
Year:	2021										
Products	Menabe	Analanjirofo	Atsimo Andrefana	Atsimo Atsinanana	Atsinanana	Boeny	Melaky	Diana	Vatovavy Fitovinany	TOTAL	
Rays	-	156,19		0,49	6,94	-	-	241,22	22,60	<b>427,44</b>	
Sharks	0,10	9,74		3,24	17,32	7,22	0,32	930,53	28,96	<b>997,44</b>	
Tunas	-	1230,83		7,25	13,84	-	-	327,11	-	<b>1 579,03</b>	
Year:	2022										
Products	Menabe	Analanjirofo	Atsimo Andrefana	Atsimo Atsinanana	Atsinanana	Boeny	Melaky	Diana	Vatovavy	Fitovinany	TOTAL
Rays	-	154,74	14,54	4,69	2,77	-	107,54	135,19	15,00	10,37	<b>444,84</b>
Sharks	1,69	215,84	18,65	4,45	2,06	30,49	140,31	78,76	-	10,18	<b>502,43</b>
Tunas	-	739,25	-	9,85	11,52	-	27,38	78,81	40,62	5,34	<b>912,77</b>

Source: DRPEB activity report  
Unit : Tons

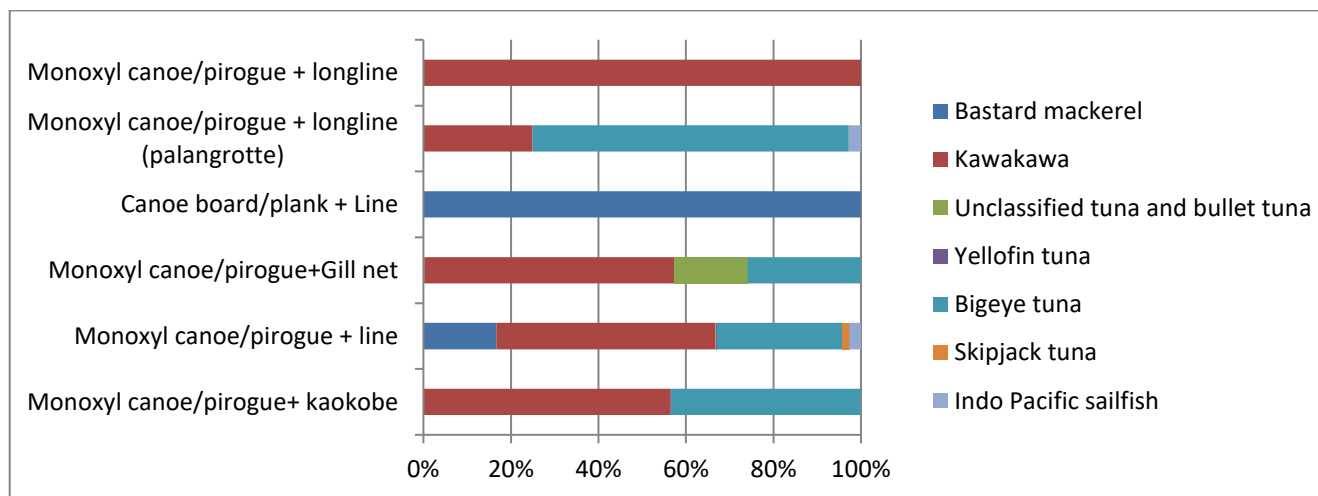
**-Per fishing unit per species**  
**Year : 2021**

Fishing unit	Rays	Sharks (Mâchoirons nca)	Sharks nca	Total Sharks (Tons)	Bastard mackerel	Kawakawa	Unclassified tuna and bullet tuna	Yellofin tuna	Bigeye tuna	Skipjack tuna	Indo Pacific sailfish	Total Tunas (Tons)	Grand Total(Tons)
Monoxyl canoe/pirogue+ kaokobe	20,55	5,36		<b>25,91</b>		11,50			8,84			<b>20,34</b>	<b>46,24</b>
Monoxyl canoe/pirogue + line	144,94	3,36	-	<b>148,30</b>	52,22	156,91	-	0,61	89,90	5,14	8,21	<b>312,99</b>	<b>461,30</b>
Monoxyl canoe/pirogue+Gill net	479,83	905,10	657,81	<b>2 042,74</b>	3,15	760,52	222,85	-	344,47	-	-	<b>1 330,99</b>	<b>3 373,73</b>
Monoxyl canoe/pirogue+ valakira	29,31	23,55	2,89	<b>55,76</b>								<b>-</b>	<b>55,76</b>
Canoe board/plank + Line	11,84			<b>11,84</b>	20,95							<b>20,95</b>	<b>32,79</b>
Monoxyl canoe/pirogue + longline (palangrotte)	8,27			<b>8,27</b>		166,64			484,02		18,59	<b>669,25</b>	<b>677,52</b>
Monoxyl canoe/pirogue+snorkel	13,14			<b>13,14</b>								<b>-</b>	<b>13,14</b>
Monoxyl canoe/pirogue + longline	56,60		66,10	<b>122,70</b>		1,70						<b>1,70</b>	<b>124,40</b>
	<b>764,48</b>	<b>937,38</b>	<b>726,81</b>	<b>2 428,66</b>	<b>76,32</b>	<b>1 097,27</b>	<b>222,85</b>	<b>0,61</b>	<b>927,22</b>	<b>5,14</b>	<b>26,80</b>	<b>2 356,22</b>	<b>4 784,87</b>

**Sharks:**



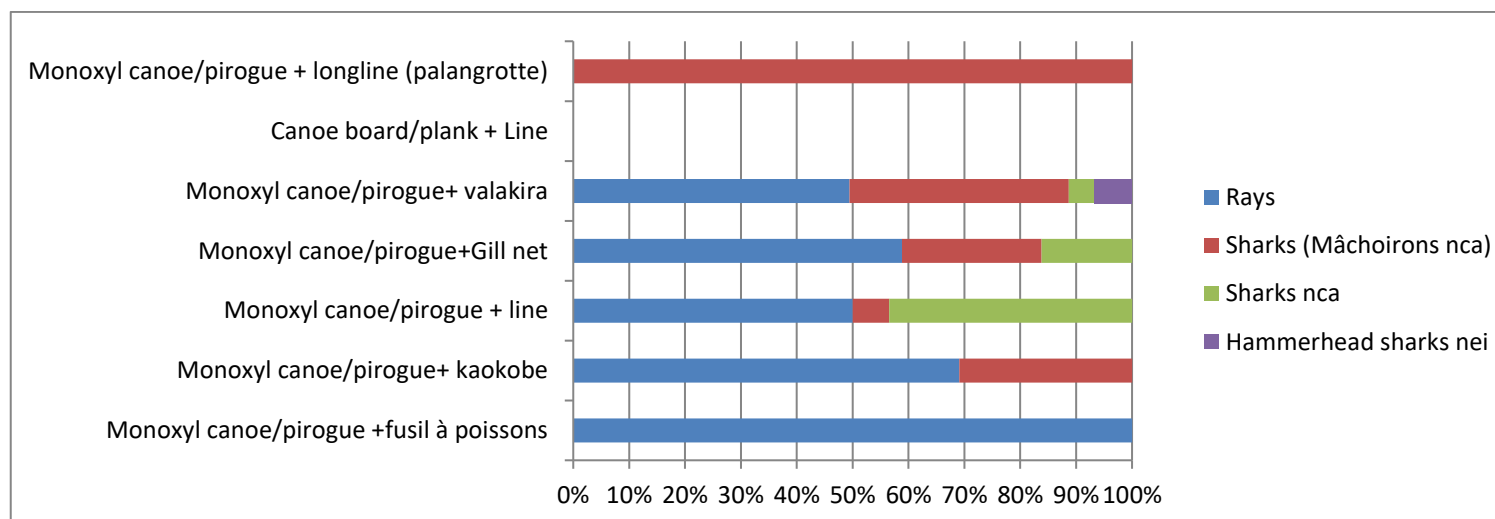
**Tunas :**

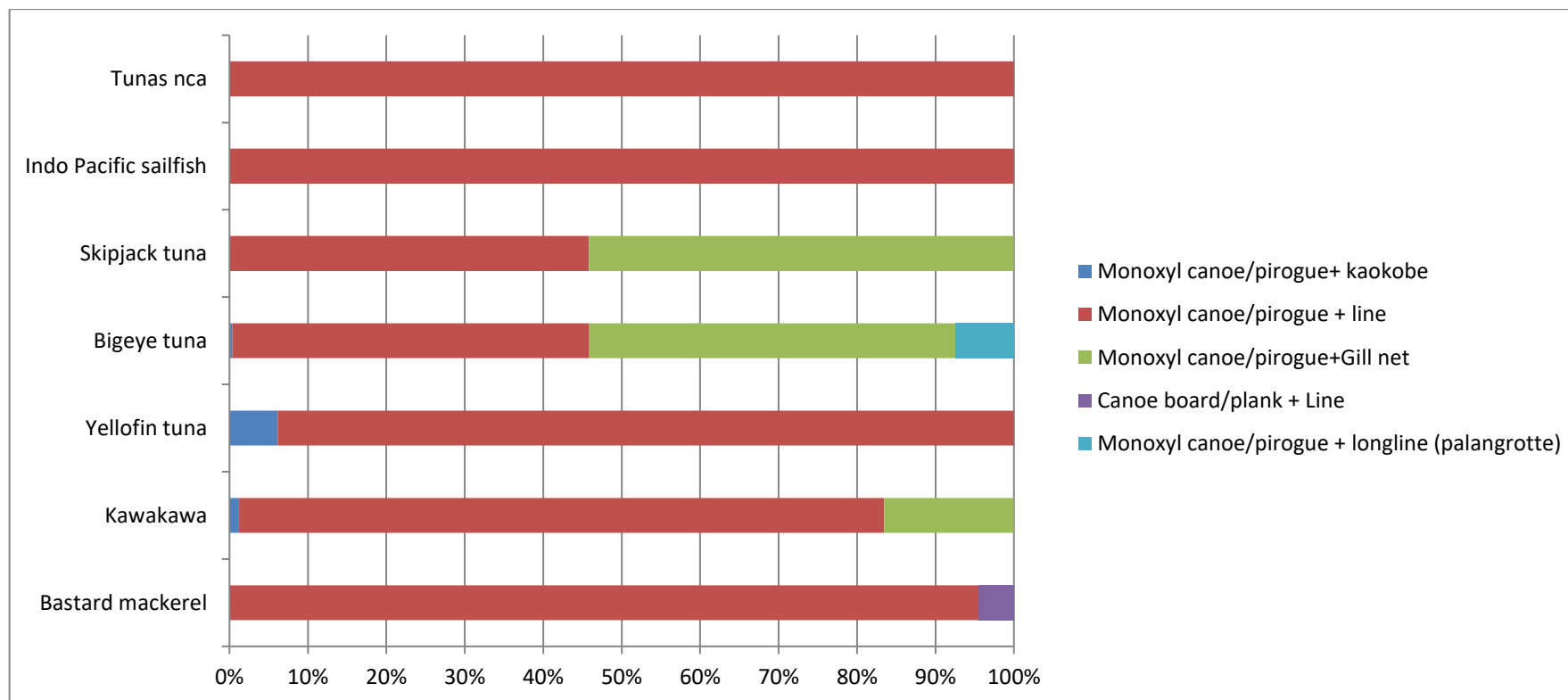


**Year : 2022**

Fishing unit	Rays	Sharks (Mâchoirons nca)	Sharks nca	Hammerhead sharks nei	Total Sharks (Tons)	Bastard mackerel	Kawakawa	Yellofin tuna	Bigeye tuna	Skipjack tuna	Indo Pacific sailfish	Tunas nca	Total Tunas (Tons)	Grand Total(Tons)
Monoxyl canoe/pirogue +fusil à poissons	4,09				4,09								-	4,09
Monoxyl canoe/pirogue+ kaokobe	4,60	2,06			6,66		4,34	0,36	0,98				5,68	12,34
Monoxyl canoe/pirogue + line	293,10	38,20	254,49	-	585,79	122,52	295,72	5,44	126,36	18,17	7,28	94,71	670,21	1 255,99
Monoxyl canoe/pirogue+Gill net	78,33	33,20	21,59	-	133,12	-	59,43	-	129,68	21,46	-		210,58	343,70
Monoxyl canoe/pirogue+ valakira	64,71	51,41	6,08	8,74	130,94								-	130,94
Canoe board/plank + Line					-	5,70							5,70	5,70
Monoxyl canoe/pirogue + longline (palangrotte)		88,35			88,35				20,61				20,61	108,96
<b>Grand Total(Tons)</b>	<b>444,83</b>	<b>213,22</b>	<b>282,16</b>	<b>8,74</b>	<b>948,95</b>	<b>128,22</b>	<b>359,49</b>	<b>5,80</b>	<b>277,64</b>	<b>39,63</b>	<b>7,28</b>	<b>94,71</b>	<b>912,77</b>	<b>1 861,72</b>

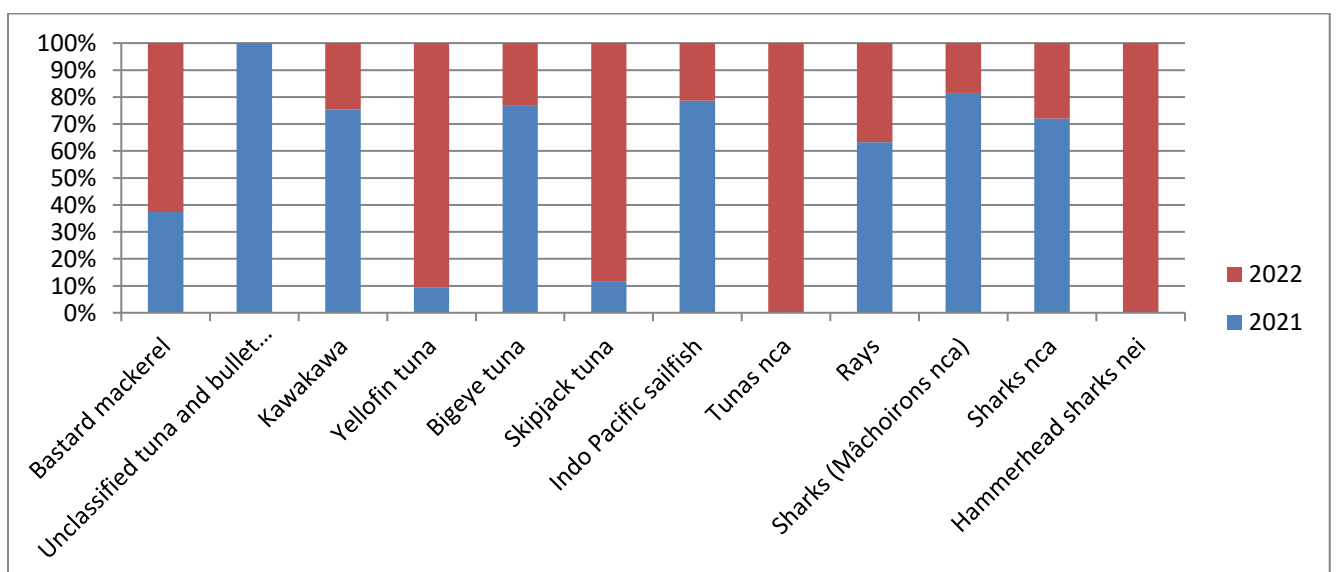
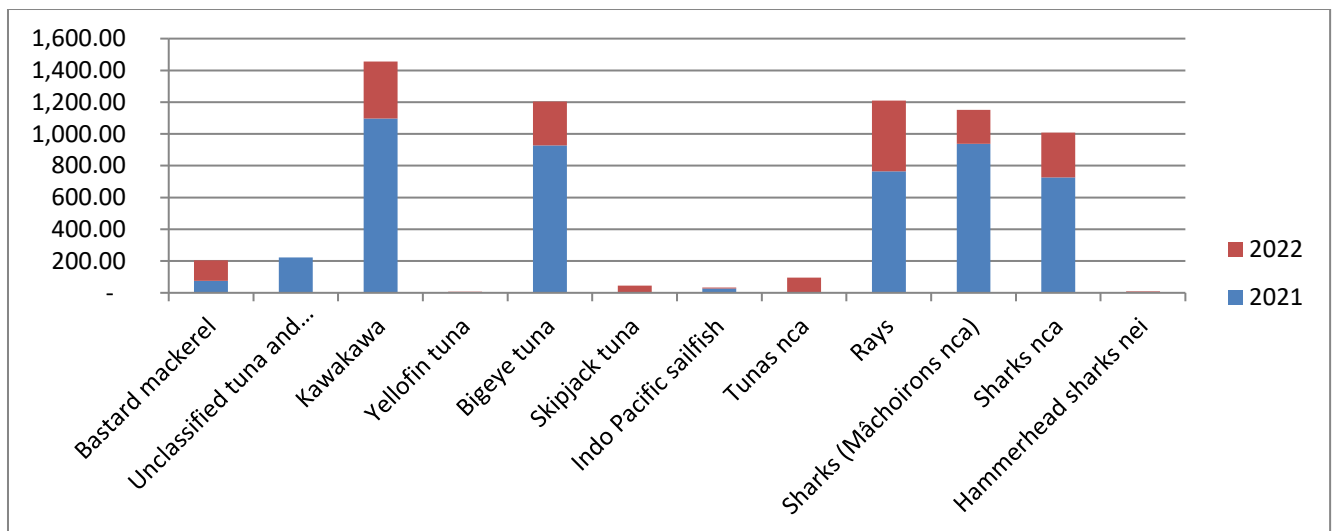
**Sharks :**



**Tunas :**

**8-Catch estimate Per species (Unit :Tons)**

Species	2021	2022
Bastard mackerel	76,32	128,22
Unclassified tuna and bullet tuna	222,85	
Kawakawa	1 097,27	359,49
Yellofin tuna	0,61	5,80
Bigeye tuna	927,22	277,64
Skipjack tuna	5,14	39,63
Indo Pacific sailfish	26,80	7,28
Tunas nca		94,71
Rays	764,48	444,83
Sharks (Mâchoirons nca)	937,38	213,22
Sharks nca	726,81	282,16
Hammerhead sharks nei		8,74



In summary, the data from **OPENARTFISH** are all species of **the small-scale fishery combined**, on the one hand **the estimate of tuna fishing catches** is between two thousand three hundred and fifty six **(2,356) tonnes** to three thousand one hundred and sixty **(3,160) tonnes (maximum catches)** and on the other hand for **sharks and rays** it is between two thousand four hundred and thirty **(2,430) tonnes** to two thousand eight hundred **(2,800) tonnes (maximum catches)** .

## 6-Future prospects

- Carry out a framework survey specific to small-scale tuna fishing (Analanjirofo, Atsinanana, Sofia, Boeny, Atsimo Andrefana, Menabe, Androy, Anosy, Melaky, Atsimo Atsinanana and Diana);
- Recruitment and deployment of data collectors at the survey site level;
- Establishment of a data collection network on small-scale tuna fishing;
- Updating basic data in the WEB application: framework survey, species identification and settings in the web application and updating the mobile application, distribution of the sample by investigators;



- measurement: height and weigh