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SOUTH WEST INDIAN OCEAN FISHERIES GOVERNANCE AND SHARED GROWTH PROJECT 1



Study on Tuna Fisheries Direct and Indirect Contribution to GDP and Wealth Distribution Patterns in the SWIOFC Member Countries

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ABBREVIATION AND ACRONYMES

Acronym	Description
ACLME.	Agulhas Current Large Marine Ecosystem
AIS	Automatic identification system
AU-IBAR	The African Union Inter-African Bureau for Animal Resources
BMU	Beach Management Unit
CCRF	FAO Code of Conduct for Responsible Fisheries
CFP	The Common Fisheries Policy
C.I.F.	Cost, Insurance, and Freight
CMM	Conservation Management Measure
CMP	Conservation Management Plan
CoC	Chain of Custody
COMESA	Common Market for Eastern and Southern Africa
CPC	IOTC Contracting Party (Member) and Cooperating Non-Contracting Party
CPUE	Catch per Unit of Effort
DWFNs	Distant Water Fishing Nations
EAC	East African Community
EA-SA-IO	Eastern African-Southern African-Indian Ocean
EASF	East African Sea Food Limited
EBM	Ecosystem Based Management
EEZs	Exclusive Economic Zones
EMFF	European Maritime and Fisheries Fund
EU	European Union
EPAs	Economic Partnership Agreements
ESA	Eastern and Southern Africa
FAA	Fisheries access arrangements
FADs	Fish Aggregating Devices
FAO	Food and Agriculture Organisation of the United Nations
FIP	Fishery's Improvement Program
SFA- FEIU	Seychelles Fisheries Authority, Fisheries Economics Intelligence Unit
FIS	Fisheries Information System
FiTI	Fisheries Transparency Initiative
F.O.B.	Free On Board
FTA	Free Trade Agreement
GDP	Gross Domestic Product
GFW	Global Fishing Watch
GoK	Government of Kenya
GRT	Gross Registered Tons
GSP	Generalized System of Preferences
GT	Gross Tons
GVA	Gross Value Added
GVA-FU	Gross Value Added – Final Use
HCRs	Harvest control rules
IEPA	Interim Economic Partnership Agreement
IGAD	Intergovernmental Authority on Development
IHO	International Hydrographic Organization
IMO	the International Maritime Organization
IOC	Indian Ocean Commission
IOTC	Indian Ocean Tuna Commission
IOO	Indian Ocean Observatory for Ports and Cities
IPOA-IUU	International Plan of Action to Prevent, Deter, and Eliminate Illegal, Unreported

Acronym	Description
	and Unregulated Fishing
ISSF	International Seafood Sustainability Foundation
ITC	International Trade Centre
IUU	Illegal, Unreported and Unregulated
GWte	Greenweight equivalent (i.e. live weight)
KeFS	Kenya Fisheries Service
KEMFRI	Kenya Marine and Fisheries Research Institute
KEMFSED	Kenya Marine Fisheries and Socio Economic Development Project
KMFRI	Kenya Marine and Fisheries Research Institute
LME	Large Marine Ecosystem
LOA	Length overall
LVFO	Lake Victoria Fisheries Organisation
MARPOL	the International Convention for the Prevention of Pollution from Ships (as in MARine POLlution)
MCS	Monitoring, Control and Surveillance
MEPC	Marine Environment Protection Committee
MEY	Maximum Economic Yield
MFN	Most Favoured Nation
MOU	Memorandum of Understanding
MSC	The Marine Stewardship Council
MSY	Maximum sustainable yield
Mt	Metric tonnes
NGO	Non-Governmental Organisation
NTMs	Non-Tariff Measures
OVPOI	Observatory of Port and Cities of the Indian Ocean
SDG	Sustainable Development Goal
SFA	Seychelles Fisheries Authority
SFP	Sustainable Fisheries Partnership
SFPA	Sustainable Fisheries Partnership Agreement
SGP	Simple Gross Profit
SPA	Seychelles Port Authority
SWIO	South West Indian Ocean
SWIOFC	South West Indian Ocean Fisheries Commission
UNCLOS	The United Nations Convention on the Law of the Sea
VBA	Visual Basic for Applications
VC	Value Chain
VCA	Value Chain Analysis
WCO	World Customs Organization

PREAMBLE

The timing of this project which was scheduled to start in April 2019 and finish by the end of June 2019 was delayed by unanticipated circumstances; On April 25th 2019, a presentation by the consultant was held in Cape Town, South Africa with the participation of the SWIOFC member states (MS) delegates who were meeting there for a workshop organized by the IOC, WWF and IPNLF. The objective of the presentation was to introduce the SWIOFC MS to the project's methodology as presented in the inception report and to showcase some of the potential outputs including country's specific economic dashboards. This presentation was meant to trigger some interests and enthusiasm among the SWIOFC MS participants.

As a follow up to the presentation, the SWIOFC MS were informed that a questionnaire would follow, requesting their contribution to produce some data related to the tuna fishery sector in their country. Then, as planned, on May 3rd 2019, an email was sent to all SWIOFC delegates present at the Cape Town workshop with a questionnaire requesting any information pertaining to the economic contribution of the tuna fishery sector in their country. By June 19th 2019, delegates from only two SWIOFC MS had replied to the request with information.

Following the poor response rate from the previous attempt, a more "user friendly" questionnaire was produced and send on July 23rd with a last reminder.

Despite this last effort, no SWIOFC delegates responded positively to the second request.

Then, on October 23rd following the SWIOFC S10 session held in end of September/ early October in Maldives, the SWIOFC MS were given the opportunity to submit views and comments on a first draft of the report. Although, the deadline for the submission of views and comments was set for the end of November 2019, to this date, no feedback has been received as of yet.

As a consequence, the original structure and analysis in this report had to adapt to this poor response rate and thus lack of crucial data, nevertheless and given the circumstances this report was written as close as possible to what was originally intended to faithfully reflect the TOR.

DISCLAIMER

This document has been prepared in good faith on the basis of information available at the date of publication without any independent verification. Some of the information and data in this report came from various sources, mostly found online; The Consultant, Philippe Lallemand makes no warranties express or otherwise or warrant the accuracy, reliability, completeness or currency of the information in this report nor its usefulness in achieving any purpose. Readers are responsible for assessing the relevance and accuracy of the content of this report. Under no circumstance will the consultant be liable for any loss, damage, cost or expense incurred or arising by reason of any person using or relying on information in this report.

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this project is greatly appreciated.

1 BACKGROUND AND CONTEXT

1.1 The Indian Ocean Tuna Resources

The Indian Ocean is the world's second largest tuna production area behind the Western Pacific Ocean. It accounts for nearly 20% of the world commercial tuna catch or 1.4 million tons in 2016 (FAO, 2019b) and 16% of the world tuna industry's revenue or USD 6.5 billion based on total wholesale price of canned tuna. Two types of fleet operate in the Indian Ocean, an industrial distant water fishing fleet and a coastal small-scale fleet, mostly of the artisanal type. Unlike other marine regions, these artisanal coastal fleets contribute significantly to the overall fishing effort, accounting for more than half of the catches. Therefore, a vast majority of Indian Ocean tuna fishers are artisanal fishers, and most of the tuna fleet consists of small fishing units, operating well inside the exclusive economic zones, sometimes less than 3 miles from the shoreline.

As a consequence, neritic tuna, one of the most common species caught in the Indian Ocean is almost exclusively caught by coastal fleets playing an important role for the coastal communities: this coastal tuna species represents 36% of the total tuna catch in the Indian Ocean.

Indian Ocean tuna catches supply local and export markets, providing a diverse range of end products: canned tuna, sashimi, steak tuna, dried tuna and Maldives Fish. Six sectors account for nearly 77% of the total catch in the Indian Ocean and their trade turnover amounts to an estimated value of USD 2.9 billion (Lecomte, Rochette, Laurans, & Lapeyre, 2017):

- Tuna canneries in the Western Indian Ocean (Seychelles, Mauritius, Madagascar) supplied by the European purse seiners fleet;
- Catches of artisanal fleets that supply local markets;
- Gillnetters from the Middle East that supply Iranian canneries;
- Freezer longliners supplying the Japanese sashimi market;
- Processing units specializing in fresh tuna for the sashimi and fresh markets;
- Catches from MSC-certified Maldivian pole and line vessels.

The Indian Ocean Tuna Industries are among the main suppliers of the world's tuna can, steak and sashimi markets.

Nearly half (44%) of the catch comes from stocks that are overexploited and overfished. The two species mainly concerned, yellowfin tuna and longtail tuna, supports industries with major economic stakes. At present, however, only yellowfin tuna is the subject of IOTC management measures (IOTC-SC21, 2018).

Some fisheries in the Indian Ocean have a significant bycatch (cetaceans, rays, sharks, etc.). Gillnet fisheries for example account for nearly 29,500 tons of bycatch per year, and industrial longline fisheries for almost 22,130 tons (including bait).

Part of the fleet operating in the Indian Ocean remains uncontrolled and poorly documented: almost half of the catch data is incomplete or unavailable and the capacity of some fleets remains unknown. The development plans outlined by coastal States of the Indian Ocean, if implemented, would increase fishing capacity by about 250% above 2006-2007 levels, a level incompatible with the sustainable exploitation of tuna resources. Finding the right balance between opening the fishery to new entrants and keeping the status quo with a fishing fleet to its current level is a major challenge for the coming years.

Indian Ocean tuna fisheries are plagued by weak governance: As a consequence, the Indian Ocean Tuna Commission (IOTC) is struggling to establish management measures, especially because of the diverging interests and priorities between the artisanal coastal fishing fleets and the industrial distant water fishing fleets. The management policies of coastal States are often limited, a fact exacerbated by the lack of available resources for the fishing sector which hinders an effective monitoring, control and surveillance of these fisheries. Trade and marketing seems to be somewhat developed and rather effective, although remains limited to few export markets.

1.2 Focus on the SWIO Region

Regional Fishery Bodies (RFB) are the critical means for promoting long-term sustainable fisheries where international cooperation is required in conservation and management. One of the main RFB involved in the SWIO region is the South West Indian Ocean Fisheries Commission or SWIOFC. SWIOFC was established in 2004 by Resolution 1/127 of the FAO Council under Article VI 1 of the FAO Constitution. Its Rules of Procedures were adopted by the Commission at its First session in 2005. SWIOFC's main objective is to promote the sustainable utilization of the living marine resources of the Southwest Indian Ocean region, by the proper management and development of the living marine resources, and to address common problems of fisheries management and development faced by the Members of SWIOFC. SWIOFC promotes the application of the provisions of the FAO Code of Conduct on Responsible Fisheries (FAO, 1995), including the precautionary approach and the ecosystem approach to fisheries management. (FAO, 2019).

SWIOFC membership is composed of nine African countries which are Comoros, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, South Africa and Tanzania as well as the non-African countries which are Yemen, Mayotte (France), La Réunion (France) and the Maldives (Figure 1-1). It is our understanding that those nine African countries plus the Maldives constitute the main geographic scope of this study. Although Yemen, La Réunion (France) and Mayotte (France) are also part of SWIOFC we covered these countries only partially in this report.

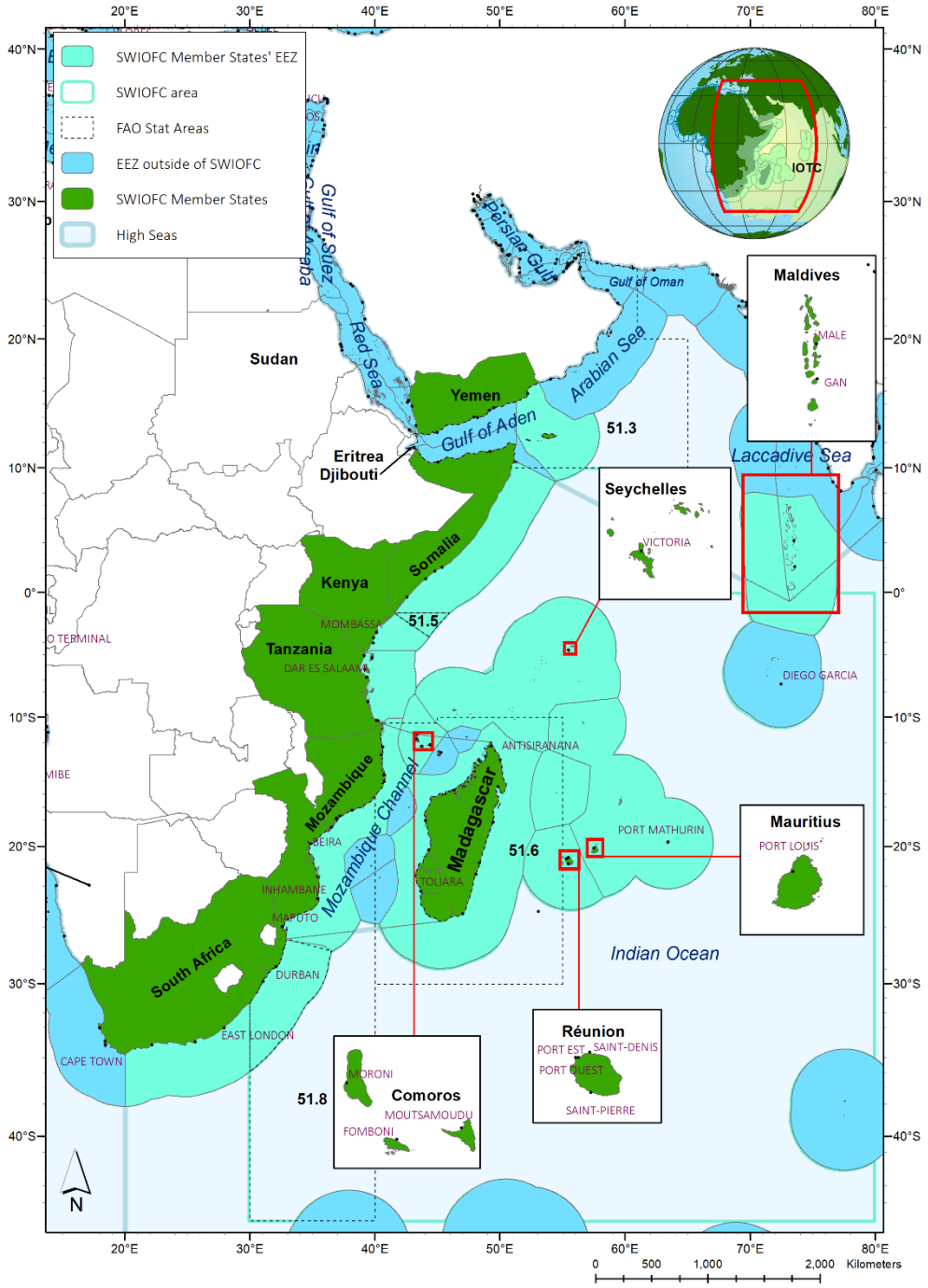


Figure 1-1: Marine zone and region under the SWIOFC jurisdiction (relevant EEZs in Turquoise, Member States in darker green)

From Now on, we will refer to the selected SWIOFC Member States as the "SWIOFC MS" for short. Table 1-1 and Table 1-2 below summarise the various membership of the African SWIOFC MS to Regional Economic Communities (RECs), Regional Fisheries Bodies (RFBs) and Regional Fisheries Management Organisations (RFMOs). These regional fisheries organisations play an important role in influencing the fishery sectors and the activities of its member whether it be through economic advice (RECs), science and technology (RFMOs) or through policy and management advise (RFBs and RFMOs). The Organisations listed below are also an important source of grey literature that provided some useful information for this project. We note that since the tables below refer only to RECs and RFBs, they do not include the African Union Inter-African Bureau for Animal Resources (AU-IBAR) from which

each African SWIOFC MS is a member; the AU-IBAR provides an important source of reporting materials on African fisheries from its involvement in the region under the FISHGov and FISHTrade projects. One can also find in the tables the EEZ's extent of each African SWIOFC MS and its relation to the overall SWIO EEZ. This suggests that about three quarter (74.76%) of the SWIO EEZ falls in EEZs managed by Eastern African Countries. We note that South Africa's EEZ's calculation only includes the Indian Ocean portion and was adjusted accordingly.

Table 1-1: SWIOFC MS' Memberships with relevant African RECs

Region/ Country	AEC African Economic Community	AU African Union	CEN-SAD Community of Sahel-Saharan States	COMESA Common Market for Eastern and Southern Africa	EAC East African Community	IGAD Intergovernmental Authority on Development	IOC Indian Ocean Commission	SACU Southern African Customs Union	SADC Southern African Development Community	SAARC South Asian Association for Regional Cooperation	CAEU Council of Arab Economic Unity	EEZ size (km2)	EEZ as a % of SWIO
Southern Africa	**1**	**1**						**1**	**1**			**701,273.98**[1]	**8.81%**
South Africa	✓	✓						✓	✓			*701,273.98*	*8.81%*
Eastern Africa	**8**	**8**	**3**	**6**	**2**	**2**	**5**		**6**			**5,950,408.23**	**74.76%**
Comoros	✓	✓	✓	✓			✓		✓			*217,426.57*	*2.73%*
Kenya	✓	✓	✓	✓	✓	✓						*115,345.67*	*1.45%*
Madagascar	✓	✓		✓			✓		✓			*1,208,170.20*	*15.18%*
Mauritius	✓	✓		✓			✓		✓			*1,292,399.26*	*16.24%*
Mozambique	✓	✓							✓			*572,017.52*	*7.19%*
Réunion							✓					*318,442.38*	*4.00%*
Seychelles	✓	✓		✓			✓		✓			*1,359,067.68*	*17.07%*
Somalia	✓	✓	✓	✓		✓						*622,799.56*	*7.82%*
Tanzania	✓	✓			✓				✓			*244,739.39*	*3.07%*
Middle East - Asia										**1**	**1**	**1,307,799.72**	**16.43%**
Maldives										✓		*937,622.94*	*11.78%*
Yemen											✓	*370,176.78*	*4.65%*
Totals	**9**	**9**	**3**	**6**	**2**	**2**	**5**	**1**	**7**	**1**	**1**	**7,959,481.93**	**100%**

[1] Indian Ocean portion

Table 1-2: SWIOFC MS' Memberships with relevant African RFBs and RFMOs

Region/ Country	Bay of Bengal Programme Inter-Governmental Organization (BOBP-IGO)	Coordinating Working Party on Fishery Statistics (CWP)	Indian Ocean Commission (IOC)	Indian Ocean Tuna Commission (IOTC)	Regional Organization for the conservation of the (PERSGA)	Stop Illegal Fishing (SIF)	South Indian Ocean Fisheries Agreement (SIOFA)	Southwest Indian Ocean Fisheries Commission (SWIOFC)	Western Indian Ocean Tuna Organization (WIOTO)	EEZ size (km2)	EEZ as a % of SWIO
Southern Africa		**1**		**1**		**1**		**1**		**701,273.98**[1]	**8.81%**
South Africa		✓		✓		✓		✓		*701,273.98*	*8.81%*
Eastern Africa		**9**	**4**	**9**	**1**	**6**	**4**	**9**	**3**	**5,950,408.23**	**74.76%**
Comoros		✓	✓	✓			✓	✓	✓	*217,426.57*	*2.73%*
Kenya		✓		✓		✓		✓		*115,345.67*	*1.45%*
Madagascar		✓	✓	✓		✓		✓		*1,208,170.20*	*15.18%*
Mauritius		✓	✓	✓		✓	✓	✓	✓	*1,292,399.26*	*16.24%*
Mozambique		✓		✓		✓		✓		*572,017.52*	*7.19%*
Réunion		✓		✓			✓	✓		*318,442.38*	*4.00%*
Seychelles		✓	✓	✓		✓	✓	✓	✓	*1,359,067.68*	*17.07%*
Somalia		✓		✓	✓			✓		*622,799.56*	*7.82%*
Tanzania		✓		✓		✓		✓		*244,739.39*	*3.07%*
Middle East- Asia	**1**	**2**		**2**				**2**		**1,307,799.72**	**16.43%**
Maldives	✓	✓	✓	✓				✓		*937,622.94*	*11.78%*
Yemen		✓		✓				✓		*370,176.78*	*4.65%*
Totals	**1**	**12**	**4**	**12**	**1**	**7**	**4**	**12**	**3**	**7,959,481.93**	**100%**

[1] Indian Ocean portion

Recent data on SWIO Tuna catch by IOTC (IOTC, 2019) shows that only 11 of the 12 SWIOFC MS reported tuna catches in 2017; although it is a member of IOTC, Somalia did not record any tuna catch in 2017 nor 2016[1].

[1] There was no data for Somalia in the IOTC database in 2016 and 2017

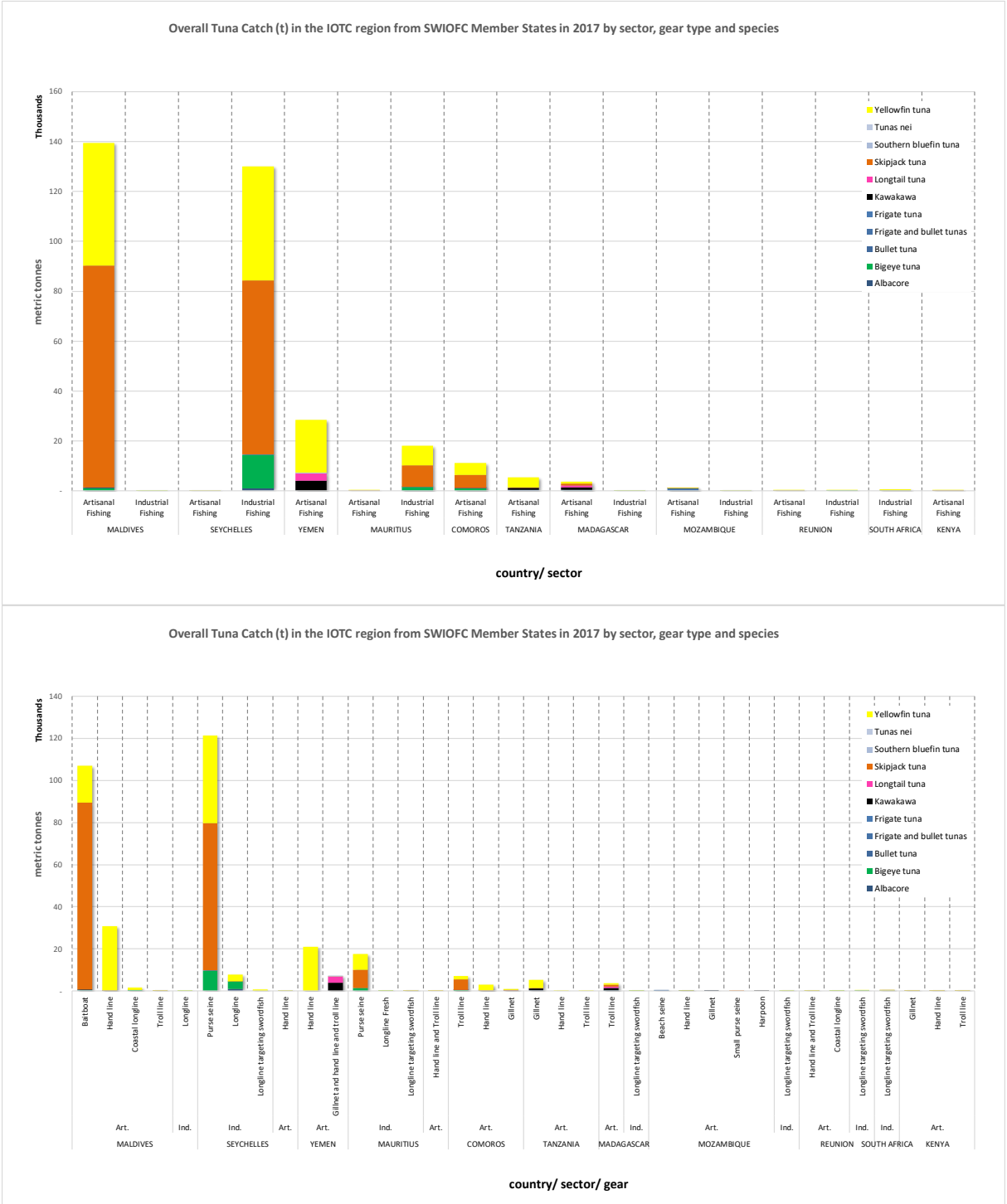


Figure 1-2: Tuna catch (t) in the IOTC region in 2017, delineated by tuna species, SWIOFC Member State (except Réunion), main sector (top graph) and method/ gear/ sector type (bottom graph) (Source: IOTC (2019))

By looking at Figure 1-2, it is clear that the industrial purse seine fishery from Seychelles and the Pole and line artisanal fishery from the Maldives are the dominant tuna fishing sectors among the SWIOFC MS in the region with tuna catch well exceeding catch from their neighbouring states. Also, there does not appear to be an industrial fishing sector in the Comoros, Kenya, Tanzania nor Yemen and there is no data reported for an artisanal tuna fishing sector in the Indian Ocean region of South Africa.
Table 1-3 below shows in more details the breakdown between species, main sector and gear type.

Table 1-3: 2017 Tuna catch in tonnes in the SWIOFC region by member state, sector, method and tuna species (source: IOTC 2017)

Catch (t) / Country/ Sector/ Gear	Species: Albacore	Bigeye tuna	Bullet tuna	Frigate and bullet tunas	Frigate tuna	Kawakawa	Longtail tuna	Skipjack tuna	Southern bluefin tuna	Tunas nei	Yellowfin tuna	Tunas Total
MALDIVES	**3.47**	**1,074.24**			**344.05**	**159.57**		**88,825.04**			**49,359.75**	**139,766.12**
Artisanal Fishing	**3.47**	**947.04**			**344.05**	**159.57**		**88,825.04**			**49,140.10**	**139,419.28**
Baitboat		269.17			334.26	141.86		88,617.12			17,499.96	106,862.37
Baitboat		269.17			334.26	141.86		88,617.12			17,499.96	106,862.37
Line	3.47	677.87			9.79	17.71		207.93			31,640.14	32,556.91
Hand line		112.76			1.41	9.20		197.70			30,562.69	30,883.76
Coastal longline	3.47	564.83						1.12			1,048.92	1,618.34
Troll line		0.28			8.38	8.51		9.11			28.53	54.81
Industrial Fishing		**127.20**									**219.64**	**346.84**
Longline		127.20									219.64	346.84
Longline		127.20									219.64	346.84
SEYCHELLES	**954.15**	**13,485.69**		**127.70**		**69.60**		**69,782.58**		**4.11**	**45,599.73**	**130,023.56**
Artisanal Fishing						**69.60**				**4.11**	**0.10**	**73.81**
Line						69.60				4.11	0.10	73.81
Hand line						69.60				4.11	0.10	73.81
Industrial Fishing	**954.15**	**13,485.69**		**127.70**				**69,782.58**			**45,599.63**	**129,949.75**
Longline	898.40	3,795.37						3.71			3,957.28	8,654.76
Longline	898.40	3,677.51						3.71			3,210.12	7,789.75
Longline targeting swordfish		117.86									747.15	865.01
Purse Seine	55.76	9,690.32		127.70				69,778.87			41,642.35	121,294.99
Purse seine	55.76	9,690.32		127.70				69,778.87			41,642.35	121,294.99
YEMEN					**18.00**	**4,050.00**	**2,850.00**	**61.00**		**360.00**	**21,100.00**	**28,439.00**
Artisanal Fishing					**18.00**	**4,050.00**	**2,850.00**	**61.00**		**360.00**	**21,100.00**	**28,439.00**
Gillnet					18.00	4,050.00	2,850.00	61.00		360.00		7,339.00
Gillnet and hand line and troll line					18.00	4,050.00	2,850.00	61.00		360.00		7,339.00
Line											21,100.00	21,100.00
Hand line											21,100.00	21,100.00
MAURITIUS	**334.21**	**1,512.39**	**1.18**		**0.20**			**8,520.03**			**8,016.52**	**18,384.53**
Artisanal Fishing	**162.60**							**16.10**			**69.20**	**247.90**
Line	162.60							16.10			69.20	247.90
Hand line and Troll line	162.60							16.10			69.20	247.90
Industrial Fishing	**171.61**	**1,512.39**	**1.18**		**0.20**			**8,503.93**			**7,947.32**	**18,136.63**
Longline	38.01	158.89	1.18		0.20			0.63			265.92	464.83
Longline Fresh	2.14	109.87									140.71	252.72
Longline targeting swordfis	35.87	49.03	1.18		0.20			0.63			125.20	212.11
Purse Seine	133.60	1,353.50						8,503.30			7,681.40	17,671.80
Purse seine	133.60	1,353.50						8,503.30			7,681.40	17,671.80
COMOROS	**81.27**	**1,052.11**	**3.81**		**33.15**	**42.31**	**37.36**	**5,231.46**			**4,806.01**	**11,287.49**
Artisanal Fishing	**81.27**	**1,052.11**	**3.81**		**33.15**	**42.31**	**37.36**	**5,231.46**			**4,806.01**	**11,287.49**
Gillnet	60.66	202.97	3.21		23.06	6.88	13.55	235.27			546.84	1,092.44
Gillnet	60.66	202.97	3.21		23.06	6.88	13.55	235.27			546.84	1,092.44
Line	20.61	849.14	0.61		10.09	35.43	23.81	4,996.19			4,259.17	10,195.05
Troll line	12.82	580.33	0.29		0.49	34.19	0.29	4,951.67			1,550.51	7,130.58
Hand line	7.79	268.81	0.32		9.60	1.24	23.52	44.53			2,708.66	3,064.47
TANZANIA					**370.98**	**764.66**		**370.98**			**3,903.59**	**5,410.20**
Artisanal Fishing					**370.98**	**764.66**		**370.98**			**3,903.59**	**5,410.20**
Gillnet					370.98	764.66		370.98			3,813.60	5,320.22
Gillnet					370.98	764.66		370.98			3,813.60	5,320.22
Line											89.98	89.98
Hand line											46.10	46.10
Troll line											43.88	43.88
MADAGASCAR	**39.01**	**57.18**	**179.28**		**180.28**	**1,076.61**	**724.14**	**834.47**			**702.95**	**3,793.92**
Artisanal Fishing		**26.62**	**179.28**		**180.28**	**1,076.61**	**724.14**	**834.47**			**675.27**	**3,696.66**
Line		26.62	179.28		180.28	1,076.61	724.14	834.47			675.27	3,696.66
Troll line		26.62	179.28		180.28	1,076.61	724.14	834.47			675.27	3,696.66
Industrial Fishing	**39.01**	**30.56**									**27.69**	**97.25**
Longline	39.01	30.56									27.69	97.25
Longline targeting swordfis	39.01	30.56									27.69	97.25
MOZAMBIQUE	**0.84**	**51.14**		**950.20**		**39.50**		**49.30**	**0.09**		**168.27**	**1,259.33**
Artisanal Fishing		**27.60**		**950.20**		**39.50**		**49.30**			**79.50**	**1,146.10**
Gillnet				184.10		17.30						201.40
Gillnet				184.10		17.30						201.40
Line		8.20		128.20		14.10					79.50	230.00
Hand line		8.20		128.20		14.10					79.50	230.00
Other		19.40		637.90		8.10						665.40
Beach seine		19.40		637.90								657.30
Harpoon						8.10						8.10
Purse Seine								49.30				49.30
Small purse seine								49.30				49.30
Industrial Fishing	**0.84**	**23.54**							**0.09**		**88.77**	**113.23**
Longline	0.84	23.54							0.09		88.77	113.23
Longline targeting swordfish	0.84	23.54							0.09		88.77	113.23
REUNION	**262.23**	**198.79**						**59.36**			**562.62**	**1,083.00**
Artisanal Fishing	**111.46**	**11.83**						**59.36**			**363.09**	**545.75**
Line	111.46	11.83						59.36			363.09	545.75
Hand line and Troll line	58.45	0.05						59.36			301.91	419.77
Coastal longline	53.01	11.79									61.19	125.99
Industrial Fishing	**150.77**	**186.95**									**199.53**	**537.25**
Longline	150.77	186.95									199.53	537.25
Longline targeting swordfish	150.77	186.95									199.53	537.25
SOUTH AFRICA	**26.50**	**261.67**						**0.47**	**46.84**		**247.48**	**582.97**
Industrial Fishing	**26.50**	**261.67**						**0.47**	**46.84**		**247.48**	**582.97**
Longline	26.50	261.67						0.47	46.84		247.48	582.97
Longline targeting swordfish	26.50	261.67						0.47	46.84		247.48	582.97
KENYA					**52.59**	**108.41**		**52.59**			**108.41**	**322.00**
Artisanal Fishing					**52.59**	**108.41**		**52.59**			**108.41**	**322.00**
Gillnet					39.72	81.87		39.72			81.87	243.18
Gillnet					39.72	81.87		39.72			81.87	243.18
Line					12.87	26.54		12.87			26.54	78.82
Hand line					6.60	13.60		6.60			13.60	40.38
Troll line					6.28	12.94		6.28			12.94	38.44
Tunas Total	**1,701.69**	**17,693.22**	**184.27**	**1,077.90**	**999.25**	**6,310.66**	**3,611.49**	**173,787.29**	**46.93**	**364.11**	**134,575.30**	**340,352.11**

This is our interpretation that ultimately one of the purpose of this study is to generate information that can be used to produce a map similar to Figure 1-3 but showing essentially the contribution of the tuna fisheries to economy of the relevant SWIOFC member states within the scope of this study.

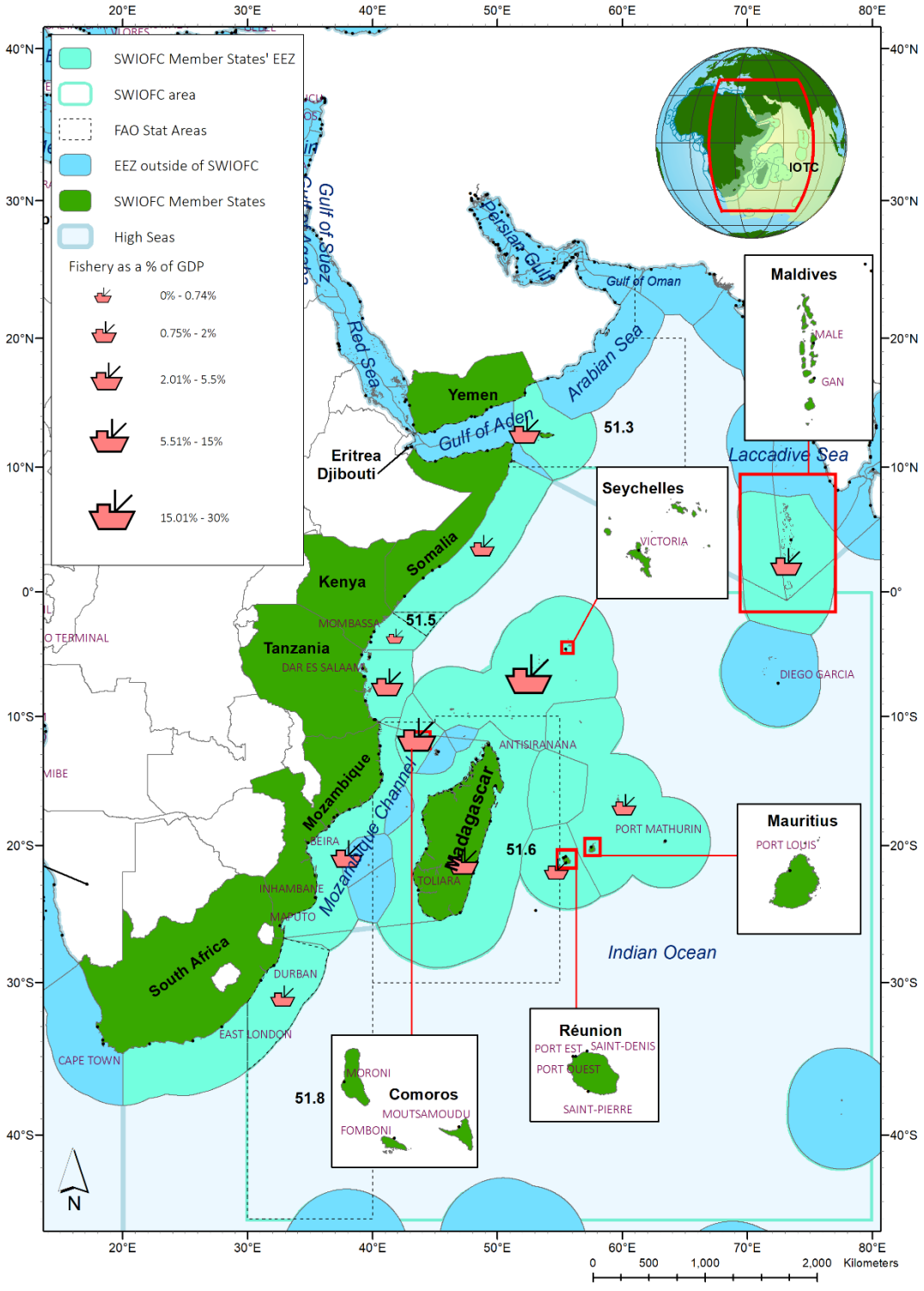


Figure 1-3: Fishery as a percent of GDP distribution map among relevant coastal SWIOFC member States Compiled by the author based on de Graaf & Garibald (2014) , The World Bank (2019a), Republic of Yemen (2012)

Figure 1-3 shows the relative importance of fishing (all species combined) in each SWIOFC MS economy and expressed as a percentage of each GDP's country.

Table 1-4: The Fisheries sector as a percentage of GDP among SWIOFC MS. Source (de Graaf & Garibaldi, 2014), (The World Bank, 2019a) and (Republic of Yemen, 2012)

Country	Fisheries sector as a % of GDP
Comoros	15.00%
Kenya	0.50%
Madagascar	5.50%
Maldives	2.50%
Mauritius	1.00%
Mozambique	4.00%
Reunion	1.30%
Seychelles	30.00%
Tanzania	2.70%
Somalia	2.00%
South Africa	1.00%
Yemen	3.00%

We note that the official number published by country such as Seychelles (Seychelles National Bureau of Statistics (2016) and (2017)) are at odd with the numbers as shown in Table 1-4. The discrepancy shows first how difficult it might be to clearly assess the contribution of fishing and particularly of the tuna industry in the economy. We interpret those variances as a difference in methodology used to calculate the economic contribution of the sector. As pointed out by Cai, Huang, & Leung (2019), despite its constant use, there is no internationally established methodology or standards to assess fisheries contribution to GDP. The number we show for Seychelles include direct and indirect impact of fishing while the number as published by the Seychelles Bureau of Statistics only include output values.

Some countries in the Western Indian Ocean (Mauritius, Madagascar, Seychelles) have large canneries that process tuna landed by industrial purse seiners operating in the region. This processing activity represents the main contribution of the tuna sector to the economies of these three countries (Yvergniaux, Greboval, & Breuil, 2016). Indeed, tuna is not traditionally targeted by the Malagasy, Mauritian and Seychellois. Their tuna fleets are of the artisanal or semi-industrial type and their landings are very low and make a limited contribution to the national economy. Their catches supply local markets (artisanal fleets) or export markets (semi-industrial fleets)…

1.3 Indian Ocean Stock Status

Indian Ocean tuna species stock statuses are regularly assessed. Figure 1-4 below shows the current state of the stocks of the main commercial tuna species in the Indian Ocean. It is estimated that at least two stocks are overexploited and overfished: the yellowfin tuna stock and the longtail stock. Catches of yellowfin tuna are equally distributed between industrial and artisanal fisheries although catches from the latter have increased in recent years (IOTC-SC21, 2018).

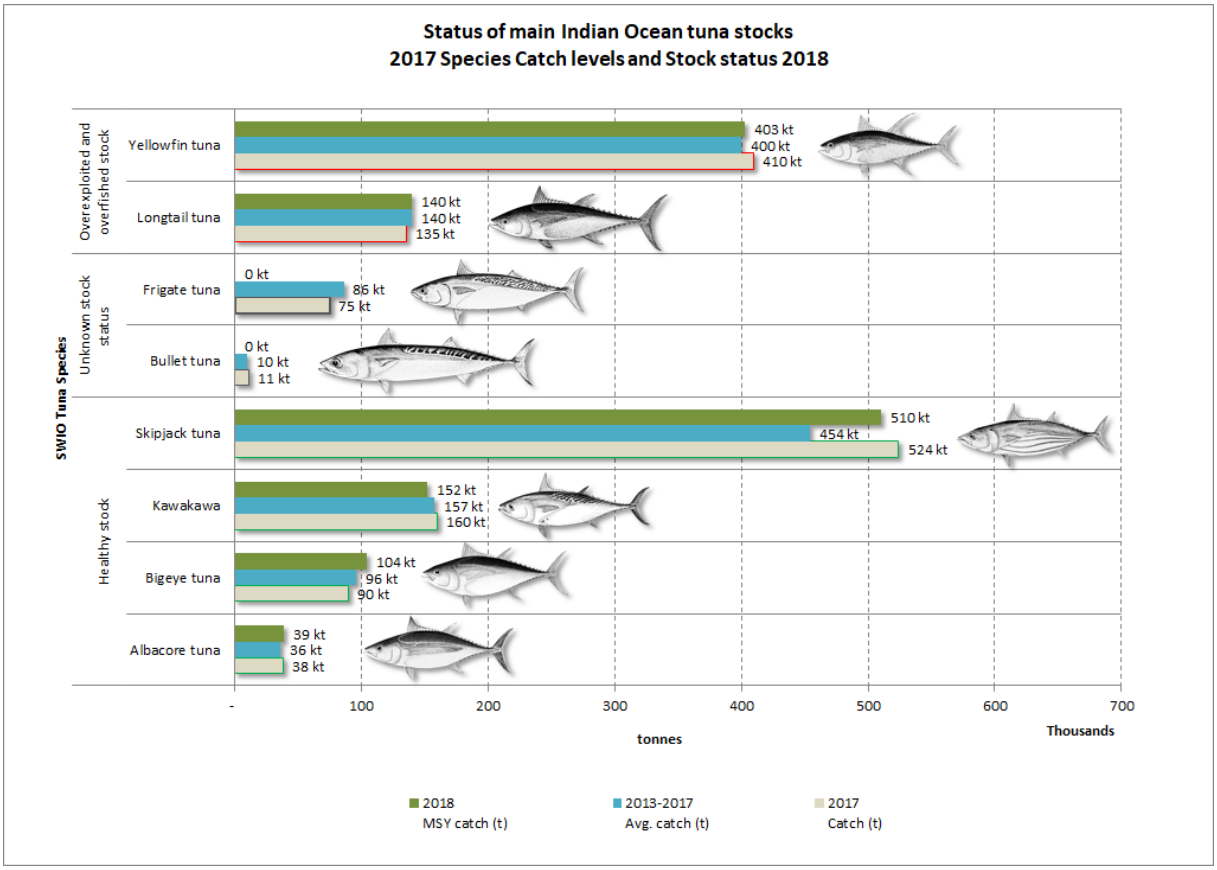


Figure 1-4: Status of main Indian Ocean tuna stocks Species Catch levels (2017) and MSY Stock status 2018 (derived based on information from IOTC (2018))

The management measures implemented within the IOTC are relatively weak and there are currently no quota systems or measures that constrain fleet capacity. With the exception of skipjack tuna, the IOTC has no harvest control rules in place. Especially for SWIO zone, it is therefore essential to have an objective and up-to-date study on the contribution of the fisheries sector to GDP in order to have a better understanding of the real issues for coastal countries.

2 OBJECTIVES

As Stated in the Term of Reference (see section 10.1 below), the rationale behind this consultancy was to undertake a study on Tuna Fisheries direct and indirect contribution to GDP and wealth distribution patterns in each SWIOFC MS and for the region. To do so, the idea was to develop and apply an appropriate methodology to estimate the impact of the tuna fisheries on GDP, human, natural, and produced capital; and net foreign assets. The methodology had to take into account not only primary production but also forward and backward linkages. For such calculation it was pertinent to use a multiplier approach and look at the effect of the tuna industry through an input-output matrix of national accounts.

Such an Economic Impact Assessment of the regional tuna fisheries should determine their contribution to national and regional economies in terms of Turnover, Gross Value- Added or Gross Domestic Products, Employment and its distributional effects along the value-chain. A value-chain approach was therefore needed to examine the upstream and downstream operations of the key segments of the regional tuna industry.

However due to the lack of data following a very low response rate from the SWIOFC MS to whom we sent 2 questionnaires, we were only able to cover 2 countries, Seychelles and Tanzania. Data for Tanzania were already available from a survey previously conducted for a separate SWIOFISH project (see Peacock, et al. (2018) and Lallemand (2018)). Although Kenya shared some data, the data collected were insufficient to inform either approach but was used to compile some of the data presented in the section on the characterisation of the country's tuna sector.

3 METHODOLOGY

A Dashboard was updated based on a previous work by the consultant for which a methodology was developed to estimate the total impact of the tuna fisheries on the national economy (i.e. on the GDP) in Seychelles, human, natural, and produced capital; and net foreign exchange from the tuna trade balance. The methodology used in the economic dashboard takes into account not only the primary tuna production but also associated activities upstream and downstream. Normally to estimate the multiplier effect behind the tuna fishery sectors, an input-output matrix of national accounts should be produced, although given the duration of the project and the number of national accounts and multiplier calculation required, we were only able to produce estimates at a relatively high level of aggregation. Again, Seychelles was one of three SWIOFC MS who shared data for this project.

However, because the dashboard approach relies on comprehensive datasets it was only relevant to the Seychelles, therefore an alternative approach was used for Tanzania for which a value chain analysis had been developed to identified the cost centres along the value chain and the potential added value generated throughout. This last approach based on survey data uses an average depiction for each tuna industry segment based on a representative and/ or data average collected in that segment which could then be extrapolated to the country's entire industry sector[2].
In the case of Tanzania, we use this value-chain approach to examine the upstream and downstream operations of the key segments of the regional tuna industry.

Both the Dashboard and value chain approaches include the followings:

1) Financial revenue derived from sale of fishing rights to the DWFN fleets through FAA (incl. private ones when available) and SFPA ,
2) Direct and indirect economic contribution to national and regional economies derived from DWFN fleets (i.e. Purse seiners, TLL and others), domesticated industrial tuna fishing fleets (i.e. Purse seiners, TLL and others) and small-scale fresh and chilled tuna fleets and value chains, including coastal aFAD[3] fisheries, including through:
    a) Tuna landings, transhipment and containerization, onshore services and other auxiliary services;
    b) Tuna processing and marketing operations;
    c) Any other relevant segments.

3.1 Partial Economic Assessement

Through the characterisation of the tuna fishing sector and associated activities in the region as a whole and then for each SWIOFC MS', this study includes a partial Economic Impact Assessment which looks at the tuna fisheries direct contribution to national and to the regional economies[4], in terms of Turnover, Gross Value- Added (through mainly the value of Exports) or Gross Domestic Products,

[2] The value chain analysis is based on a previous Swiofish project in Tanzania involving the consultant and for which a survey was conducted to collect data on each segment of the fishing industry.
[3] Anchored Fish Aggregating Devices
[4] Due to the lack of data covering most of the SWIOFC MS, it would be hazardous to extrapolate from the three SWIOFC MS from which we had data to the entire region.

Employment (where available) and its distributional effects along the value chain and among the economic agents (individuals, households, firms, governments), Net Foreign Exchange Earnings and Economic Integration, including the value of Fisheries Agreements with DWFN by SWIOFC MS as well as private licenses, and other factors.
To do so, we first describe the SWIOFC region, then we look at each individual members' reliance and attachment on the Tuna fishing sectors through a description of the harvesting sector, processing and tuna exports.

3.2 Economic Dashboard

Following the methodology used by the World Bank (The World Bank, 2011) and more recently Lallemand (Lallemand, 2015) we estimate the influence of the tuna sector in selected SWIOFC MS, namely Seychelles, in terms of the direct economic impacts and the indirect economic impacts. The economic model is based on the "**effects method**[5]". This method can not only measure the financial impacts of the tuna industry but can also estimate the impacts on the entire economy by estimating:

(i) the share of **direct value-added** (DVA) generated by the tuna fishing and processing sectors operating in the SWIOFC MS only accounting for the portion remaining in the relevant local economies;
(ii) the **indirect value-added** (IVA), generated by ancillary activities related to the tuna fishing industry (harvesting and processing sectors) taking place in each SWIOFC MS, only accounting for the portion remaining in the relevant local economies; and
(iii) The IVA will also estimate the share of DVA of all suppliers operating within the SWIOFC region attributable to the tuna industry (harvesting and processing sectors) only accounting for the portion remaining in the relevant local economies.

To apply the "**effects method**" to this analysis, we needed to update the following sets of economic data previously available until 2013:

(i) on the sector's economic activities including the primary, or first rank players (such as the cannery) and all local suppliers of the tuna fleets and the canning industry (such as the electricity, or fuel companies, port's facilities, ..);
(ii) accurate measurement of the indirect economic effects (indirect value-added) which requires,
(iii) details of the accounts of primary, or first rank players and suppliers with the breakdown of their value-added and the distribution between local and imported intermediate consumption; and
(iv) use of the national accounts input-output table to measure the wealth created by the secondary, or lower rank suppliers of goods and services by the purchases of the primary suppliers.

We note that, thanks to the collaboration of the Seychelles authority, we were able to update a large number of parameters used in the economic dashboard. For those parameters for which we did not receive new estimate, we adjusted accordingly the parameter value by the contemporaneous CPI or PPI to reflect the state of the economy (i.e. inflation or deflation) at the time compared to the latest useful estimate.

[5] This method was developed in the 1960s and was used by the French Ministry of Cooperation for project assessment.

3.2.1 Direct Value Added (DVA)

The direct value-added (DVA) can be regarded as a proxy for the economic wealth directly generated by a sector. The DVA can be estimated either by calculation of: (a) the difference between the sales (turn-over) and the intermediary consumption; or (b) the sum of the elements composing the value added-wages and social charges; taxes except corporation taxes; financial fees, and EBITDA[6]. However, since the DVA can be earned locally or abroad, the determination of the domestic component of the DVA requires a detailed analysis of the operating accounts by a sector specialist. The distribution of the DVA remaining in the country (local DVA) among the three economic agents (employees, companies and State) can then be estimated.

3.2.2 Indirect Value Added (IVA) and Primary Value Added (PVA)

The intermediary consumption (IC) of a sector can be local or imported. The local intermediary consumption (LIC) is the purchases from local suppliers and consequently part of their sales (turn-over). By generating part of their suppliers' sales (turn-over), the tuna industry contributes indirectly to the generation of value added by the suppliers: this is the indirect value-added (IVA). This IVA is the IVA of first iteration, since the suppliers themselves purchase LIC from others suppliers, and so on. By successive iterations, creation of value added can be tracked along the value chain and, finally, two values are obtained: the value of imports and the indirect local value-added generated all along the tuna industry value chain.

The objective of the method of the effects is to calculate the primary[7] value added i.e., the sum of the DVA and the IVA *of n iterations*, which determine the total wealth (VA) created by one sector and its contribution to the national economy. Double counting should however be avoided, and the term "contribution to GDP" refers to the DVA, while the term "contribution to economy" refers to the PVA (i.e., DVA + IVA). However, since the ToR (see section 10.1 in the Annexes) refers to this project as a "Study on Tuna Fisheries direct (i.e. DVA) and indirect (IVA) Contribution to GDP", we will attempt to estimate both DVA and IVA depending on the data available .

We note that identification of the IVA *of n iterations* requires a very detailed input – output table for the various branches of the national economy. Due to the lack of such data in the SWIOFC Region, the IVA calculation must be done through a detailed investigation of the operating accounts of all the first rank suppliers of the tuna industry (calculation of their DVA linked to the tuna industry at first iteration). The investigation will be limited to the first rank suppliers to the IVA of first iteration (the most important part of the total IVA however). Calculation of second iteration would require examination of the operating account of the suppliers of the first rank suppliers, and so on, for IVA of *n iterations* which would be a daunting task in itself.

[6] Earnings before interest, tax, depreciation and amortization.

[7] The secondary value added refers to the dissipation / filtration of wages in the national economy. This value cannot be added to the primary value added, and its calculation requires a large amount of data. Its calculation would have no real interest for the economic intelligence tool.

3.2.3 Historical and Simulation Dashboard

We used the existing model developed for the FEIU in Seychelles (Lallemand, 2015) which operates in two modes using an historical and a simulation dashboard. In historical mode, the economic dashboard calculates the direct and indirect economic values from existing economic data and activity indicators. In simulation mode, the dashboard measures the effects of the variations of critical parameters in the model, permitting a forecast for future years or a sensitivity analysis, for example, estimating the impact of the variation of parameters such as fleet size, exchange rate, CPI, compared to a baseline scenario.

Based on the FEIU dashboard (see details description in section 10.2 below), value-added can be calculated by the difference between sales (turnover) and the intermediary consumption. The value-added generated by the tuna fleet licenced to fish in the SWIOFC MS' EEZ such as the Seychelles EEZ can also be appraised in terms of the access rights that is, licence fees, plus fishing agreement revenues for the European Union (EU) fleet operating under the Sustainable Fisheries Partnership Agreements (SFPA).
DVA refers to value-added generated by all tuna fishing and processing activities taking place in the SWIOFC MS.
IVA refers to value-added generated by all the ancillary activities related to fishing and processing activities taking place in each of the SWIOFC MS. The IVA generated by the local suppliers and captured by the model is the IVA of first iteration.
By summing the DVA and the IVA of first iteration, the model can provide an estimate of the Primary Value-Added (PVA=DVA+IVA) generated by the tuna fisheries sector, and hence a contribution of the entire sector to the SWIOFC MS' economy.
The economic model should also produce an estimate of the sharing of PVA between Employees (workers), Companies and State.

3.3 Value Chain Analysis

The Tanzanian Value Chain (VC) Economic Model presents the economics of twelve segments (or strands) from five priority species value chain through a combined dashboard and simulation module; this approach is similar to the one used in investment decision making process where financial indicators such as Net Present Value (NPV), Internal Rate of Return (IRR) and breakeven points can be used to compare and contrast investment scenarios. We first transcribed in a tabular format the economic data previously collected through several field surveys covering each relevant segment and conducted in 2018 as part of a separate SWIOFISH project (Peacock, et al., 2018). The data thus collected constitute the model "default" values for the segments and were organised along the VC for each actor and according to their revenues and cost centres.
For each segment and actor, the model calculates annual and monthly revenues, costs, profit or loss, and overall capital investment, net present value, internal rate of return, breakeven catch (or production level) under 3 scenarios (pessimistic, optimistic and average also known as the "status quo" reflecting the current situation) (See Lallemand (2018) and Peacock, et al. (2018)).

4 DATA

4.1 Data Sources

To conduct our analysis, we had hoped to gather information from all SWIOFC MS delegates that we met in Cape Town on April 25th 2019 (see section 10.2 below), however only few cooperated. We also

collected secondary data from the following sources:

- International Organisations
    - The World Bank: publications, reports, published indicators (GDP, CPI, PPI, Exchange rate,..) for the relevant SWIOFC MS, …
    - UN Comtrade: trade data (volume and value) by SWIOFC MS and Tuna product form,..
    - International Trade Centre (ITC): mirrored trade data (volume and value) by SWIOFC MS, tariffs, spatial distribution of exports by SWIOFC MS
    - FAO FishStatJ: Capture Production 1950-2017 by Tuna species and SWIOFC MS, Fisheries Commodities Production and Trade 1976-2016 by Tuna species and SWIOFC MS and Food balance sheets of fish and fishery products 1961-2013 by Tuna species and SWIOFC MS …
    - FAO: Report such as the recent report by Cai, Huang, & Leu (2019) titled "Understanding and measuring the contribution of aquaculture and fisheries to gross domestic product (GDP)"
    - Sea Around Us (SAU): this was used to give us an indication of lost revenue through identifying, when relevant, IUU fishing and discards in each SWIOFC MS tuna fishery (Pauly & Zeller, 2018).
- Regional Organisations (RFBs, RFMOs, RECs, LMEs..):
    - IOC: various relevant reports on the region from project such as Smartfish (see for example Lallemand (2015))
    - IOTC: Fleet data by gear types, flag, sector, …
    - SWIOFC: Any relevant contextual agreements between the SWIOFC MS and relevant Information on goals and objectives, …
    - Agulhas and Somali Current Large Marine Ecosystems Project (ASCLME): GIS Data, Ecosystem Assessment, stock Assessment, Transboundary Diagnostic Analysis between SWIOFC MS (ASCLME/SWIOFP, 2012a, 2012b).
    - AU-IBAR: relevant reports on FISHGov and FISHTrade projects.
- National Institutions (web source):
    - Department of fisheries: Information on Fisheries Acts and Regulations
    - Bureau of statistics: data on local manufacturing, investment, employment, …
    - Ministry of economic development (pamphlets, bulletins, gazette, regulations, communiqués, Legal Acts,.
    - Other relevant Ministries.
- Grey literature (any relevant web source):
    - Reports: Fishing and processing cost information, country studies, …
    - Pamphlet
    - electronic sources, web sites, …
- Peer reviewed literature
    - Country Analysis (Micro and Macro Analysis)
    - Tuna Fisheries Analysis
    - Tuna Market and Trade Analysis
- Additional data were collected through personal communications:
    - e.g. scheduled meeting in Cape Town on April 25th 2019 with a delegation of SWIOFC
    - Expert advice through email and/ or personal communication, Skype call, …

4.2 Data Need

Data reconstruction tools and techniques using MS Excel were used extensively to develop summary tables and chart (pivot tables and charts) and standardised business models, operating accounts, and cash flows for calculating the financial and economic impacts of the key segments of the industry, including direct and indirect local value-added (VA) and shares of domestic and exported VA, and distribution of the VA among the economic agents. For a previous version of the tool see Lallemand (2015)

Data from tuna Industry Stakeholders such as NGOs, institutional players and representative of the tuna industry were collected online and as mentioned earlier, SWIOFC MS delegates were briefed on the strategic importance of the study to ensure their cooperation with disappointing results. The meeting with SWIOFC stakeholders in Cape Town on the 25th of April was meant to facilitate a first contact between the consultant and the interested parties.
The following list is an indication of the source and type of information that was collected for this project:

- Macro Economic indicators for each SWIOFC Member State: Producer Price Index (PPI), Consumer Price Index (CPI), Exchange Rate (local currency vs US dollars and Euro) Inflation, Population statistics (Number, growth rate, demographics, gender and age split), Gross Domestic Product (GDP) from the World Bank (2019a) and (2019b), Eurostat (2019)
- Catch-Effort and landing data were collected for the SWIO region as a whole and for each SWIOFC MS's through FAO FishStatJ (FAO, 2019b), complemented by information from the various fisheries authority and IOTC (IOTC, 2019). These data were used to characterise the state of each SWIOFC MS's tuna fisheries by looking at the historical trend in volume and value and the spatial distributions of catch-effort (where possible), landings by vessel type, gear type and main tuna species and trade of the main tuna species.
- Sector, method and gears: through the available data from IOTC (2019) we were able to identify the types of fishing operations in activity in the SWIOFC waters:
    - Small scale crafts such as pirogues, (artisanal, traditional, subsistence,..) usually fishing in nearshore coastal waters (territorial seas)
    - Industrial larger scale vessels (chartered vessels, foreign flags under Fisheries access agreements) usually fishing beyond territorial waters to the EEZ..We understand that fisheries access agreements do not apply to ABNJ waters and therefore any catch taken in ABNJ will be ignored.
- IUU: In order to account for all types of landing in the SWIOFC waters, we assessed the issue of Illegal Unreported Unregulated (IUU) catch. We collected some of those data through the web portal of the Sea Around us project (SAU) which produces by country estimates of unreported catch. We note that these data should be taken with a grain of salt and were only used as a proxy to find out if tuna's IUU was an issue or not for the SWIOFC MS.
- FAA and SFPA: We should also incorporate any data on international or regional fisheries agreement and relevant conventions and treaties signed by each SWIOFC MS: details and data on SFPA with the EU are widely available and published on the EU website for each SWIOFC MS (POSEIDON, MRAG, NFDS and COFREPECHE, 2014). There might be an issue regarding private agreement or Joint-venture which might be confidential.
- Trade data: relevant trade data of tuna products from the UN Comtrade website (UN Comtrade, 2019), the FAO FishStatJ database tool (FAO, 2019b) and ITC website (ITC, 2019). These trade data should give us an indication of the most valuable and largest export market destinations for each SWIOFC MS as well as the potential fish products value added if any. We might also be able use the trade data to infer the extent of IUU tuna fishing and which species are the most targeted by comparing official landings with exports of the same tuna products. In some instances we will need to use the ITC data instead of the UN Comtrade on which they are based because they reconciliate Export from a country to the imports of other countries from that country to give a more accurate picture of trade volumes and values.
  The data includes information from ITC on Non-Tariff measures (NTMs) experienced by companies involved in international tuna commodities trade. ITC identifies at product and partner country-level the predominant regulatory and procedural trade obstacles. These include not only NTMs imposed by other countries, but also potential bottlenecks in the home country's capabilities and technical facilities to meet regulations and demonstrate compliance with NTMs.
- Data from grey literature: Finally, we shall augment our SWIOFC fisheries knowledge database

by sourcing some of the information from the grey literature/ reports/ assessments by international organisations such as the European Maritime and Fisheries Fund (EMFF) (POSEIDON, MRAG, NFDS and COFREPECHE, 2014), the United Nations (UN), AU-IBAR, FAO, the World Bank, WWF, Somali Coastal Current (LME) (Sherman, Okemwa, & Ntiba, 2009) and (One Shared Ocean, 2015), Sea Around Us (Pauly & Zeller, 2015), relevant RFMOs, RFBs and RECs, Global Fishing Watch (Global Fishing Watch, 2018), FISH-i Africa (fish i-Africa, 2018), the Fishing Transparency Initiative (FiTi) (FiTi, 2015).

- Processing data: we were able to collect some data on tuna can processing facilities (e.g. the processing plant operating from in Port Victoria, Seychelles and owned by IOT).
- Value Chain data: We present data collected essentially from a survey conducted in Tanzania in 2018 from a SWOFISH project on VCA (Peacock, et al., 2018).
- Updated data relevant to the tuna fishing industry in Seychelles used to run the new dashboard. The previous dashboard was built in 2015, for the Fisheries Economic Intelligence Unit (FEIU) at the Seychelles Fisheries Authority (SFA) to look at the socio-economic impact of the tuna industry. Some tables and outputs from the FEIU dashboard can be found later in this document.
- GIS data: data required to build detailed Maps to characterise the SWIOFC region in terms of:
    - Geophysical characteristics (bathymetry, continental shelves, coastlines,..)
    - Spatial distribution analysis (EEZ/fishing ground/ catch/ effort/ trade)
    - Geographic locations: ports, populated areas.

5 SWIOFC Region Overview

In this section, we first present the geographic extent and characteristic of each SWIOFC MS EEZ as a proxy for their fishing ground and therefore their catch potential.
We later present for each country, the current state of tuna production (volumes and values) by species type, sector and method used. Where available we then present the volume and values of tuna exports by commodity and main trading partners as well as the tariff and any barrier of entry often referred to as NTMs or Non-Tariff Measures (ITC, 2019) faced by each SWIOFC MS when exporting tuna commodities across the World.

5.1 SWIOFC's Geographic Extent

The United Nations Convention on the Law of the Sea (UNCLOS), 1982 came into force on 16 November 1994 . UNCLOS contains navigational provisions as well as provisions for determining the limits of various maritime zones. These provisions are binding to all states that have ratified the Convention.
We used ESRI ArcGIS (ESRI, 2018) to map and calculate the area of the respective EEZs. We downloaded the ESRI shapfile of the EEZs from the Marine Regions website (Marine Regions, 2018). Those shapefiles were compiled by the Flanders Marine Institute in 2018 (Flanders Marine Institute, 2018) combining the Exclusive Economic Zones (v10) based on data from UNCLOS (UNCLOS, 1982) and Sea areas (v3) from the International Hydrographic Organization (IHO , 1953).
We then compared the relative size of each SWIOFC MS' own fishing ground approximated by the size of their respective Exclusive Economic Zone (EEZ). Table 5-1 shows that the largest EEZs in the SWIO region are in descending order under the jurisdiction of; 1. the Seychelles with 16.5% of the combined SWIO's EEZs, then 2. Mauritius at 15.7%, 3. Madagascar at 14.7% and 4. the Maldives at 11.4%, with each of the remaining SWIOFC MS' EEZ being under 10% of the combined SWIO's EEZs.

Table 5-1: Exclusive Economic Zone (EEZ) geographical area broken down by marine region and sovereignty by SWIOFC MS. The Area km^2 calculation are based on data from GIS shapefiles obtained through the "Marine Regions"' website (Marine Regions, 2018). We used a world Mercator projection.

NDX	Marine Region	EEZ	Territory	Sovereign	Area km^2	as a % of SWIOFC EEZ	
1a	Comoran part of the Indian Ocean	Comoran Exclusive Economic Zone	Comores	Comores	80,833.81	1.0%	2.0%
1b	Comoran part of the Mozambique Channel	Comoran Exclusive Economic Zone	Comores	Comores	85,686.06	1.0%	
2a	Kenyan part of the Indian Ocean	Kenyan Exclusive Economic Zone	Kenya	Kenya	115,345.67	1.4%	2.0%
2b	Overlapping claim: Kenya / Somalia part of the Indian Ocean	Overlapping claim: Kenya / Somalia	Kenya/ Federal Republic of Somalia	Kenya/ Federal Republic of Somalia	50,906.70	0.6%	
3a	Madagascan part of the Indian Ocean	Madagascan Exclusive Economic Zone	Madagascar	Madagascar	831,678.01	10.1%	14.7%
3b	Madagascan part of the Mozambique Channel	Madagascan Exclusive Economic Zone	Madagascar	Madagascar	376,492.19	4.6%	
4a	Maldives part of the Arabian Sea	Maldives Exclusive Economic Zone	Maldives	Maldives	301,914.21	3.7%	11.4%
4b	Maldives part of the Indian Ocean	Maldives Exclusive Economic Zone	Maldives	Maldives	295,913.08	3.6%	
4c	Maldives part of the Laccadive Sea	Maldives Exclusive Economic Zone	Maldives	Maldives	339,795.65	4.1%	
5	Mauritian part of the Indian Ocean	Mauritian Exclusive Economic Zone	Republic of Mauritius	Republic of Mauritius	1,292,399.26	15.7%	
6a	Mozambican part of the Indian Ocean	Mozambican Exclusive Economic Zone	Mozambique	Mozambique	48,543.57	0.6%	6.9%
6b	Mozambican part of the Mozambique Channel	Mozambican Exclusive Economic Zone	Mozambique	Mozambique	523,473.95	6.4%	
7a	Réunion part of the Indian Ocean	Réunion Exclusive Economic Zone	Réunion	France	318,442.38	3.9%	7.2%
7b	Overlapping claim Ile Tromelin: Reunion / Madagascar / Mauritus part of the Indian Ocean	Overlapping claim Ile Tromelin: Reunion / Madagascar / Mauritus	Réunion/ Republic of Mauritius	France/ Republic of Mauritius	277,603.05	3.4%	
8	Seychellois part of the Indian Ocean	Seychellois Exclusive Economic Zone	Seychelles	Seychelles	1,359,067.68	16.5%	
9	Somali part of the Indian Ocean	Somali Exclusive Economic Zone	Federal Republic of Somalia	Federal Republic of Somalia	622,799.56	7.6%	
10	South African part of the Indian Ocean	South African Exclusive Economic Zone	South Africa	South Africa	701,273.98	8.5%	
11	Tanzanian part of the Indian Ocean	Tanzanian Exclusive Economic Zone	Tanzania	Tanzania	244,739.39	3.0%	
12	Yemeni part of the Arabian Sea	Yemeni Exclusive Economic Zone	Yemen	Yemen	370,176.78	4.5%	
				Total EEZ area:	**8,237,084.98**	**100.0%**	

In accordance with Article 55 of the United Nations Convention on the Law of the Sea (UNCLOS, 1982), a Coastal State's Territorial Sea Area and Exclusive Economic Zone must not overlap. Occasionally, small areas at the boundary of two or more Coastal States may be in dispute regarding the establishment of maritime jurisdiction, which may result in a small section of Territorial Sea overlapping an EEZ in the disputed area.

Where issues of maritime jurisdiction between two or more Coastal States are in dispute, the proposed EEZ of one Coastal State may overlap the proposed EEZ of another Coastal State. We identified those areas of overlapping EEZ claims from competing parties in Table 5-1 showing the disputed area with separate Exclusive Economic Zone features and with the country names of the disputing states.

Figure 5-1 below shows the share of each EEZ and of the contentious areas in relation to the combined SWIO's EEZs.

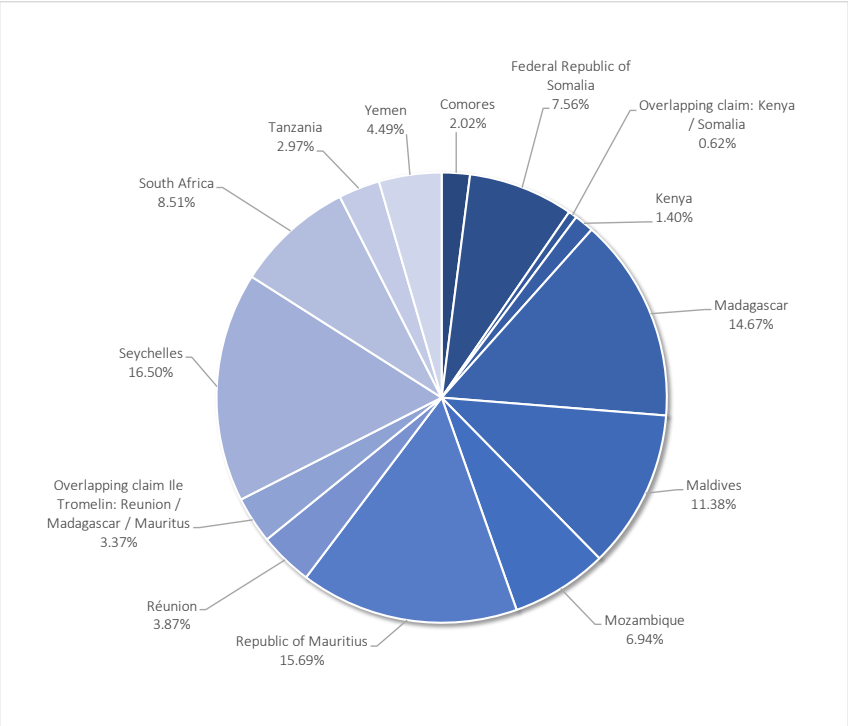


Figure 5-1: Relative size of each SWIOFC MS EEZ in the SWIO.

Figure 5-2 is a map showing spatially the relative size of each EEZ and their respective geographic location in relation to one another. We note that some EEZs are contiguous to the high seas and therefore benefit from an easy access to additional fishing grounds while others are totally or partially surrounded by neighbouring countries' EEZs restricting their free access to fishing the high seas.

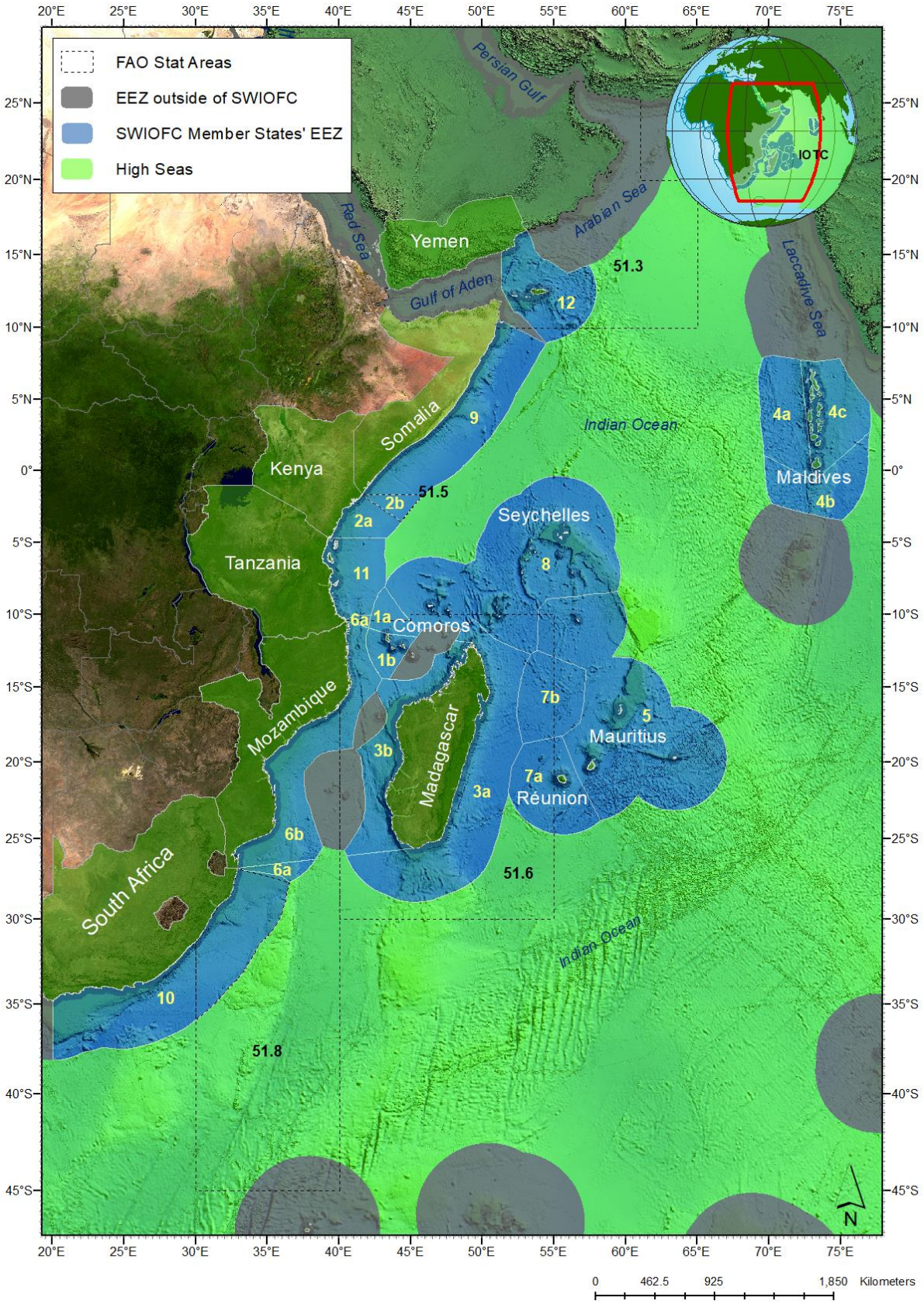


Figure 5-2: Map of SWIOFC Member States, EEZs, High Seas. The numbers in each EEZ area corresponds to the numbers in NDX column of Table 5-1 which correspond to subsets of marine regions.

With four countries controlling more than half (58%) the combined SWIO's EEZs, we expect their relatives share of the SWIO tuna production and exports volumes to reflect proportionally the relative size of their EEZ.

5.2 Economic potential and fisheries governance in the SWIO region

The tuna industry of the SWIO region is a multi-million-dollar industry, yet its real contribution to each SWIOFC MS and the regional economies is not well understood.

Tuna is one of the world's most popular seafood products, with a consumption level of almost half a kilo per person – year on average. Tuna species are associated with many types of consumer products, which are in turn linked to various sectors of the tuna industry (Macfadyen & Defaux, 2016) which are:

- Canned tuna is the main form of tuna consumption across the world: nearly 75% of the world's tuna catch is targeted to be sold as canned tuna. The main species used in canneries are skipjack and yellowfin tuna, which are mostly caught by purse seiners;
- Sashimi tuna is the poster child of the Japanese market. The species sought after are yellowfin tuna, bigeye tuna and the three Bluefin species, the latter being almost exclusively sold as Sashimi. The sashimi market has very strict quality control requirements and is essentially supplied by the longline fishing industry;
- Steaks and tuna loins are the most common form of tuna consumed in European and American markets which consists principally of yellowfin and albacore, caught by longliners and artisanal fishing fleets from Indonesia, the Maldives and Sri Lanka;
- In certain countries with large artisanal tuna fleets, locally-caught-tuna consumed locally (notably Indonesia, Maldives and Sri Lanka) also represent a significant domestic outlet.

In term of markets opportunities, Japan is the main international destinations for tuna with the World largest consumer market, all tuna products combined, then comes the United States and the European Union (Kawamoto, 2016). These so-called "traditional" markets are now entering a mature phase with a stagnation of the demand, while several emerging markets are now consuming more tuna products, especially canned tuna.

The relative importance of the fisheries sector and the levels of fish and seafood consumption vary considerably from one country to another. The East coast of Africa in particular is characterized by low levels of development in fisheries that mainly focus on freshwater species (e.g. Tilapias caught in Lake Victoria). Also, in countries bordering the Arabian Sea (Iran, Pakistan), with less than 1% of the GDP, the fishing sector makes only a marginal contribution to the national economy and fish product consumption levels are among the lowest in the world (9.8kg for Iran and 1.9kg for Pakistan) (FAO, 2019a), (FAO, 2015), (FAO, 2013), (The World Bank, 2019a), (The World Bank, 2019b). In the Western Indian Ocean, rapid population growth and overall economic expansion in coastal countries have dramatically increased the pressure on coastal resources (Groeneveld, et al., 2018). Thus, many countries are now seeking to diversify their fishing activities and to restructure their industry. As part of the solution, they consider the development of a tuna fishing industry a way to reduce fishing pressure on the lagoons and reefs alike (IOTC-SC21, 2018). The Maldives and the Seychelles are two island states with not well diversified economies for which fishing is a key sector. Their seafood consumption levels particularly for tuna, are among the highest in the world (in the Maldives , 94 kg of tuna are consumed per capita each year (Hemmings, Harper, & Zeller, 2014)) and fishing plays a vital role in their national economies.

At the global level, the Indian Ocean is the second largest tuna production area in the World, accounting for nearly 20% of world commercial tuna catches (skipjack, yellowfin, albacore and bigeye). The tuna industry in the Indian Ocean has an estimated turnover of USD 6.5 billion or 16% of the value generated by the tuna industry globally (Macfadyen, Huntington, Caillart, & Defaux, 2016).

Although, as per SWIOFC's constitution, most SWIOFC Members States committed to manage their fisheries sustainably, the current fisheries development strategies seem at odd with such ambitions.
While coastal fisheries are currently fairly developed in the region and commonly accepted as a crucial activity for economic development, the collection of data suitable to run full stock assessment models is fairly limited and as a consequence, local scientists must rely on data-poor assessment methods which in turn do not provide a reliable indication of the state of stocks, particularly for neritic tunas and bycatch species. Despite this lack of certainty regarding the actual state of the fish stocks, nearly 44% of the Indian Ocean tuna catch come from stocks in critical states: yellowfin tuna and longtail tuna's stocks are either overexploited or overfished (IOTC, 2018). Coastal artisanal fleets are the main contributors to the catches of these two species. As a consequence, artisanal fisheries in the Indian Ocean contribute more negatively to the impact on the most threatened species than their industrial counterparts.

Different actors are involved in improving the sustainability of tuna fisheries in the Indian Ocean. Depending on the nature of these actors (public or private) and their scale of action, there are several types of governance that apply to Indian Ocean tuna fisheries (Lecomte, Rochette, Laurans, & Lapeyre, 2017):

- Regional governance at the level of the IOTC area of competence;
- National governance at the level of the EEZ of each coastal State;
- Market-based governance, at the level of supply chains, emanating from certain market players committed to integrating more sustainability into seafood products.

These types of governance consider tuna resources in different ways. Within the framework of the IOTC and coastal States, tuna is regarded as a natural resource which management must be framed. Market actors consider tuna as a commodity that reaches end markets according to a supply chain that they can influence through their market power (Gutierrez & Morgan, 2016).

The Indian Ocean Tuna Commission (IOTC) has currently 31 permanent members, including Indian Ocean Coastal States and remote fishing nations and 2 Cooperating Non-Contracting Parties (CNCP) (IOTC, 2019). South Africa was the latest country to become a full member in 2016 (it used to be a CNCP prior to joining). The IOTC mandate includes 16 tuna and large pelagic species. Beyond these species, the Commission Secretariat collects data on bycatch, non-target and dependent species that are affected by tuna fishing activity (IOTC, 2018).

Within the IOTC plenaries, two major blocs with opposing views can be observed: the bloc of distant water fishing nations (DWFN), which includes the European Union, Japan, Korea and China, and the bloc of coastal States, mainly led by the Maldives, Mauritius, South Africa and more recently the Seychelles. The arrival of South Africa in 2016 has considerably changed the way debates are organized (although tuna catches in South Africa are marginal). South Africa has positioned itself as the leader of coastal States, particularly African States, and strongly supports the right of coastal States to develop. The Maldives has also positioned itself as a regional champion of sustainability and often provides motions for resolution. Mauritius has also become a strong actor in proposing management measures. Formerly aligned with the Spanish perspective, the position of the Seychelles has recently changed to follow the Maldivian and Mauritian positions. These three countries and South Africa constitute the main coastal States bloc that provides the main proposals for management measures. Within this coastal States bloc, many African States (Kenya, Mozambique, and Tanzania) are also increasingly involved in the establishment of management proposals.
Opposing this bloc, the European Union, Japan, China and Korea represent the interests of distant industrial fisheries.
The debates are thus polarized between distant and industrial fishing fleets on one side, and mainly artisanal coastal fleets on the other, with two distinct rationales. In the eyes of coastal States, distant fishing fleets are the main ones responsible for the reduction of resources, and operate only for profit.
However, the bulk of these coastal States fleets are exempt from management measures because of

their small scale and artisanal status, even though their contribution to the overall catch and thus the pressure on the fish stocks is apparent. This "double standard" reduces the effectiveness of management measures, which should ideally apply to all fleets that have an impact on the stocks (Lecomte, Rochette, Laurans, & Lapeyre, 2017).

5.3 SWIO Fishing Fleet

The IOTC statistics in Table 5-2 seem incomplete [8], as it shows that the number of artisanal fishing crafts targeting tuna species in the SWIO would have decreased in 2016 by almost 80% compared to 2015 from 695 to 154 fishing boats. The discrepancy comes from the unreported number of baitboats (i.e. Pole and Lines) from the Maldives (513 crafts in 2015 compared to 0 in 2016). Putting aside the anomaly of unreported baitboats, the most sticking difference between 2015 and 2016 is the decrease of coastal longline crafts from 48 to 22 and the increase in Handline and Troll line crafts from 117 to 130.

Table 5-2: IOTC Statistics on the number of fishing crafts catching tuna in the SWIO by sector, gear type and country in 2015 and 2016. Source IOTC (2019)

Fleet size	2015										2016							
flag/ sector/ gear	Maldives	Réunion	Seychelles	South Africa	Mauritius	Madagascar	Nei.Frozen	Tanzania	Nei.Fresh	2015 Total	Réunion	Seychelles	South Africa	Mauritius	Madagascar	Nei.Frozen	Tanzania	2016 Total
Industrial Fishing	**9**	**19**	**61**	**15**	**12**	**7**	**6**	**3**	**2**	**134**	**19**	**84**	**16**	**13**	**7**	**4**	**3**	**146**
Longline Fresh	9								2	**11**								
Purse seine			13		7					**20**		13		2				**15**
Longline			37				6	3		**46**		47				4	3	**54**
Longline targeting swordfish		19	11	15	5	7				**57**	19	24	16	11	7			**77**
Artisanal Fishing	**555**	**137**		**3**						**695**	**152**		**2**					**154**
Sport fishing				3						**3**			2					**2**
Hand line	5									**5**								
Troll line	9									**9**								
Coastal longline	28	20								**48**	22							**22**
Hand line and Troll line		117								**117**	130							**130**
Baitboat	513									**513**								
Subtotal fleet size	**564**	**156**	**61**	**18**	**12**	**7**	**6**	**3**	**2**	**829**	**171**	**84**	**18**	**13**	**7**	**4**	**3**	**300**

[8] The IOTC fishing crafts dataset lists the number of vessels operating under the flag of the reporting country catching tuna and tuna-like species by gear and size category within one calendar year. Foreign vessels chartered by or under joint venture arrangements with the reporting country are reported separately. The data is organized by LOA (overall length) size categories. In 2013 the IOTC Secretariat conducted a comprehensive review of the fishing craft statistics available for industrial vessels, with the objective of harmonizing the units and size class intervals used for industrial vessels. The Fishing Craft Statistics database is in the process of being updated based on the results from this latest review

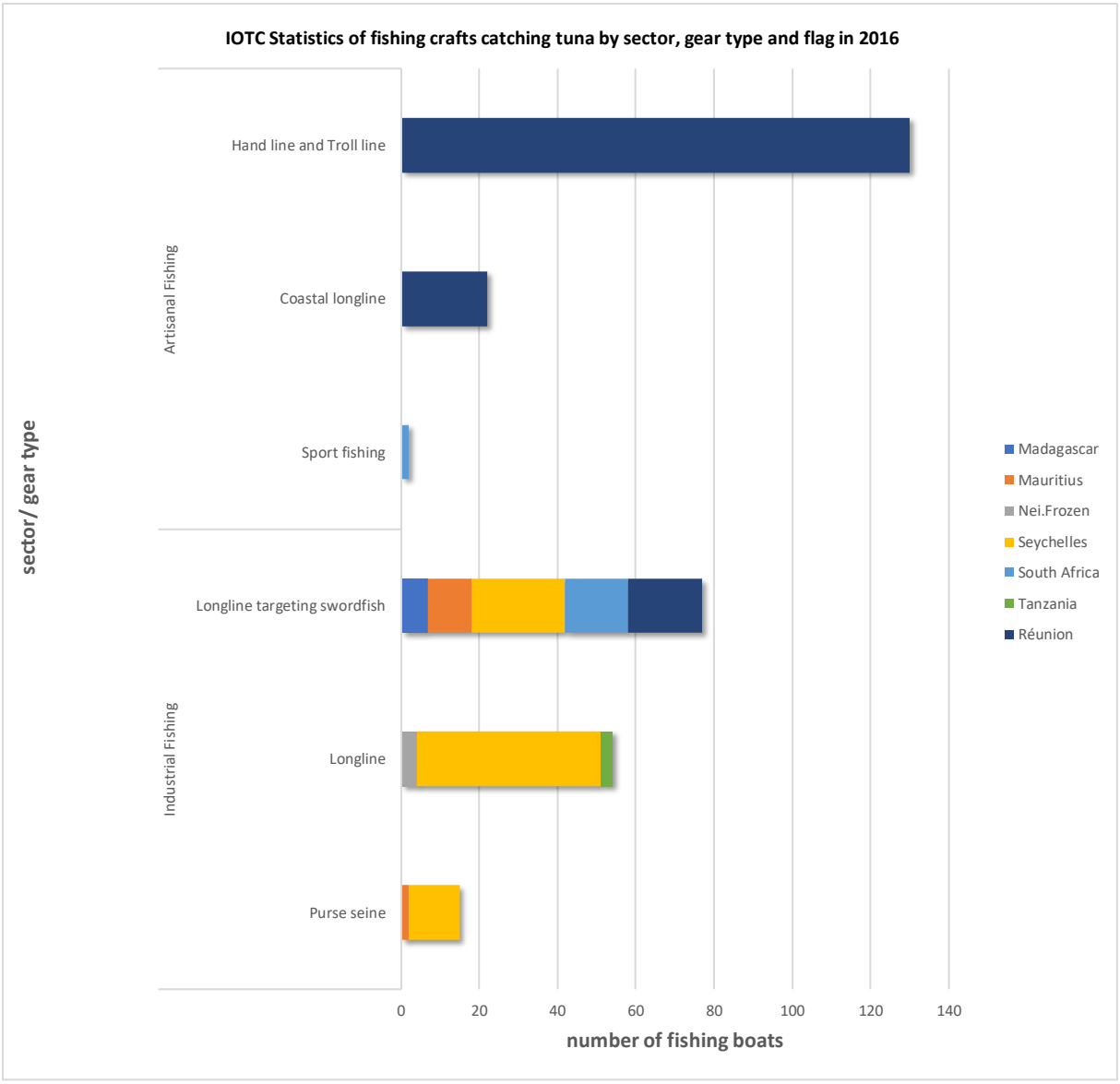


Figure 5-3: Number of fishing crafts from SWIOFC MS targeting tuna in the SWIO IOTC in 2016. Source: IOTC (2019)

5.3.1 SWIO Coastal Artisanal Fishing Fleets

With 154 boats in 2016 (pending correction in the IOTC statistics) and 695 in 2015, the artisanal fishing fleet constitute the main type of craft targeting tuna in the South West Indian Ocean; in comparison the industrial fleet accounted for 146 in 2016 and 134 in 2015 (Table 5-2),. Coastal fleets are mainly artisanal, using a wide variety of fishing gear, including gillnets, lines and small purse seines, often in combination.

Figure 5-4 shows the geographic distribution of catch by the coastal (i.e. artisanal) fisheries in the SWIO in 2017 according to IOTC (2019). Most of the reported catch and effort took place around the Maldives while the main species targeted was Yellow fine tuna (YFT).

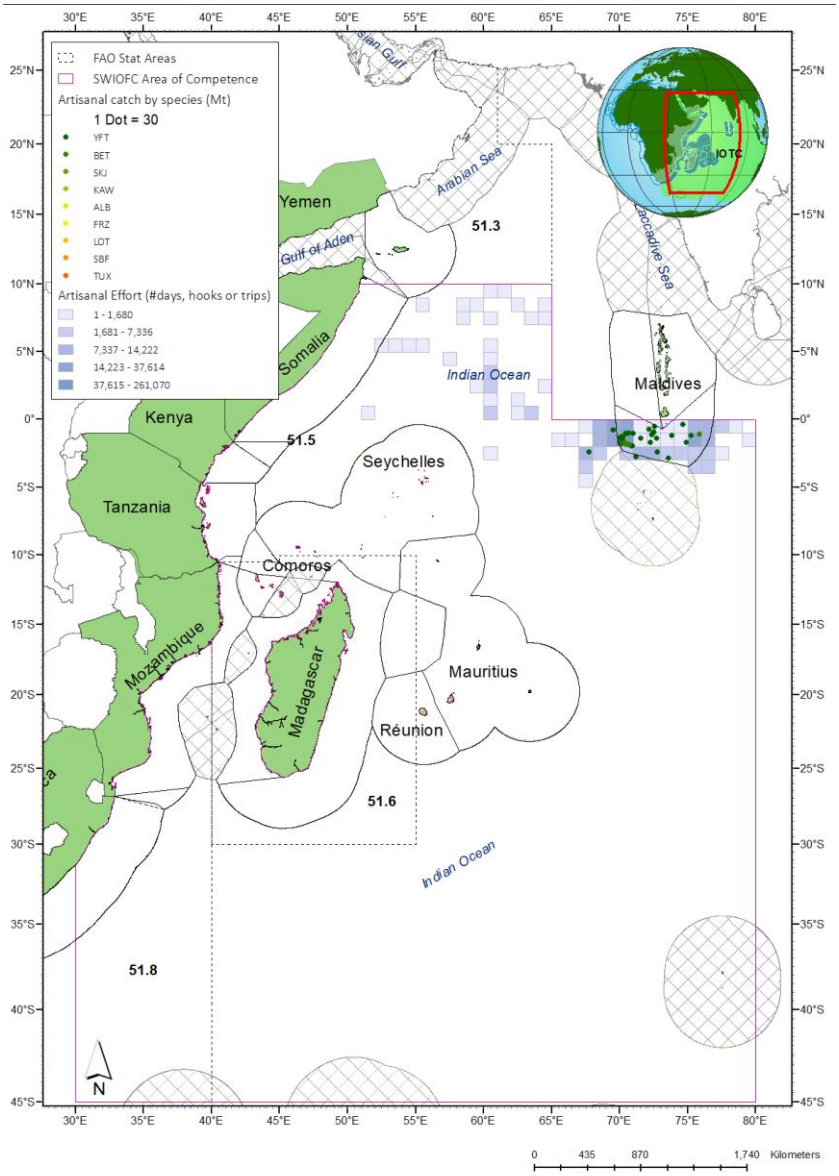


Figure 5-4: Catch and Effort from Coastal artisanal fishers in the SWIO area in 2017 and using the IOTC grid 1ºx1º. Compilation based on IOTC "CE other gears" data (IOTC, 2019)

Table 5-3: Tuna Catch (t) in the IOTC-WIO region in 2017 by SWIOFC Member States and by sector, "Line" gear type and species. Source: IOTC (2019)

Catch (t)	Gear				
gear group/ Country/ sector/ species	Coastal	Hand line	Hand line and	Troll line	Total
Line	1,744.33	55,438.53	667.67	10,964.37	68,814.89
MALDIVES	1,618.34	30,883.76		54.81	32,556.91
Yellowfin tuna	1,048.92	30,562.69		28.53	31,640.14
Bigeye tuna	564.83	112.76		0.28	677.87
Skipjack tuna	1.12	197.70		9.11	207.93
Kawakawa		9.20		8.51	17.71
Frigate tuna		1.41		8.38	9.79
Albacore	3.47				3.47
YEMEN		21,100.00			21,100.00
Yellowfin tuna		21,100.00			21,100.00
COMOROS		3,064.47		7,130.58	10,195.05
Skipjack tuna		44.53		4,951.67	4,996.19
Yellowfin tuna		2,708.66		1,550.51	4,259.17
Bigeye tuna		268.81		580.33	849.14
Kawakawa		1.24		34.19	35.43
Longtail tuna		23.52		0.29	23.81
Albacore		7.79		12.82	20.61
Frigate tuna		9.60		0.49	10.09
Bullet tuna		0.32		0.29	0.61
MADAGASCAR				3,696.66	3,696.66
Kawakawa				1,076.61	1,076.61
Skipjack tuna				834.47	834.47
Longtail tuna				724.14	724.14
Yellowfin tuna				675.27	675.27
Frigate tuna				180.28	180.28
Bullet tuna				179.28	179.28
Bigeye tuna				26.62	26.62
REUNION	125.99		419.77		545.75
Yellowfin tuna	61.19		301.91		363.09
Albacore	53.01		58.45		111.46
Skipjack tuna			59.36		59.36
Bigeye tuna	11.79		0.05		11.83
MAURITIUS			247.90		247.90
Albacore			162.60		162.60
Yellowfin tuna			69.20		69.20
Skipjack tuna			16.10		16.10
MOZAMBIQUE		230.00			230.00
Frigate and bullet tunas		128.20			128.20
Yellowfin tuna		79.50			79.50
Kawakawa		14.10			14.10
Bigeye tuna		8.20			8.20
TANZANIA		46.10		43.88	89.98
Yellowfin tuna		46.10		43.88	89.98
KENYA		40.38		38.44	78.82
Yellowfin tuna		13.60		12.94	26.54
Kawakawa		13.60		12.94	26.54
Frigate tuna		6.60		6.28	12.87
Skipjack tuna		6.60		6.28	12.87
SEYCHELLES		73.81			73.81
Kawakawa		69.60			69.60
Tunas nei		4.11			4.11
Yellowfin tuna		0.10			0.10
Total	**1,744.33**	**55,438.53**	**667.67**	**10,964.37**	**68,814.89**

Table 5-4: Tuna Catch (t) in the IOTC-WIO region in 2017 by non-SWIOFC MS and by sector, "Line" gear type and species. Source: IOTC (2019)

Catch (t)	Gear				
gear group/ Country/ sector/ species	Coastal	Hand line	Hook and line	Troll line	Total
Line	11,142.80	15,357.61	5,339.10	23,488.40	55,327.91
INDIA			5,339.10	18,000.13	23,339.23
Skipjack tuna			51.40	11,980.19	12,031.59
Yellowfin tuna			525.92	6,018.67	6,544.58
Bullet tuna			2,357.35		2,357.35
Kawakawa			2,068.52	0.20	2,068.72
Frigate tuna			262.30	0.67	262.97
Longtail tuna			73.58		73.58
Bigeye tuna			0.04	0.41	0.44
OMAN		14,728.23		2,418.99	17,147.22
Yellowfin tuna		7,251.23		2,418.99	9,670.22
Longtail tuna		6,452.62			6,452.62
Kawakawa		922.90			922.90
Frigate tuna		91.90			91.90
Tunas nei		9.57			9.57
IRAN ISLAMIC REP.	8,452.00			2,490.93	10,942.93
Yellowfin tuna	8,452.00			353.81	8,805.81
Longtail tuna				1,665.28	1,665.28
Kawakawa				458.07	458.07
Frigate tuna				13.77	13.77
SRI LANKA	2,690.80	35.80			2,726.60
Yellowfin tuna	1,860.30	23.10			1,883.40
Skipjack tuna	734.80	11.10			745.90
Bigeye tuna	74.90	0.50			75.40
Kawakawa	19.10	0.50			19.60
Frigate tuna	1.70	0.60			2.30
SAUDI ARABIA		582.12		68.82	650.94
Kawakawa		505.29		63.56	568.85
Longtail tuna		76.83		5.26	82.09
UN. ARAB EMIRATES				323.24	323.24
Longtail tuna				123.95	123.95
Kawakawa				116.98	116.98
Frigate tuna				82.31	82.31
EU.FRANCE		7.11		186.29	193.39
Yellowfin tuna		1.47		78.64	80.10
Skipjack tuna		2.37		53.70	56.08
Bigeye tuna				48.93	48.93
Kawakawa		1.12		2.47	3.58
True tunas nei		0.79		2.55	3.34
Albacore		1.36			1.36
UK.TERRITORIES		4.36			4.36
Yellowfin tuna		2.73			2.73
Kawakawa		1.53			1.53
Skipjack tuna		0.11			0.11
Total	**11,142.80**	**15,357.61**	**5,339.10**	**23,488.40**	**55,327.91**

Table 5-5: Tuna Catch (t) in the IOTC-WIO region in 2017 by SWIOFC Member States and by "Other" gear type and species. Source: IOTC (2019)

Catch (t)	Gear		
gear group/ Country/ sector/ species	Beach seine	Harpoon	Total
Other	657.30	8.10	665.40
MOZAMBIQUE	657.30	8.10	665.40
Frigate and bullet tunas	637.90		637.90
Bigeye tuna	19.40		19.40
Kawakawa		8.10	8.10
Total	**657.30**	**8.10**	**665.40**

Table 5-6: Tuna Catch (t) in the IOTC-WIO region in 2017 by non-SWIOFC MS and by "Other artisanal" gear type and species. Source: IOTC (2019)

Catch (t)	Gear				
gear group/ Country/ sector/ species	Beach seine	Unclassified	Trap	Trawl	Total
Other	7,581.42	602.76	24.33	299.31	8,507.82
OMAN	6,498.41		24.33		6,522.74
Longtail tuna	4,574.13				4,574.13
Kawakawa	1,065.04		1.56		1,066.60
Tunas nei	846.13				846.13
Yellowfin tuna			22.77		22.77
Frigate tuna	13.10				13.10
INDIA	959.31			243.22	1,202.53
Kawakawa	713.40			20.15	733.55
Yellowfin tuna	87.10			76.69	163.79
Longtail tuna				120.90	120.90
Frigate tuna	115.08			0.71	115.78
Skipjack tuna	20.37			22.31	42.69
Bullet tuna	23.36			2.45	25.81
Bigeye tuna	0.01			0.01	0.01
EGYPT		338.00			338.00
Kawakawa		323.00			323.00
Yellowfin tuna		15.00			15.00
SAUDI ARABIA		133.76		56.09	189.85
Longtail tuna		117.87		8.42	126.29
Kawakawa		15.89		47.67	63.56
JORDAN		131.00			131.00
Kawakawa		50.00			50.00
Skipjack tuna		33.00			33.00
Yellowfin tuna		22.00			22.00
Longtail tuna		17.00			17.00
Frigate and bullet tunas		9.00			9.00
SRI LANKA	123.70				123.70
Kawakawa	59.60				59.60
Skipjack tuna	22.80				22.80
Bullet tuna	17.50				17.50
Yellowfin tuna	16.60				16.60
Frigate tuna	7.20				7.20
Total	**7,581.42**	**602.76**	**24.33**	**299.31**	**8,507.82**

Using current traditional methods, artisanal fisheries tend to have an important impact on the coastal marine environment especially close to the lagoons and reefs known to be spawning grounds for many marine species. Fisheries Aggregating devices (FADs) are now also being promoted by SWIOFC to bring the coastal fishers to fish outside the lagoon with the aim to reduce fishing pressure on lagoon stocks. IOTC's resolution 15/08 (IOTC, 2015) first adopted by SWIOFC requires to collect information regarding the deployment of FADs and subsequently report to IOTC. (FAO Subregional Office for Southern Africa, 2018)

In 2015 SWIOFC adopted eight Conservation and Management Measures Resolution 17/08 (IOTC, 2017b) on a Proposal for amendment of Resolution 15/08: Procedures on a fish aggregating devices (FADs) management plan, including a limitation on the number of FADs, more detailed specifications of catch reporting from FAD sets, and the development of improved FAD designs to reduce the incidence of entanglement of non-target species. . (FAO Subregional Office for Southern Africa, 2018).

5.3.2 The SWIO Freezer longliner fleets

The contribution of these longline fleets to the economies of the coastal states is less than that of the

purse seine fleet due to the importance of trans-shipping which deprives Indian Ocean countries of the incomes related to fleet expenditure in the port infrastructure. Coastal States, however, receive payments for fishing rights. The majority of Asian longliners operate under private agreements to gain access to the EEZs of Indian Ocean countries. Japan operates in the Mauritian EEZ under private agreements with the Japan Tuna Fisheries Cooperative Association. Taiwanese longliners operate in the Seychellois EEZ under the agreement with the Taiwan Deep-Sea Tuna Longline Boat Owner and Exporter Association. Unlike the European agreements that are public, it is very difficult to access data on the price of licences in the framework of these private agreements (Lecomte, Rochette, Laurans, & Lapeyre, 2017).

The main landing ports for these longline fleets are Port Louis (Mauritius) and Port Victoria (Seychelles). Mauritius is an important transshipment base for tuna. Foreign longliners (licensed and non-licensed) fishing in the South West Indian Ocean, transship their catches in Port Louis, whence freezer carrier ships transport the catches to Asian markets. Port Louis is the main landing port for freezer longliners, particularly the Taiwanese fleet. Nearly half of the catches of freezer longliner fleets are landed at Port Louis, making it a major landing centre (Lecomte, Rochette, Laurans, & Lapeyre, 2017).

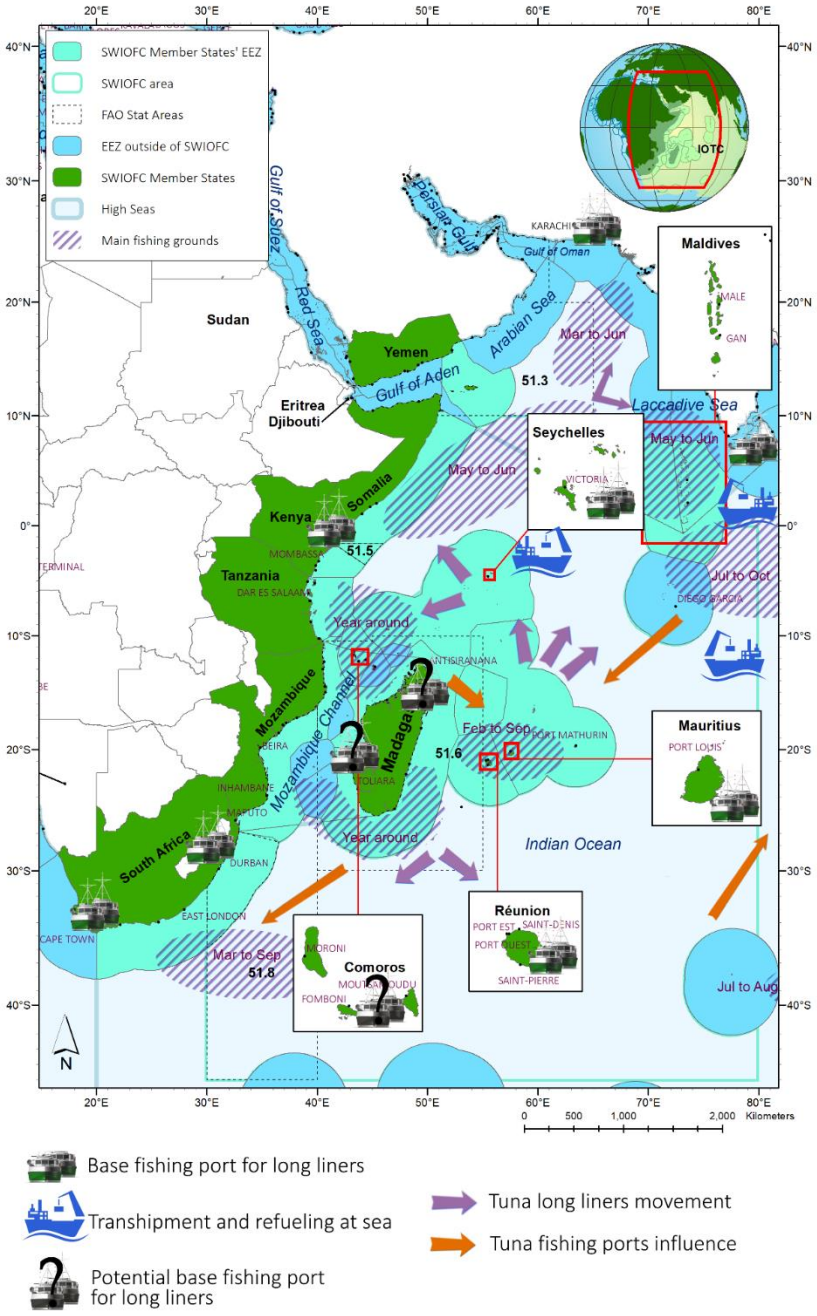


Figure 5-5: Seasonal Movement of the Industrial Longline Tuna Fleet in the SWIO. Based on (Sweenarain, 2018)

Also, the high landing volume is partly related to the conditions of the Mauritian fishing licences. They stipulate that all catches in the Mauritian EEZ must be landed at Port Louis (Lecomte, Rochette, Laurans, & Lapeyre, 2017). The competitiveness of the port services and the presence of a range of cold storage rooms allowing handling and processing of catches at -40°C for loins, chunks and steaks are also a factor in the competitiveness of the Mauritian port (OVPOI, 2014a).

In 2015, 52,586 tonnes of tuna were landed by longliners in Port Louis (i.e. 70% of the total catches of the freezer longliner fleet) (Mootoosamy, A., Sookall, & M., 2016). In that year, the majority of tuna landed was albacore (40% of tonnage) (Mootoosamy, A., Sookall, & M., 2016). These landings represent a significant part of Port Louis's port traffic. Between 2006 and 2013, berthing of industrial longliners accounted for 20% of the average annual moorings (for comparison, purse seiners accounted for only 1% of moorings) (OVPOI, 2014b).

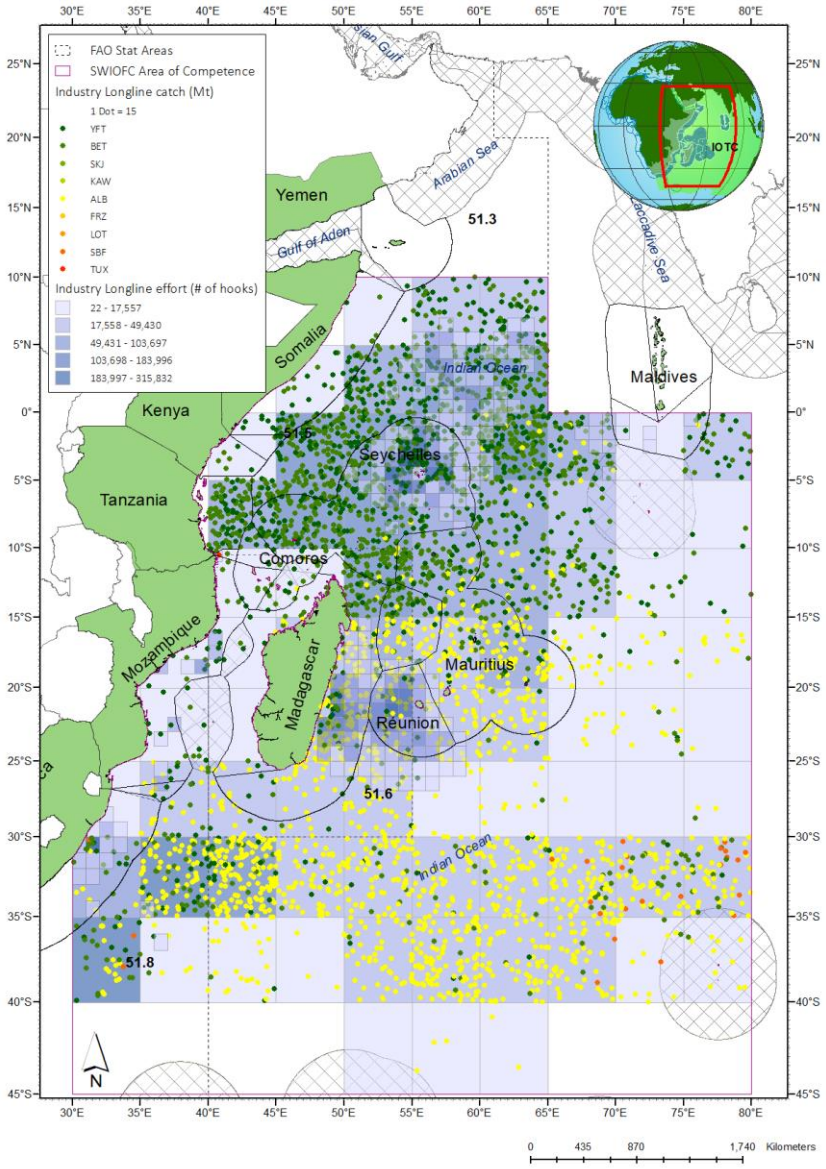


Figure 5-6: Cath and Effort from Longliners in the SWIO area in 2017 and using the IOTC grid 5ºx5º overlapped with grid 1ºx1º. Compilation based on IOTC "CE longline" data (IOTC, 2019)

Mauritius' industry is also the only one in the Western Indian Ocean that processes longliner catches, particularly albacore (Figure 5-7). Thus, almost 15,000 tonnes of albacore are processed annually in Mauritian canneries. The canneries work for the US can tuna brand *Bumble Bee* for loining part of the catches, which are then exported to the US for canning. The US market is the main consumer of canned albacore, which accounts for 60% of the tins consumed, i.e. nearly 240,000 tonnes a year (processed weight) (Lecomte, Rochette, Laurans, & Lapeyre, 2017)..

Port Victoria receives the landings of the Seychellois, Taiwanese and Chinese fleets. They generate a relatively low maritime traffic: longliners' moorings accounted for 11% of tuna vessel moorings in 2014 (SFA, 2016). Their expenditures contribute little to total spending. In 2014, these fleets expenditure only accounted for 0.2% of tuna fishing vessel expenditure (SFA, 2016). Their catches are not processed locally and are exported by container or cargo ships to final markets.

Thus, with the exception of a proportion of the albacore catches of the Taiwanese fleet, freezer longliners' catches are not processed in the region, but are sent by directly to the Japanese market. Countries in the region do not benefit from the processing of catches.

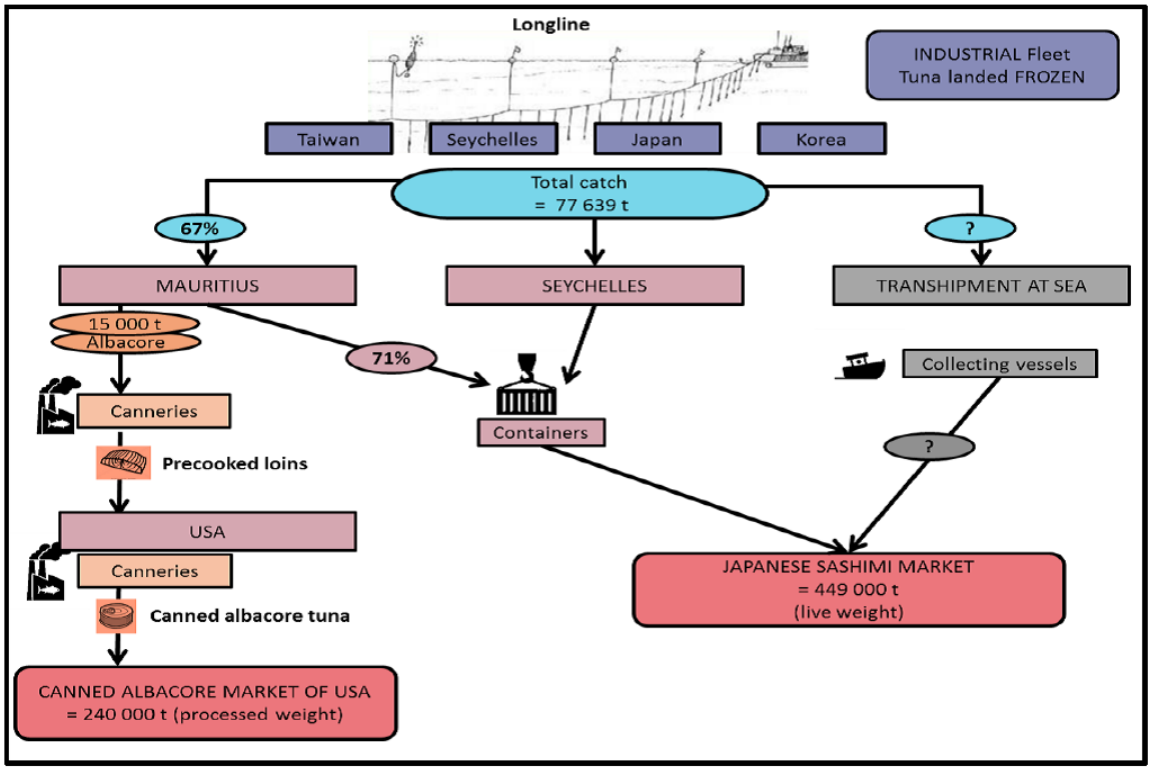


Figure 5-7: The industrial longline value chain. Source: Lecomte et al. (2017)

The tuna catches from the Indian Ocean supply several types of channels. Industrial purse seine fleets operating in the Western Indian Ocean are responsible for the largest catch volumes and mainly supply the canning plants of Madagascar, Mauritius and the Seychelles. The contribution of this fleet is of major importance to the economies of these states, whether in terms of expenditure in the port infrastructure, revenues from fishing licensing or processing in canneries. Within these countries, the main contribution of the fisheries sector to the national economy is related to the processing of the purse seine catches in national canneries.

Unlike industrial purse seiners, catch from industrial longliners in the SWIO do not contribute much to the local economy of the SWIOFC MS, since most of their catches are trans-shipped and sent directly to the Japanese market without prior processing in the region (Figure 5-7).

5.3.3 The SWIO Purse Seine fleet and Canneries:

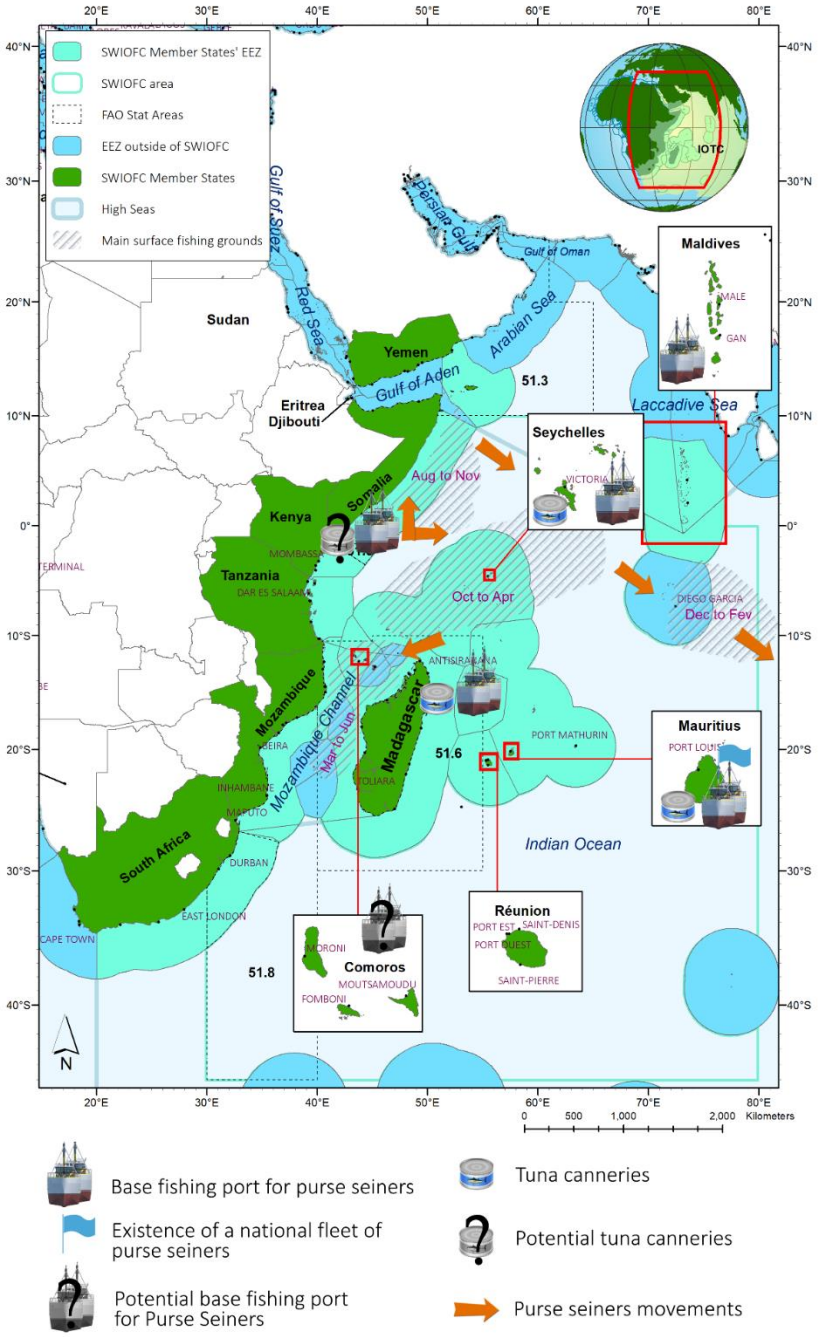


Figure 5-8: Seasonal Movement of the Industrial Purse Seine Tuna Fleet in the SWIO. Based on Sweenarain (2018)

The canneries of Madagascar, Mauritius and the Seychelles are thus supplied by catches from the industrial purse seine fleet operating in the Western Indian Ocean (Figure 5-8). These industrial purse seiners come from European (French and Spanish), Seychellois (funded by Spanish capital), Mauritian (funded by French capital) and Korean fleets. Although the Korean fleet lands its catches in the region's ports, these catches are not processed in the Indian Ocean canneries. Therefore, we only address here the European and Seychellois and Mauritian fleets.

These purse seine fleets follow the migratory routes of tuna. Access to the coastal states' EEZs is crucial, as nearly half of the tuna catches of the purse seine fleets are made in the EEZs of SWIO countries, particularly in the Seychellois EEZ (POSEIDON, MRAG, NFDS and COFREPECHE, 2014).

To access these EEZs, industrial purse seine fleets establish fishing agreements with the coastal states' governments. The European fleet operates under fishing agreements negotiated and concluded by the European Commission. These agreements, now known as Sustainable Fisheries Partnership Agreements (SFPAs), enable European vessels to fish tuna resources in the EEZ of third countries involved, in exchange for payment for fishing rights (DG MARE, 2017a). These agreements are characterized by the fact that they are accompanied by a sectoral contribution consisting of a fund dedicated to the development of the fishery sectors of coastal States. In 2016 the European Union had implemented SFPAs with the Seychelles, Mauritius, Madagascar and Comoros.

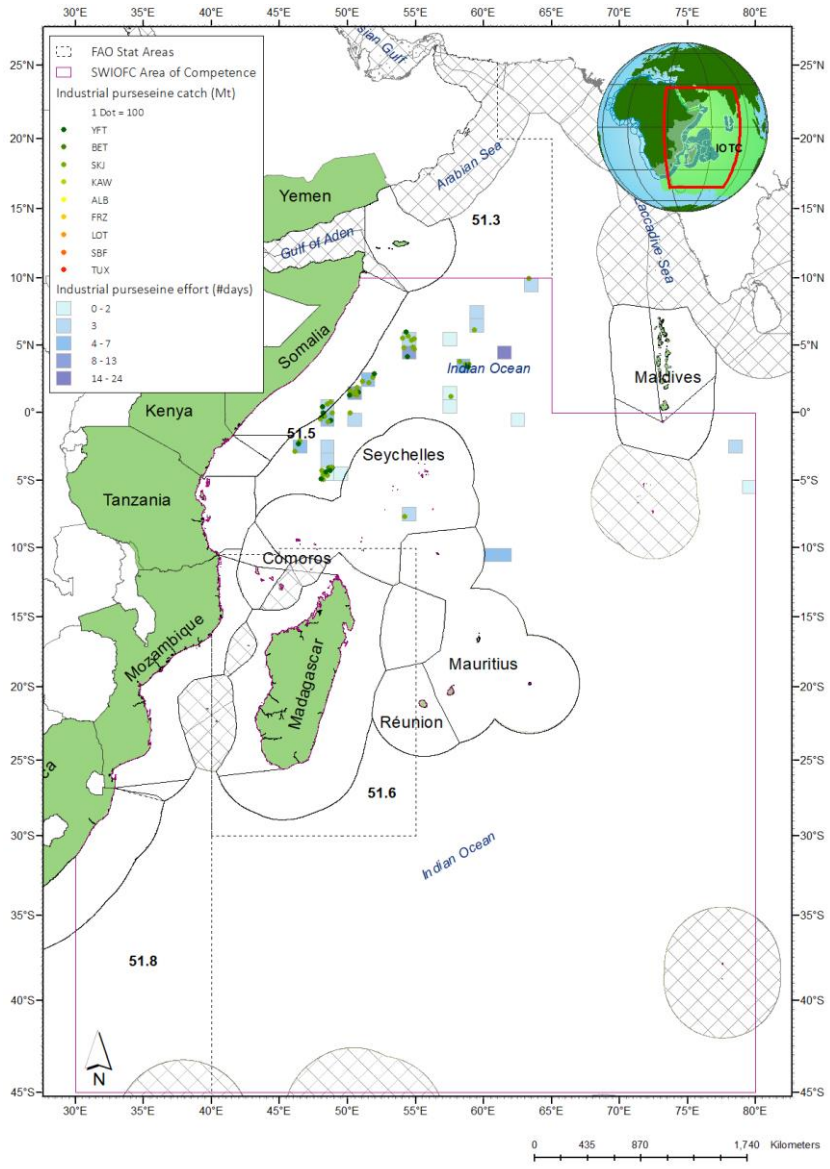


Figure 5-9: Cath and Effort by tuna species from Purse Seiners in the SWIO area in 2017 and using the IOTC grid 1ºx1º. Compilation based on IOTC "CE surface fisheries" data (IOTC, 2019)

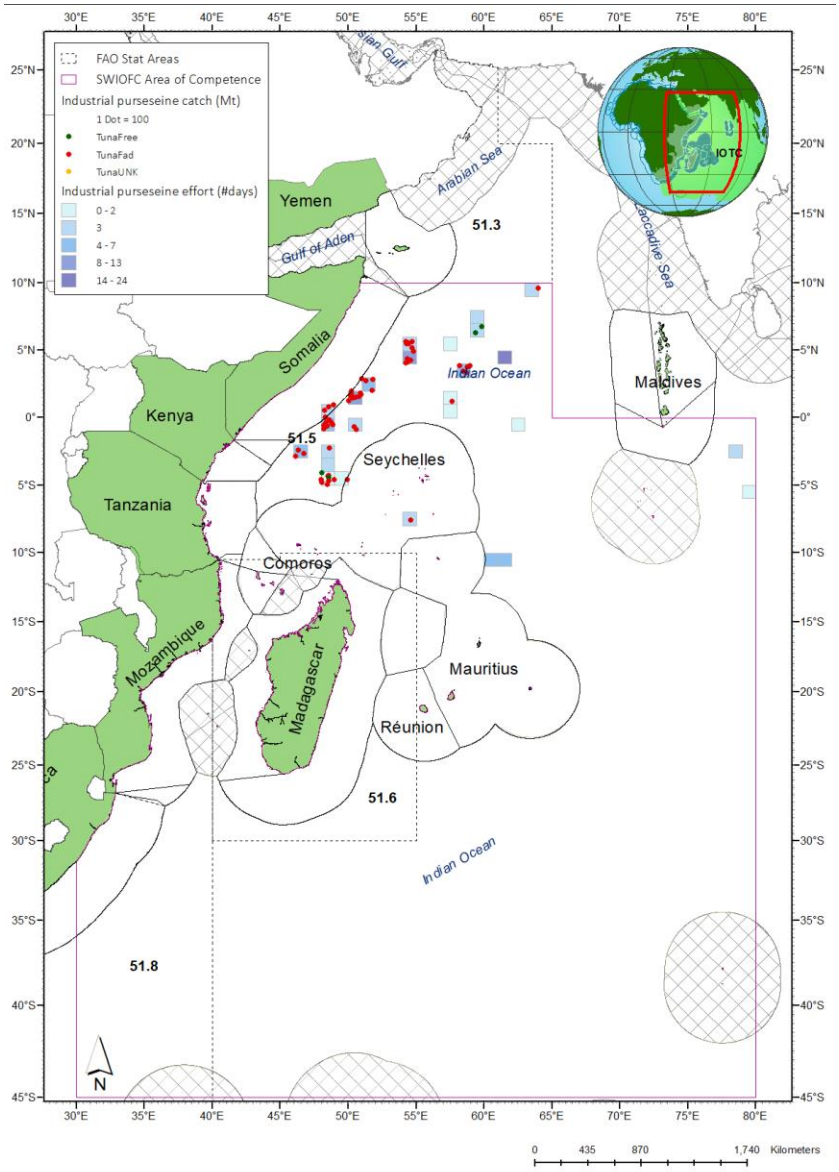


Figure 5-10: Cath and Effort from Purse Seiners in the SWIO area in 2017 highlighting FAD and free school catch and using the IOTC grid 1ºx1º. Compilation based on IOTC "CE surface fisheries" data (IOTC, 2019)

French and Spanish fishing vessels have also established private agreements for access to the EEZs of Kenya and Tanzania (DG MARE, 2017a). These fishing rights represent a significant income for the countries in the area, and make up a significant proportion of the budgets of some fishery ministries in the region

Catches by industrial purse seiners are in the order of 290,000 tonnes per year (IOTC, 2019). All catches by this fleet are landed in the following three ports: Victoria (Seychelles), Port Louis (Mauritius) and Diego Suarez (Madagascar) (OVPOI, 2014b). The main landing port is Victoria, which accounts for 95% of the fleet's landings, while Port Louis and Diego Suarez each host 2% of landings (SFA, 2016).
Within the fleet of European industrial purse seiners, there are two strategies for adding value to catches.

- "Traditional" purse seiners freeze their catches in brine tanks at -18°C and allocate most of their catch to the region's canneries. These purse seiners constitute most the European fleet at present;
- Other European purse seiners freeze their catches at -40°C (SAPMER vessels) or -60°C

(Echebastar vessels) for the European tuna steak markets and Asian sashimi markets. These catches are valued at higher prices than tuna for canning. The SAPMER catches are mainly processed in Mauritian processing units, while the Echebastar has its own processing plant in Spain (SAPMER (2019) and Echebastard (2019).)

The Korean fleet lands its catches in the region but does not process them within the region's canneries, as they are owned by vertically integrated groups (Silla, Donwgon, Sajo). These catches are largely sent to their Korean canneries.

Once landed in Victoria, a small proportion of the purse seine catch (24%) is processed in the Indian Ocean Tuna cannery. The majority (76%) of the landed catch is trans-shipped by refrigerated cargo ships (74% of trans-shipped catches) or by container (26% of trans-shipped catches) (SFA 2016). Cargo vessels enable large volumes of tuna to be trans-shipped in bulk, while containers allow small quantities (26 tonnes per container) to be transported. Recently, investment in a Fish Loader in Victoria has boosted the containerization of tuna for export: this allow enhancement of the catches' value and to target the demand from final markets (SFA, 2016).. The shipment of tuna with container allows the export of homogeneous batches (tunas sorted by quality, species, size) that responds to specific market request. The average price of tuna exported by container is much higher than the price of bulk tuna exported by reefers. A regular bulk cargo line has been established between Victoria and Mauritius and between Victoria and Madagascar to supply canneries in both countries. These canneries receive very little direct landings and are thus dependent on these cargo ships for their supplies.

Mauritius has two canneries and two units specializing in processing tuna at -40°C and -60°C. It is currently the largest processing capacity in the Western Indian Ocean (105 000 tons annually). Madagascar's cannery is of smaller capacity and the volumes produced by this cannery are currently very limited.

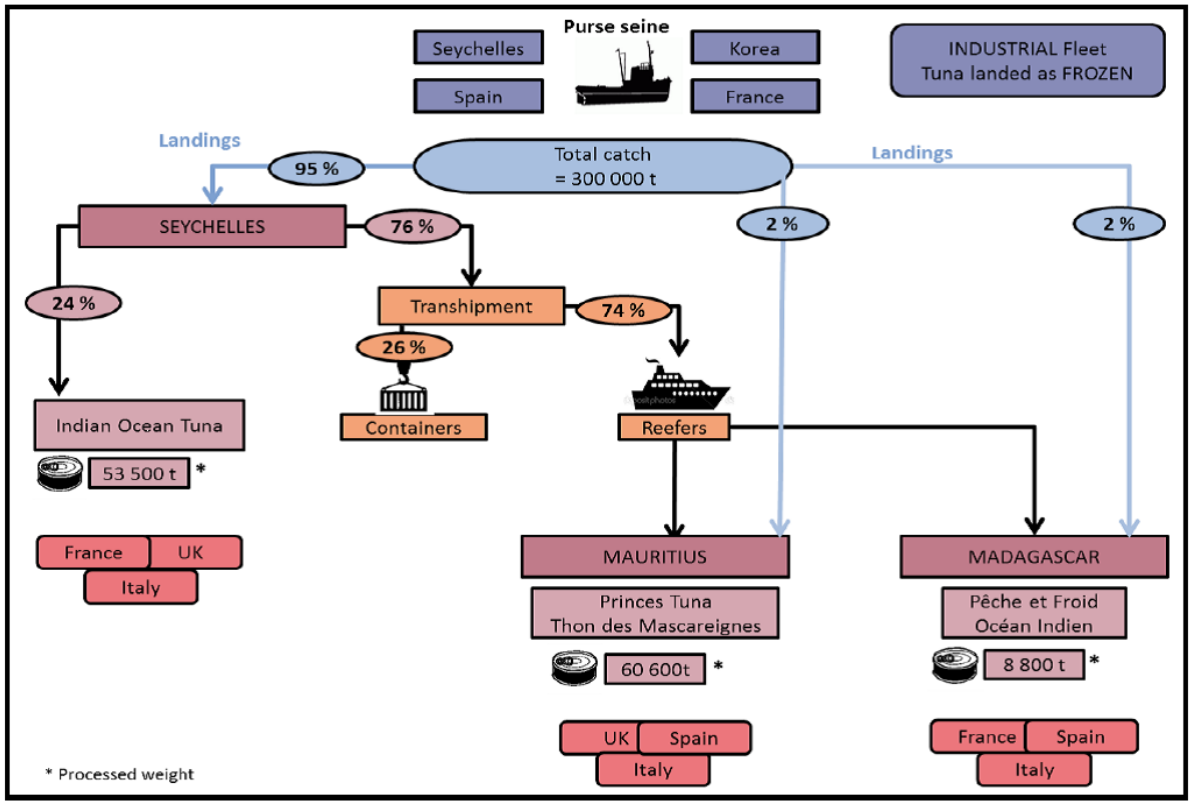


Figure 5-11: The Western Indian Ocean cannery value chain. Source: Lecomte et al. (2017)

The majority of catches from the industrial purse seine fleet are destined for canneries in the area.

These canning plants thus process nearly 70% of the European and Seychellois fleets' catches.

This canning industry contributes to the Malagasy, Mauritian and Seychellois economies in three ways:

- Payment of fishing access rights;
- Financial flows from industrial purse seine fleets into their port infrastructure;
- Distribution of the catches from this purse seine fleet into canneries and processing units that involve labour intensive activities (however, in Seychelles and Mauritian canneries a large proportion of the labor force employed is foreign workers).)

In the Seychelles, in particular, activities related to the landing and processing of catches from the industrial purse seine fleet are vital to Seychelles' economy. The purse seiner fleet and the associated supply vessels account for the bulk of the Port of Victoria's traffic: in 2014, this fleet accounted for half of the moorings (SFA, 2016).. Expenditures for this fleet (purse seiners and supply vessels) amounted to USD 163 million in 2014 (SFA, 2016).. Nearly 1,000 port workers are directly involved in the landing and handling of catches. Almost all the activities of the Seychelles Petroleum Company are linked to these fleets: 96% of the fuel expenses of the fishing fleet is related to purse seiners (SFA, 2016).. The Seychellois economy is largely dependent on the activities of the canneries (African Bank of Development 2014), which represents the island's largest private employer and is responsible for nearly 37% of goods export's value from the Seychelles. These exports generate a large amount of container traffic and ensure that the Port of Victoria is on the route of container ships. This dynamism in the Port of Victoria also indirectly benefits the tourist industry, which imports a large quantity of goods to satisfy tourist demand. Canned tuna exports enable container companies to rationalize their transport operations by refilling their containers with canned tuna to bring back, thus adding to the attraction of the Port of Victoria.

The contribution of this industrial purse seiners sector is less significant for the national economies of Mauritius and Madagascar. Purse seine fleet expenditure in port infrastructure in these two countries is lower than in the Seychelles, but the activities of the canneries constitute almost all the income generated by the fisheries sector.

In Mauritius, purse seiners only land a small proportion of their catches; most of the tuna catch being delivered to canneries via cargo ships. However, tuna processing is the main activity of the so-called *Seafood Hub*, a centre being developed by the Mauritian government to promote seafood processing activities, particularly for tuna products. Presented as the fourth pillar of the Mauritian economy, the Seafood Hub contributes nearly 1.3% of Mauritian GDP through these tuna activities (Yvergniaux, Greboval, & Breuil, 2016). The direct value added created by Mauritian canneries is thus the highest of the region's canning plants.

In Madagascar, the impact of this canning industry is noticeable on the scale of the economy of the city of Diego Suarez. The PFOI cannery and the SECREN shipyard are the main employers in the Northern region of Madagascar. The Diego Suarez salt plant, which supplies almost all the salt for the purse seine fleet's brine tanks, is also a major employer in the region. A 2016 study thus estimated that the tuna fishery accounted for 35% of the economy of the city of Diego Suarez (Rakotomolala, 2017).

5.4 Tuna Fisheries Access Agreements

The EU fleet dominates the purse seine fishery in the WIO with two third of total tuna purse seine catches coming from Spanish and French purse seiners (IOTC, 2019). In comparison, only 2 % of the total purse seine fishery can be attributed to EU purse seiners in the west central Pacific (POSEIDON, MRAG, COFREPECHE and NFDS, 2013).

5.4.1 Agreements between SWIO MS and the EU

The EU has committed many Sustainable Fisheries Partnerships or SFP with third countries to enhance sustainable exploitation of fisheries. Sustainable Fisheries Partnerships Agreements or SFPAs allow EU fleets to fish in third countries' Exclusive Economic Zones, with a regulated and guaranteed environment. SFPAs target surplus stocks only, and aim towards resource conservation and

environmental sustainability, ensuring that EU fishing laws and principles (including human rights) are respected (EU, 2015c). In other words, SFPAs guarantee the respect of the European Common Fisheries Policy's (CFP) key principles and values. The CFP is a set of rules for managing European fishing fleets and for conserving fish stocks. Designed to manage a common resource, it gives all European fishing fleets equal access to EU waters and fishing grounds and allows fishermen to compete fairly. The CFP aims to ensure that fishing is environmentally, economically and socially sustainable (EU, 2015b).

In exchange for access rights, the EU, firstly pays for those rights, and secondly also contributes financially to support local fishing sectors and third countries fishing governance, including IUU fight and scientific research.

The annual contribution from the EU to these countries through SFPAs was € 180 million in 2015 (EU, 2015c).

The EU already signed tuna specific SFPAs with the following countries: Cape Verde, *Comoros*, Côte d'Ivoire, Gabon, Kiribati, *Madagascar*, *Mauritius*, *Mozambique*, Sâo Tomé and Principe, Senegal and *Seychelles* (EU, 2015)

Table 5-7: EU's fisheries access agreements with SWIO MS

Country	Expiry date	Type	Total EU contribution per year	Sectorial support per year
Comoros	*Protocol expired on 31/12/2016. Agreement denounced*			
Madagascar	*Protocol expired on 31/12/2018*			
Mauritius	07/12/2021	Tuna	€ 575,000	€ 220,000
Mozambique	*Protocol expired on 31/01/2015*			
Seychelles	17/01/2020	Tuna	€ 5,350,000 in 2014 To € 5,000,000 in 2019	€ 2,600,000

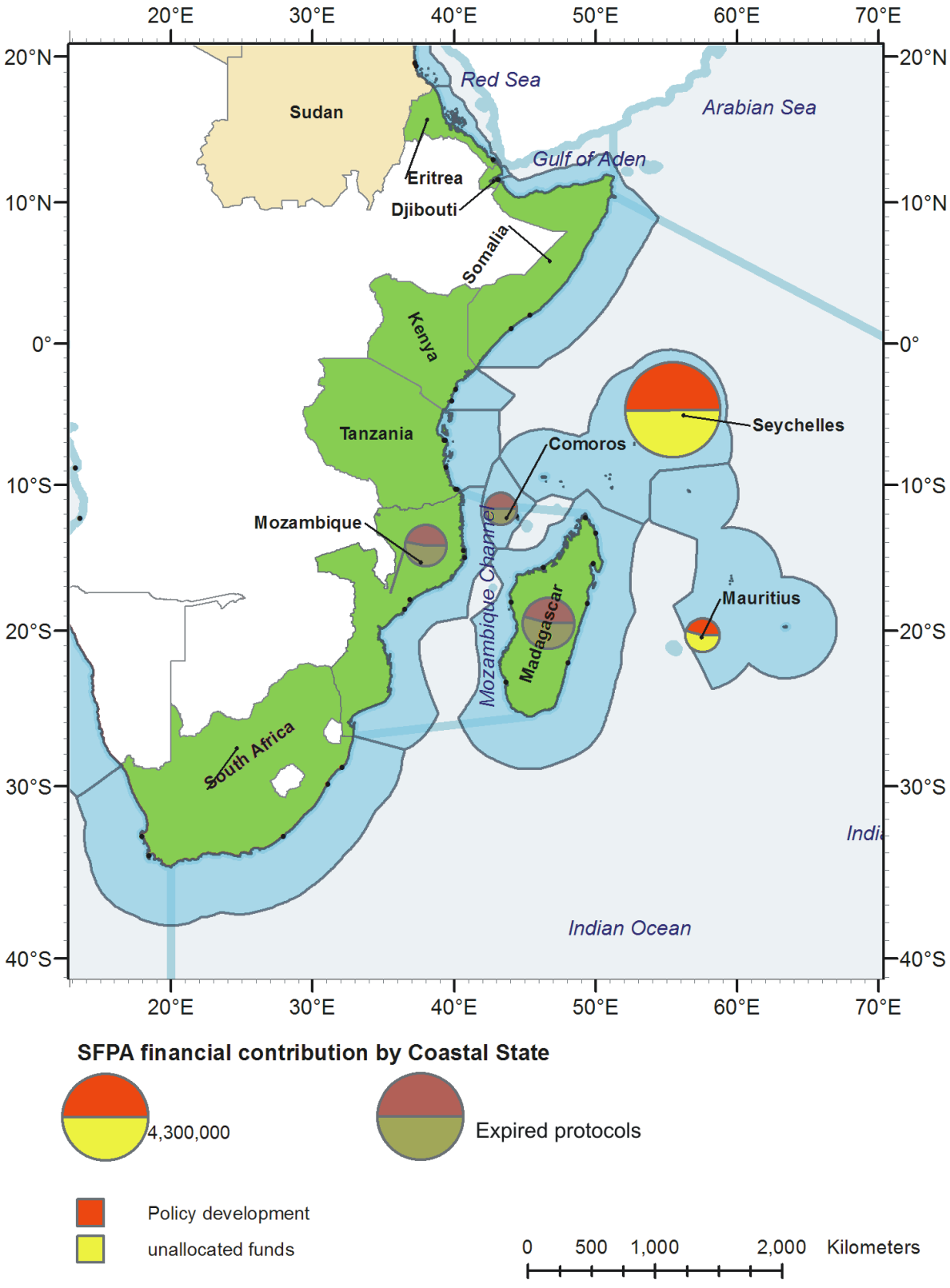


Figure 12: Current and expired EU-SWIO MS Fisheries Partnership Agreements as of 2015 (values expressed in Euros).

5.4.2 Non-SFPAs with SWIO MS

Table 5-8: Past Fishing Access Agreement between SWIO MS and third parties (Lallemand, 2016b)

	Host country								
	Eastern Africa								Southern Africa
	Madagascar			Mauritius	Mozambique	Seychelles	Somalia	Comoros	South Africa
Fishing Country	bilateral	exploratory	private	bilateral	bilateral	bilateral	bilateral	bilateral	bilateral
Australia									
Start Year			2009						
End Year			2012						
China									
Start Year							1989		
End Year							1992		
Côte d'Ivoire									
Start Year						1984			
End Year						1989			
France									
Start Year	1986		2011	1990	1987	1984		1988	
End Year	2013		2013	2007	2015	2012		2013	
Italy									
Start Year	1986			1990	1987	1984		1988	
End Year	2013			2007	2015	2012		2013	
Japan									
Start Year		1988	2008			1990			
End Year		1988	2008			1995			
Panama									
Start Year						1984			
End Year						1989			
Portugal									
Start Year	1986			1990	1987	1984		1988	
End Year	2013			2007	2015	2012		2013	
Réunion (France)									
Start Year			2010						
End Year			2013						
Romania									
Start Year					1978				
End Year					1983				
Russian Federation									
Start Year					1976	1978			
End Year					1981	1993			
Seychelles									
Start Year			2011						
End Year			2013						
South Africa									
Start Year					1984				
End Year					2003				
Spain									
Start Year	1986		2009	1990	1977	1981		1988	1982
End Year	2013		2012	2007	2015	2012		2013	1992
Thailand									
Start Year	2000								
End Year	2002								
Ukraine									
Start Year					1976	1978			
End Year					1981	1991			
United Kingdom									
Start Year				1990		1984			
End Year				2007		2012			

5.5 Tuna Production in the SWIO region

5.5.1 Catch by SWIOFC MS, sector and gear type.

The following figures speak volume as they clearly show the importance of certain methods in catching and landing specific tuna species, especially certain species sought after depending on the markets targeted. We note that both baitboat (i.e. pole and lines from the Maldives) and Purse Seiners (from Seychelles) target mainly Skipjack while more lucrative yellowfin tuna tend to be targeted by handlines.

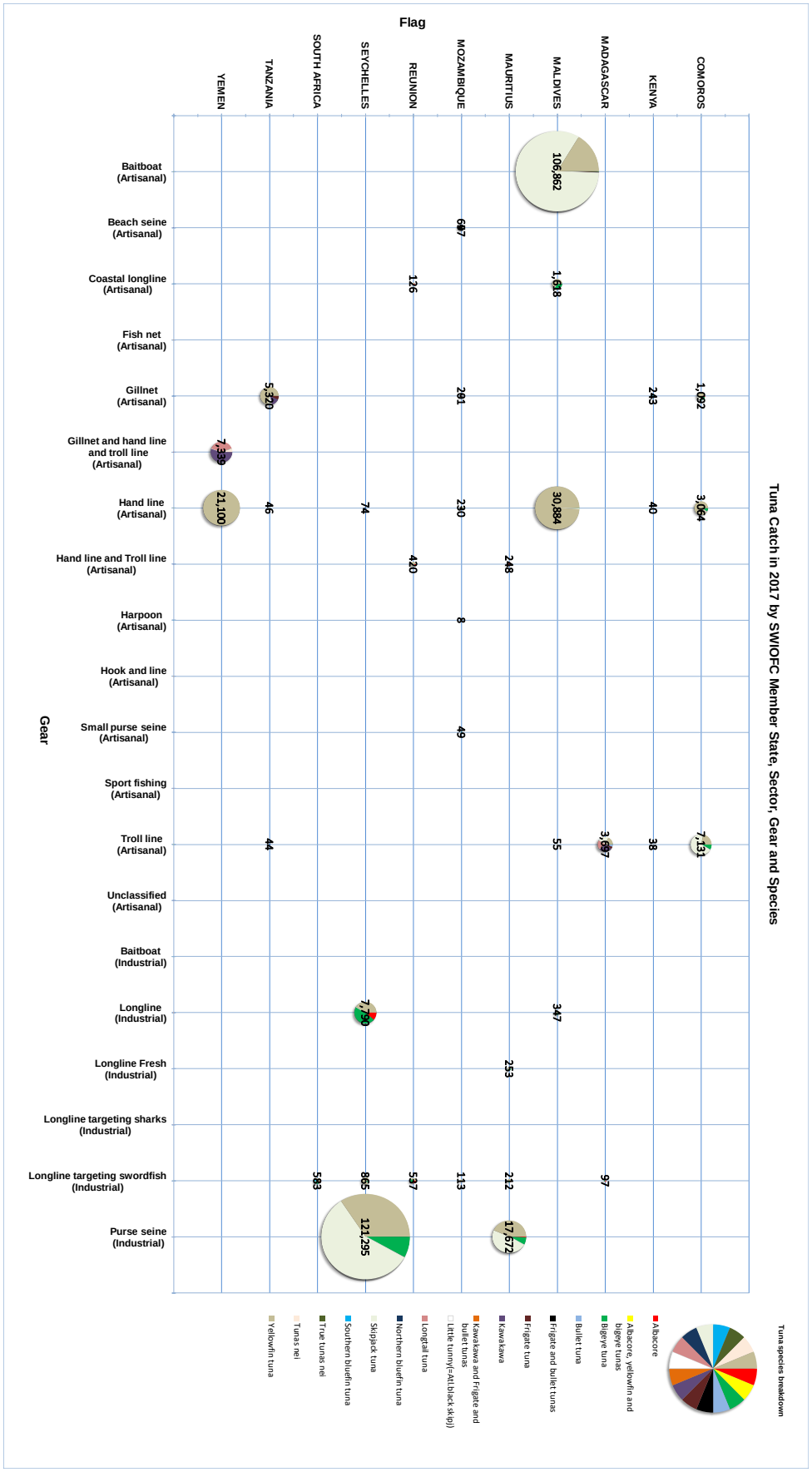
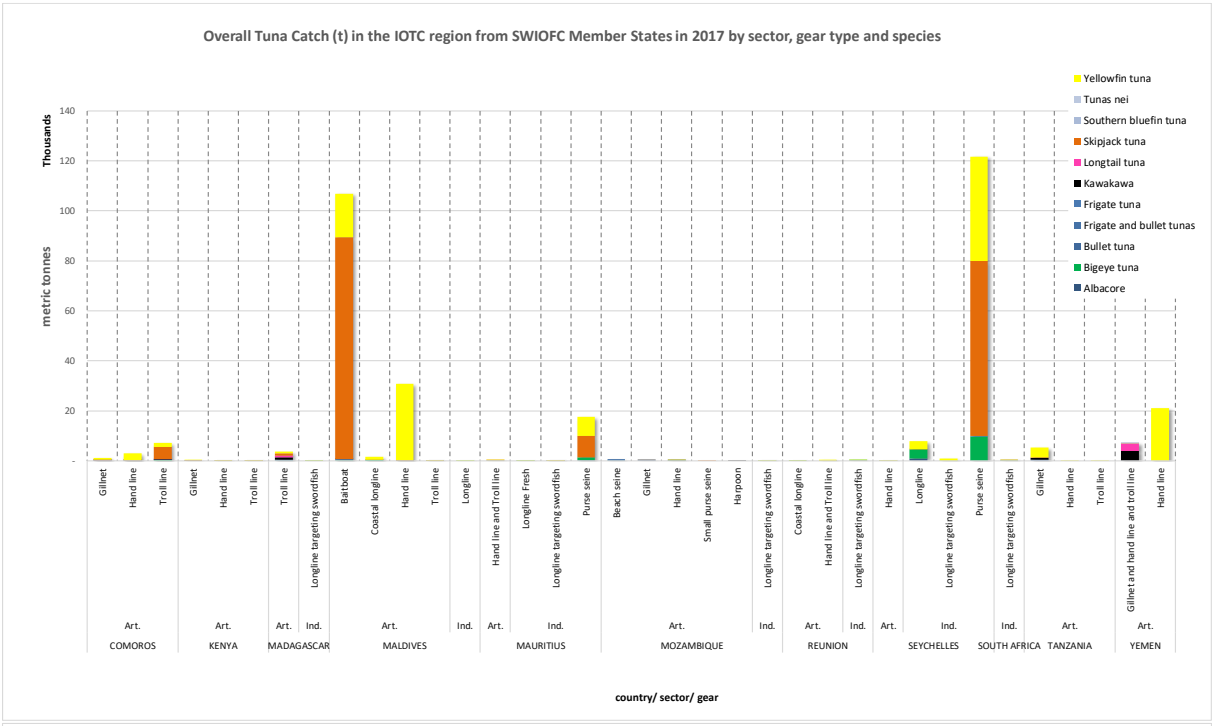
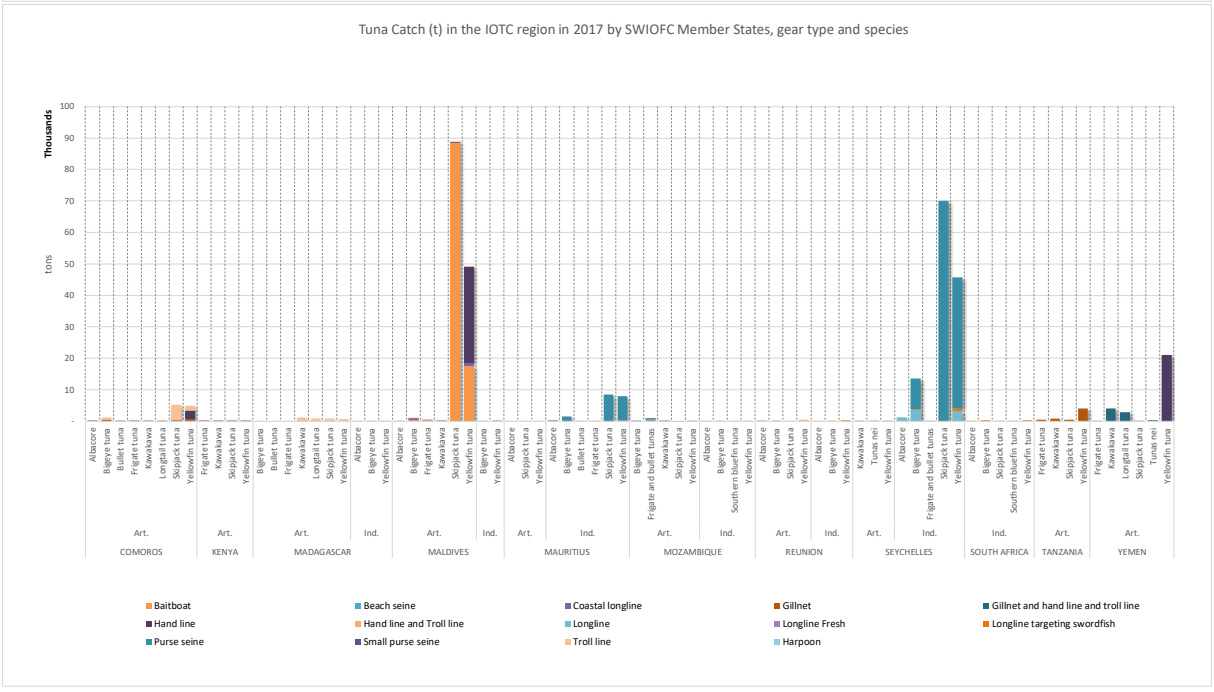


Figure 5-13: 2017 Tuna breakdown catch (Mt) by Species, SWIOFC Member States and gear. Compiled by the author based on IOTC (2019)


Overall Tuna Catch (t) in the IOTC region from SWIOFC Member States in 2017 by sector, gear type and species
Thousands
metric tonnes
140
120
100
80
60
40
20
-
Yellowfin tuna
Tunas nei
Southern bluefin tuna
Skipjack tuna
Longtail tuna
Kawakawa
Frigate tuna
Frigate and bullet tunas
Bullet tuna
Bigeye tuna
Albacore
Gillnet
Hand line
Troll line
Longline targeting swordfish
Baitboat
Coastal longline
Longline
Hand line and Troll line
Longline Fresh
Purse seine
Beach seine
Small purse seine
Harpoon
Gillnet and hand line and troll line
Art.
Ind.
COMOROS
KENYA
MADAGASCAR
MALDIVES
MAURITIUS
MOZAMBIQUE
REUNION
SEYCHELLES
SOUTH AFRICA
TANZANIA
YEMEN
country/ sector/ gear


Tuna Catch (t) in the IOTC region in 2017 by SWIOFC Member States, gear type and species
Thousands
tons
100
90
80
70
60
50
40
30
20
10
-
Art.
Ind.
COMOROS
KENYA
MADAGASCAR
MALDIVES
MAURITIUS
MOZAMBIQUE
REUNION
SEYCHELLES
SOUTH AFRICA
TANZANIA
YEMEN
Baitboat
Beach seine
Coastal longline
Gillnet
Gillnet and hand line and troll line
Hand line
Hand line and Troll line
Longline
Longline Fresh
Longline targeting swordfish
Purse seine
Small purse seine
Troll line
Harpoon

5.5.2 IUU Tuna Landings

The data p[resented here and for each section referring to IUU tuna landings are based one the Sea Around (SAU) data found on their Website (http://www.seaaroundus.org). SAU data are "reconstructed data" and combine official reported data and reconstructed estimates of unreported data (including major discards), with reference to individual EEZs. Official reported data are mainly extracted from the Food and Agriculture Organization of the United Nations (FAO) FishStatJ database. The "Reported catch" represent all landings deemed reported (including foreign) and allocated to each individual country (Pauly & Zeller, 2018).

Table 5-9: Reported and unreported tuna landings (Mt and USD) for all SWIOFC MS by sector in 2014. Source (SAU, 2019)

Tuna Landings						
	Reported		Unreported		Total Catch (metric tonnes)	Total Landed value (US$)[1]
Country/sector/method/ species	Catch (metric tonnes)	Landed value (US$)[1]	Catch (metric tonnes)	Landed value (US$)[1]		
Comoros Isl.	6,186.9	14,815,908.7	6,198.6	14,843,534.4	12,385.5	29,659,443.1
Artisanal	4,944.6	11,843,265.2	4,954.7	11,867,378.4	9,899.3	23,710,643.6
Industrial	0.9	2,534.7			0.9	2,534.7
Subsistence	1,241.4	2,970,108.8	1,243.9	2,976,156.0	2,485.3	5,946,264.8
Kenya	62.0	146,144.9	13.9	28,990.4	75.9	175,135.2
Artisanal	31.5	65,646.0	12.5	26,091.3	44.0	91,737.3
Industrial	26.2	70,367.4			26.2	70,367.4
Recreational	0.8	2,837.4			0.8	2,837.4
Subsistence	3.5	7,294.0	1.4	2,899.0	4.9	10,193.0
La Réunion (France)	532.2	1,685,485.9	587.5	1,926,887.6	1,119.6	3,612,373.5
Artisanal	367.2	1,204,304.8	403.9	1,324,735.2	771.0	2,529,040.0
Industrial	165.0	481,181.1			165.0	481,181.1
Recreational			183.6	602,152.4	183.6	602,152.4
Madagascar	5,110.3	12,408,643.4	332.1	754,288.6	5,442.4	13,162,932.0
Artisanal	1,583.0	3,595,311.0	166.1	377,144.3	1,749.1	3,972,455.3
Industrial	1,944.3	5,218,021.4			1,944.3	5,218,021.4
Subsistence	1,583.0	3,595,311.0	166.1	377,144.3	1,749.1	3,972,455.3
Maldives	25,960.4	67,932,894.3	12,201.6	31,690,487.3	38,162.0	99,623,381.5
Artisanal			5,477.6	16,039,423.4	5,477.6	16,039,423.4
Industrial	1,655.8	3,504,512.5			1,655.8	3,504,512.5
Subsistence	24,304.6	64,428,381.8	6,724.0	15,651,063.9	31,028.6	80,079,445.7
Mauritius	1,318.5	3,306,310.7	669.7	1,851,307.9	1,988.2	5,157,618.6
Artisanal	125.9	436,793.4			125.9	436,793.4
Industrial	1,192.6	2,869,517.3			1,192.6	2,869,517.3
Recreational			669.7	1,851,307.9	669.7	1,851,307.9
Mozambique	512.4	983,887.8			512.4	983,887.8
Industrial	512.4	983,887.8			512.4	983,887.8
Seychelles	436.0	968,817.8	10.1	17,977.6	446.1	986,795.4
Artisanal	67.4	119,850.6	7.6	13,483.2	74.9	133,333.8
Industrial	368.7	848,967.3			368.7	848,967.3
Recreational			2.5	4,494.4	2.5	4,494.4
Somalia	4,282.8	12,021,063.2	57,670.9	164,553,895.6	61,953.7	176,574,958.8
Artisanal	4,224.2	11,869,016.7	1,026.5	2,884,249.5	5,250.6	14,753,266.2
Industrial	58.7	152,046.6	56,644.4	161,669,646.1	56,703.1	161,821,692.6
South Africa (Indian Ocean Coast)	437.6	1,237,502.2	40.6	105,597.1	478.2	1,343,099.3
Artisanal	169.3	439,988.0	40.6	105,597.1	209.9	545,585.1
Industrial	268.3	797,514.2			268.3	797,514.2
Tanzania	6,107.7	19,048,747.6	2,131.9	6,652,997.8	8,239.5	25,701,745.4
Artisanal	6,075.0	18,980,245.0	2,126.3	6,643,085.8	8,201.3	25,623,330.8
Industrial	16.7	40,182.6			16.7	40,182.6
Subsistence	16.0	28,320.0	5.6	9,912.0	21.6	38,232.0
Yemen (Arabian Sea)	37,935.4	117,425,552.3	84,989.3	268,444,222.3	122,924.7	385,869,774.6
Artisanal	37,935.4	117,425,552.3	66,520.6	210,469,658.6	104,456.0	327,895,210.9
Subsistence			18,468.7	57,974,563.7	18,468.7	57,974,563.7
Grand Total	88,882.1	251,980,958.7	164,846.2	490,870,186.4	253,728.3	742,851,145.1

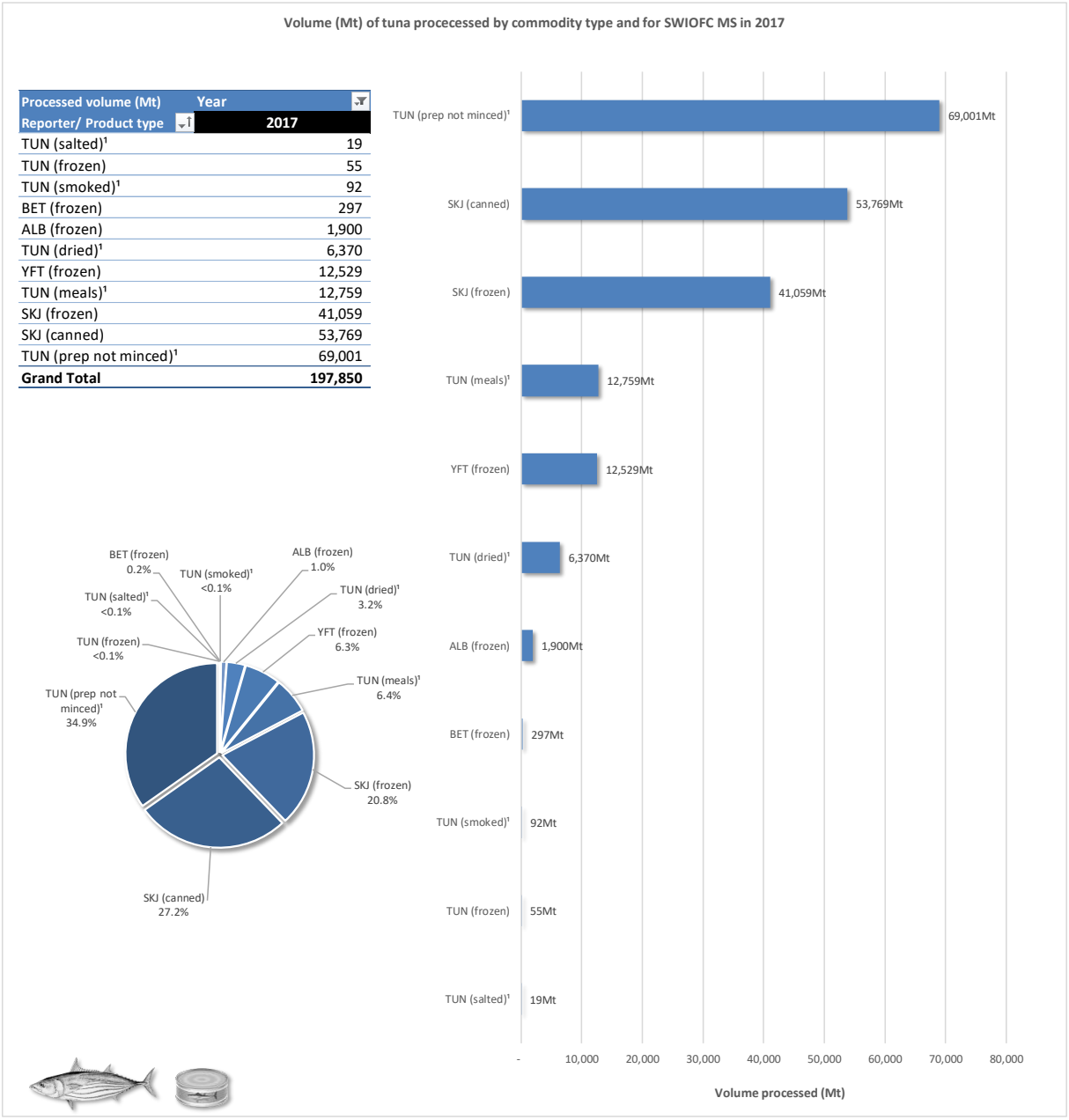
[1] Value estimated applying 2017 ex-vessel prices from Poseidon (2019)

5.6 Tuna Processing in the SWIO region

The data presented here include the output of processed commodities, produced on board factory-ships and by fishers' families as domestic activities, e.g. drying, salting, smoking, etc.
These data also include the preserved and processed fishery commodities produced on board

domestic fish factory-ships and fishing craft from the reporting country or area, even when landed directly in foreign ports. However, data do not include fishery commodities produced on board of foreign fish factory-ships or fishing craft and landed directly in domestic ports. (FAO, 2019c).
The main form of tune processed in the SWIO is canned and prepared whole (i.e. not minced)

5.6.1 Volume of Tuna processed in the SWIO region



Processed volume (Mt)	Year
Reporter/ Product type	2017
TUN (salted)[1]	19
TUN (frozen)	55
TUN (smoked)[1]	92
BET (frozen)	297
ALB (frozen)	1,900
TUN (dried)[1]	6,370
YFT (frozen)	12,529
TUN (meals)[1]	12,759
SKJ (frozen)	41,059
SKJ (canned)	53,769
TUN (prep not minced)[1]	69,001
Grand Total	**197,850**

[1] the product form "TUN (prep not-minced)" might include other fish: it was included as some reporter do not record the production as Tuna per se but just as generic fish; we needed to take into account this category to reconciliate some of the data we collected between FAO FishStatJ (FAO, 2019c) and UNComtrade (UN Comtrade, 2019).

Figure 5-14: Tuna processed (metric tonnes) by SWIOFC MS and product type in 2017. Source FAO (2019b)

5.7 SWIOFC Tuna Exports Markets

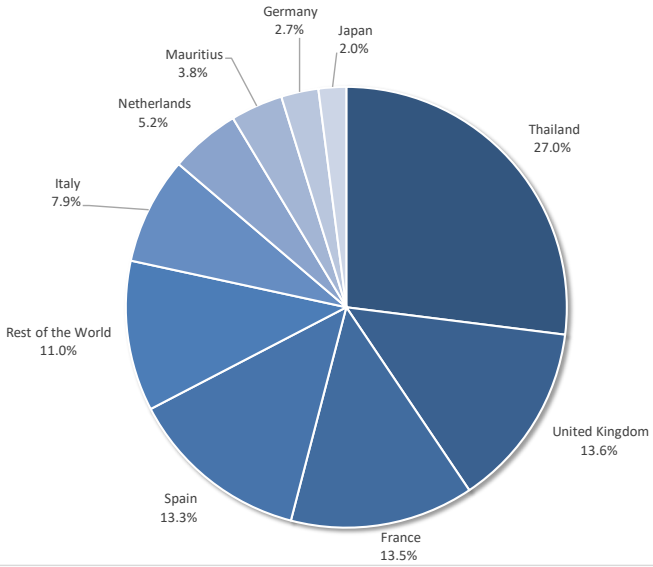
Tuna exports from the SWIO region account for most of the revenue generated by the tuna industry. Other than the fact that the local demand in most SWIOFC MS countries is not sufficient to absorb the supply, there are opportunity with such an iconic species as tuna to target premium markets mostly

found in OECD country. This was well understood by the small nation of the Maldives who successfully gain MSC certification for its Pole and Line (a.k.a. baitboat) Skipjack fishery in 2012 while the certificate for the yellowfin tuna component of this fishery is currently suspended. This fishery is confined within the 200 mile Maldives Exclusive Economic Zone, and only licensed Maldivian vessels may participate. After tourism, tuna is the country's major source of income and its primary export. The following maps and figures gives a bird eye's view of the various exports destination of the SWIO caught tuna species. The bigger export market in volume being Europe (France, Spain, Italy, the Netherlands and Germany), then Thailand and the rest of the world. Regionally Mauritius is the only SWIOFC MS country who registers some tuna imports.

5.7.1 Tuna Exports Volume



Volume (Mt) and its %age distribution of tuna exports from SWIOFC MS for the Top 10 market destinations in 2017



Top 10 partners/ netweight (Mt)	2017
Thailand	55,537.21Mt
United Kingdom	27,980.35Mt
France	27,704.64Mt
Spain	27,411.94Mt
Rest of the World	22,696.47Mt
Italy	16,173.02Mt
Netherlands	10,609.75Mt
Mauritius	7,882.52Mt
Germany	5,626.48Mt
Japan	4,173.18Mt
Grand Total	**205,795.56Mt**

Figure 5-15: Share of tuna exports volume (% and Metric tonnes) between the top 10 market destination for all SWIOFC MS and for all products combined in 2017 (does not include Somalia and Yemen). Source UN ComTrade (2019) and FAO (2019b)

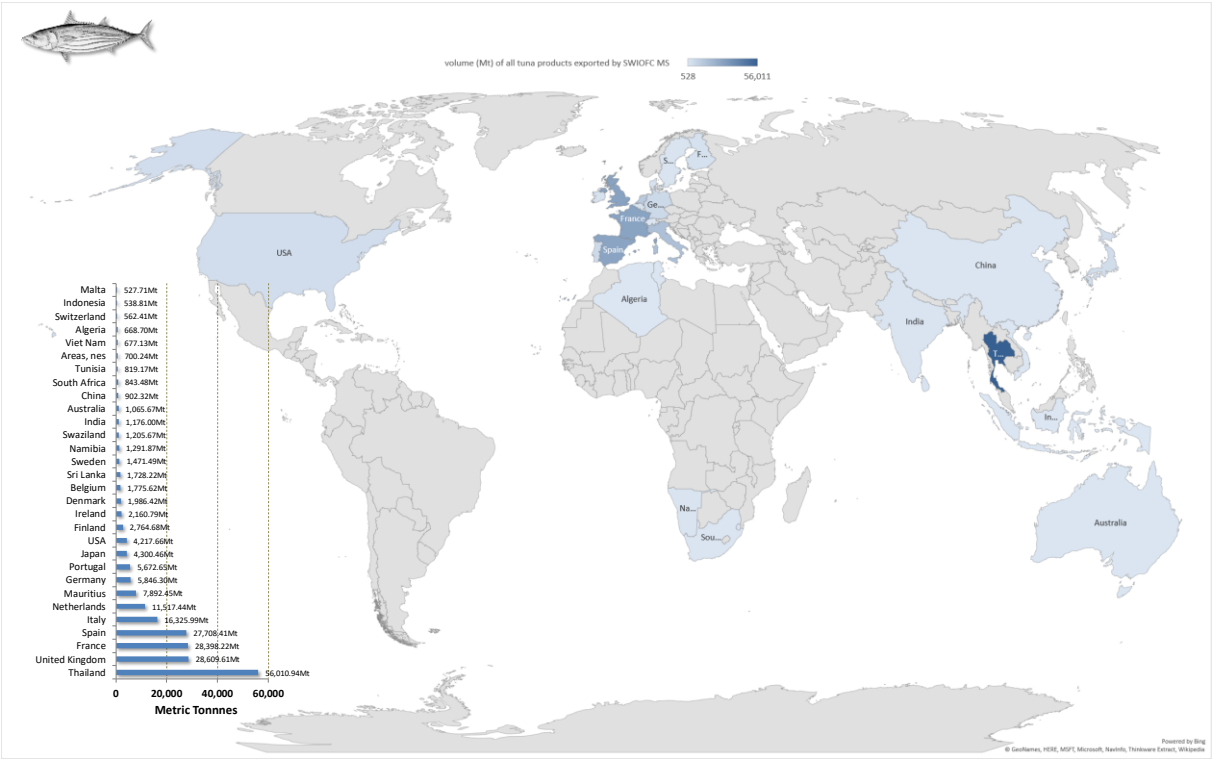
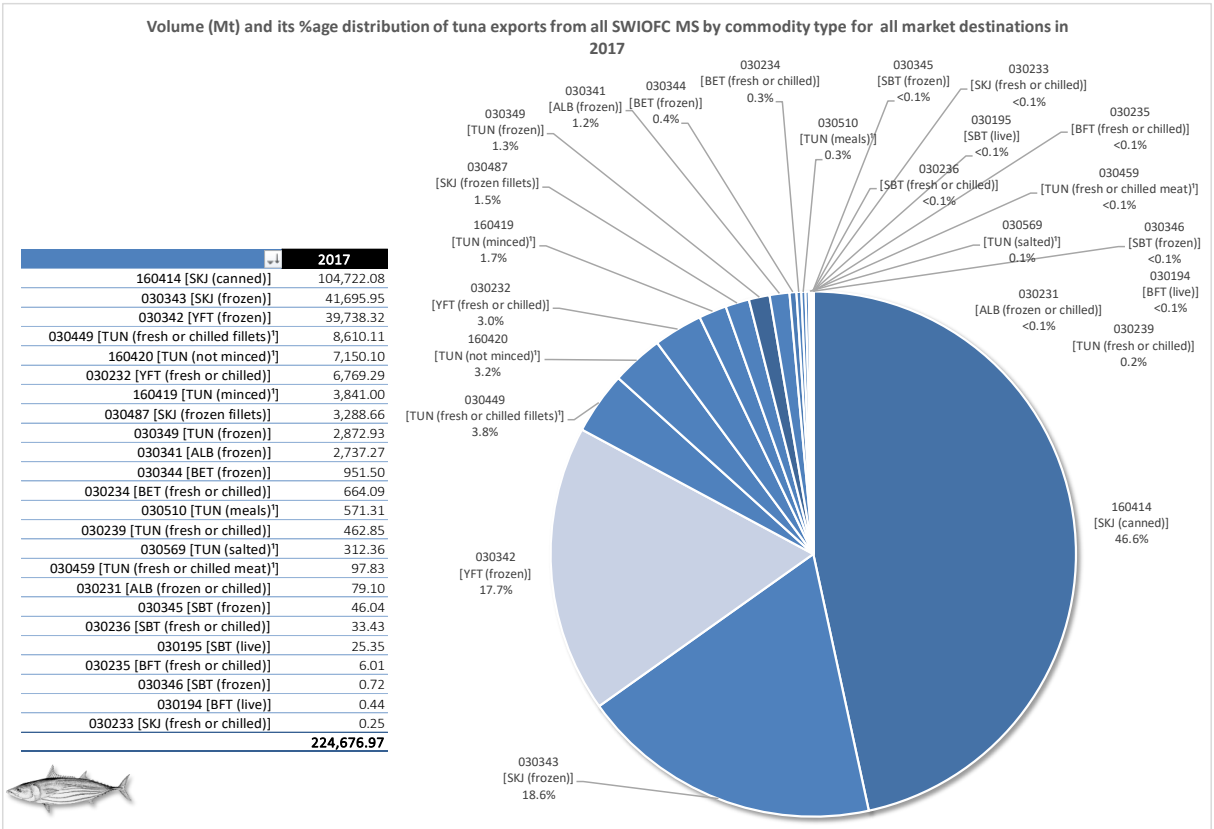


Figure 5-16: Geographic distribution by market destination of tuna exports volume (Mt) for all SWIOFC MS and products combined in 2017 (does not include Somalia and Yemen). Source UN ComTrade (2019) and FAO (2019b)



	2017
160414 [SKJ (canned)]	104,722.08
030343 [SKJ (frozen)]	41,695.95
030342 [YFT (frozen)]	39,738.32
030449 [TUN (fresh or chilled fillets)†]	8,610.11
160420 [TUN (not minced)†]	7,150.10
030232 [YFT (fresh or chilled)]	6,769.29
160419 [TUN (minced)†]	3,841.00
030487 [SKJ (frozen fillets)]	3,288.66
030349 [TUN (frozen)]	2,872.93
030341 [ALB (frozen)]	2,737.27
030344 [BET (frozen)]	951.50
030234 [BET (fresh or chilled)]	664.09
030510 [TUN (meals)†]	571.31
030239 [TUN (fresh or chilled)]	462.85
030569 [TUN (salted)†]	312.36
030459 [TUN (fresh or chilled meat)†]	97.83
030231 [ALB (frozen or chilled)]	79.10
030345 [SBT (frozen)]	46.04
030236 [SBT (fresh or chilled)]	33.43
030195 [SBT (live)]	25.35
030235 [BFT (fresh or chilled)]	6.01
030346 [SBT (frozen)]	0.72
030194 [BFT (live)]	0.44
030233 [SKJ (fresh or chilled)]	0.25
	224,676.97

Figure 5-17: Share of tuna exports volume (% and Metric tonnes) by product for all SWIOFC MS in 2017 (does not include Somalia and Yemen). Source UN ComTrade (2019) and FAO (2019b)

Volume (Mt) of tuna exports from all SWIOFC MS by commodity type and market destination in 2017

Netweight (Mt)	Year
Product/ Trading partner	2017
030233 [SKJ (fresh or chilled)]	**0.25**
Mozambique	0.25
030194 [BFT (live)]	**0.44**
Japan	0.44
030346 [SBT (frozen)]	**0.72**
France	0.72
030235 [BFT (fresh or chilled)]	**6.01**
Botswana	0.01
Japan	1.04
Lesotho	0.01
USA	4.95
030195 [SBT (live)]	**25.35**
Japan	13.02
Namibia	0.38
United States Minor Outlying Islands	1.22
USA	10.73
030236 [SBT (fresh or chilled)]	**33.43**
Botswana	0.12
Japan	22.56
United States Minor Outlying Islands	0.22
USA	10.54
Rest of the World	0.00
030345 [SBT (frozen)]	**46.04**
Botswana	0.01
Ethiopia	0.15
Namibia	24.09
Rep. of Korea	21.79
030231 [ALB (frozen or chilled)]	**79.10**
France	18.46
Mauritius	3.71
Spain	56.43
Swaziland	0.50
Rest of the World	0.00
030459 [TUN (fresh or chilled meat)']	**97.83**
Botswana	22.57
France	5.18
Lesotho	39.35
Swaziland	12.58
USA	8.77
Rest of the World	9.38
030569 [TUN (salted)']	**312.36**
China, Hong Kong SAR	159.47
France	18.11
Netherlands	46.27
Portugal	30.67
Zambia	13.21
Rest of the World	44.63
030239 [TUN (fresh or chilled)]	**462.85**
France	10.98
Japan	62.74
Mauritius	276.96
Namibia	6.68
Rep. of Korea	93.06
Rest of the World	12.43
030510 [TUN (meals)']	**571.31**
Australia	200.37
Botswana	2.12
Japan	366.80
Mozambique	0.65
Saint Helena	0.69
Rest of the World	0.67
030234 [BET (fresh or chilled)]	**664.09**
France	20.72
Japan	99.26
Thailand	142.28
USA	333.52
Rest of the World	68.31
030344 [BET (frozen)]	**951.50**
China	73.29
Japan	420.25
Spain	154.17
Thailand	107.63
Rest of the World	196.16
030341 [ALB (frozen)]	**2,737.27**
France	425.46
Indonesia	360.24
Japan	295.95
Seychelles	276.06
Spain	1,103.78
Rest of the World	275.78
030349 [TUN (frozen)]	**2,872.93**
Areas, nes	618.34
Mauritius	84.76
Portugal	332.40
Spain	888.89
Sri Lanka	594.88
Rest of the World	353.67
030487 [SKJ (frozen fillets)]	**3,288.66**
Canada	176.26
France	975.34
Italy	176.37
Japan	701.02
Spain	305.28
Rest of the World	954.39
160419 [TUN (minced)']	**3,841.00**
Australia	723.60
Germany	1,924.34
Italy	648.64
Mauritius	235.71
Portugal	63.99
Rest of the World	244.72
030232 [YFT (fresh or chilled)]	**6,769.29**
France	777.30
Germany	172.69
Spain	392.80
Sri Lanka	993.27
USA	1,605.61
Rest of the World	2,827.62
160420 [TUN (not minced)']	**7,150.10**
France	465.70
Namibia	483.96
Portugal	855.42
Swaziland	1,093.34
United Kingdom	2,266.71
Rest of the World	1,984.98
030449 [TUN (fresh or chilled fillets)']	**8,610.11**
France	1,235.87
Germany	851.48
Italy	764.16
Netherlands	2,824.24
Switzerland	249.92
Rest of the World	2,684.44
030342 [YFT (frozen)]	**39,738.32**
Mauritius	6,960.09
Spain	9,104.32
Thailand	13,898.00
Rest of the World	9,775.92
030343 [SKJ (frozen)]	**41,695.95**
Japan	94.80
Spain	361.70
Thailand	41,125.50
Rest of the World	113.96
160414 [SKJ (canned)]	**104,722.08**
France	15,433.22
Italy	7,763.37
Spain	10,159.53
United Kingdom	23,913.84
Rest of the World	47,452.12
Grand Total	**224,676.97**

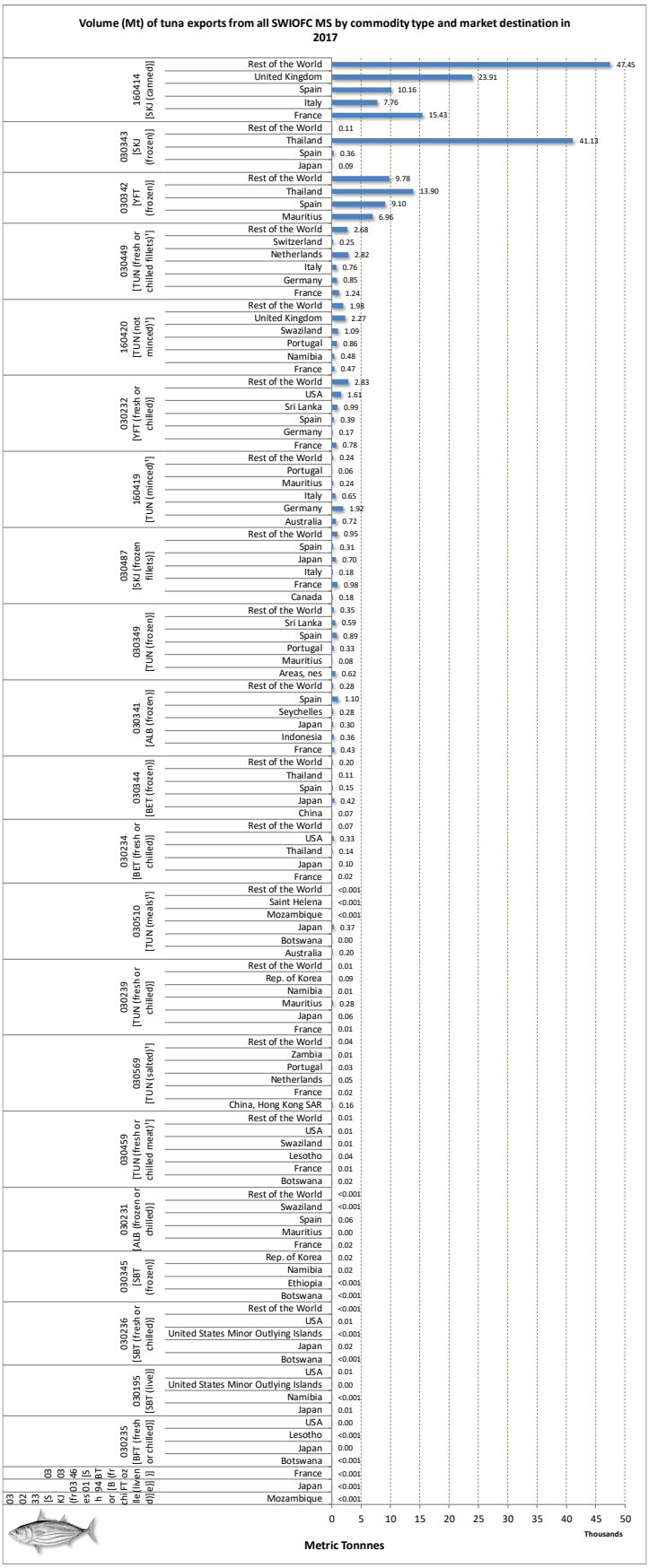
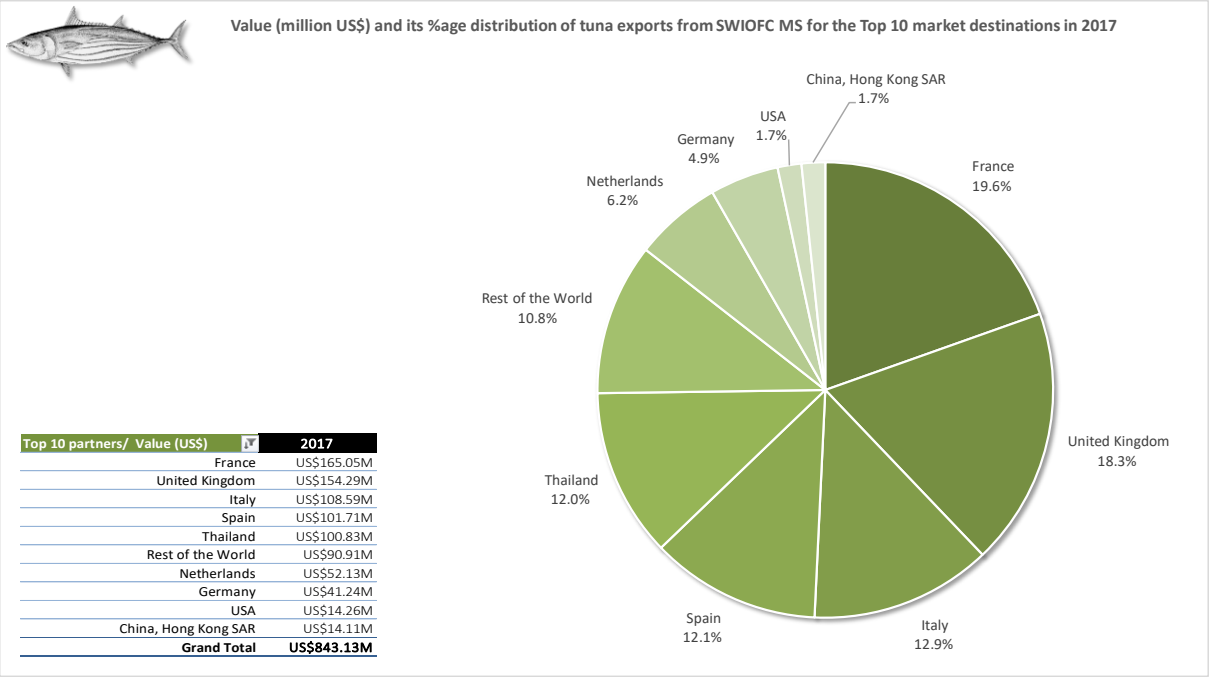


Figure 5-18: Tuna exports volume (Mt) for all SWIOFC MS in 2017 by product and market destination (does not include Somalia and Yemen). Source UN ComTrade (2019) and FAO (2019b)

5.7.2 Tuna Exports Value

The breakdown of exports by value follows pretty much the same pattern as the exports expressed in volume.



Top 10 partners/ Value (US$)	2017
France	US$165.05M
United Kingdom	US$154.29M
Italy	US$108.59M
Spain	US$101.71M
Thailand	US$100.83M
Rest of the World	US$90.91M
Netherlands	US$52.13M
Germany	US$41.24M
USA	US$14.26M
China, Hong Kong SAR	US$14.11M
Grand Total	**US$843.13M**

Figure 5-19: Share of tuna exports value (% and million USD) between the top 10 market destination for all SWIOFC MS and for all products combined in 2017 (does not include Somalia and Yemen). Source UN ComTrade (2019) and FAO (2019b)

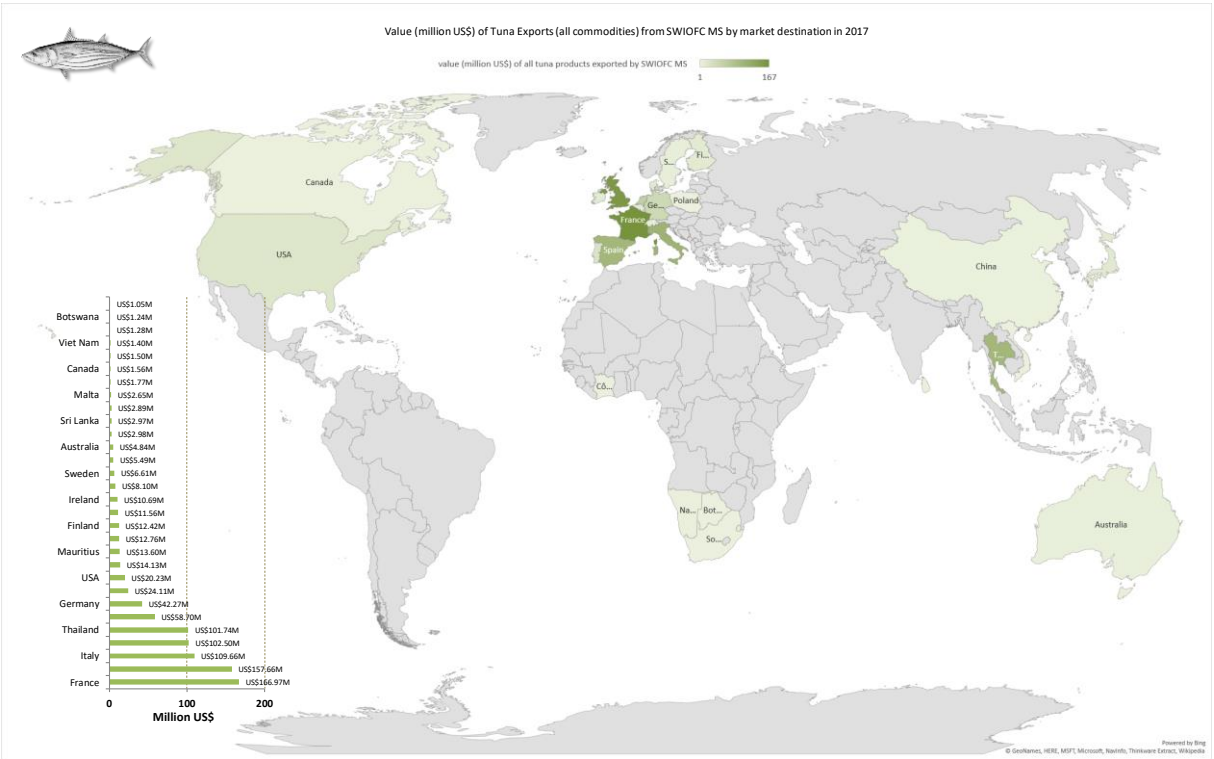
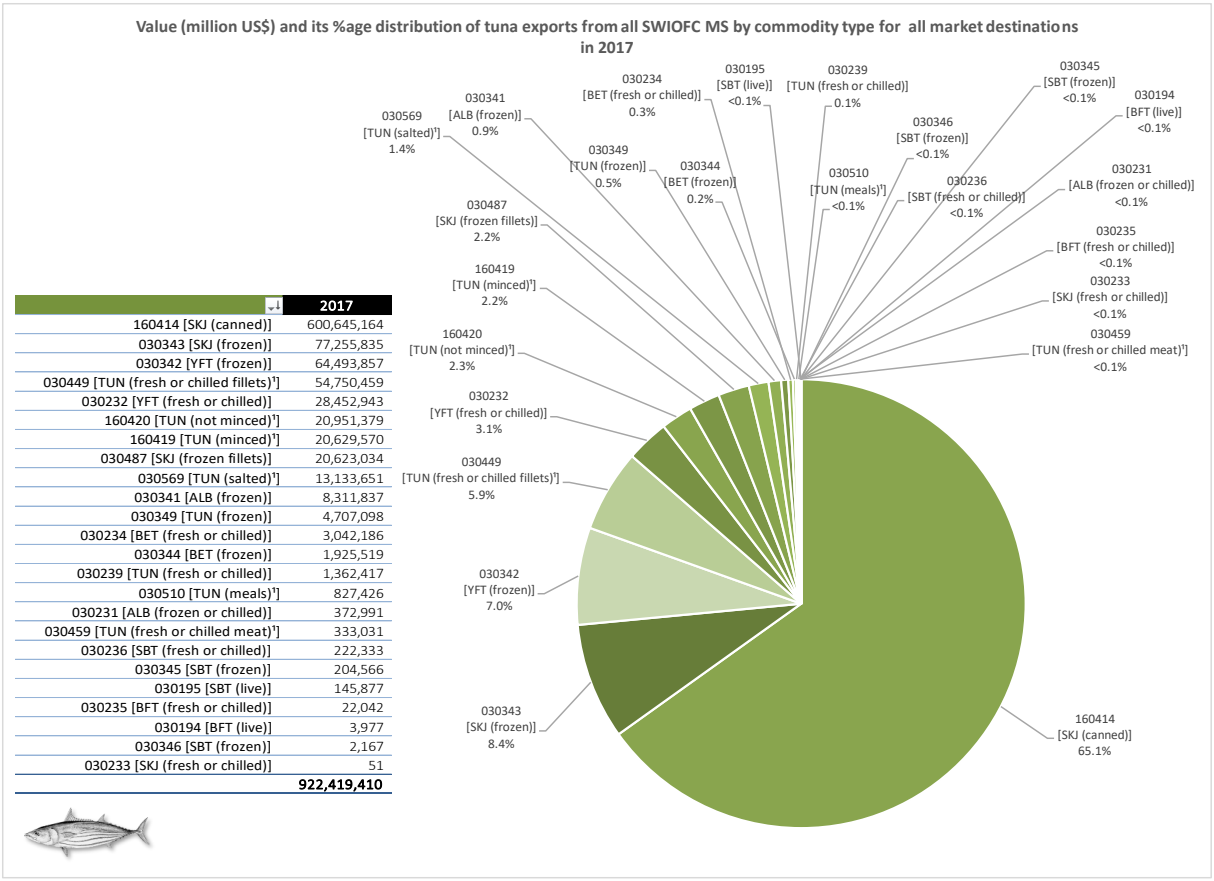


Figure 5-20: Geographic distribution by market destination of tuna exports value (million USD) for all SWIOFC MS and products combined in 2017 (does not include Somalia and Yemen). Source UN ComTrade (2019) and FAO (2019b)



	2017
160414 [SKJ (canned)]	600,645,164
030343 [SKJ (frozen)]	77,255,835
030342 [YFT (frozen)]	64,493,857
030449 [TUN (fresh or chilled fillets)¹]	54,750,459
030232 [YFT (fresh or chilled)]	28,452,943
160420 [TUN (not minced)¹]	20,951,379
160419 [TUN (minced)¹]	20,629,570
030487 [SKJ (frozen fillets)]	20,623,034
030569 [TUN (salted)¹]	13,133,651
030341 [ALB (frozen)]	8,311,837
030349 [TUN (frozen)]	4,707,098
030234 [BET (fresh or chilled)]	3,042,186
030344 [BET (frozen)]	1,925,519
030239 [TUN (fresh or chilled)]	1,362,417
030510 [TUN (meals)¹]	827,426
030231 [ALB (frozen or chilled)]	372,991
030459 [TUN (fresh or chilled meat)¹]	333,031
030236 [SBT (fresh or chilled)]	222,333
030345 [SBT (frozen)]	204,566
030195 [SBT (live)]	145,877
030235 [BFT (fresh or chilled)]	22,042
030194 [BFT (live)]	3,977
030346 [SBT (frozen)]	2,167
030233 [SKJ (fresh or chilled)]	51
	922,419,410

Figure 5-21: Share of tuna exports value (% and million USD) by product for all SWIOFC MS in 2017 (does not include Somalia and Yemen). Source UN ComTrade (2019) and FAO (2019b)

Value ('000 US$) of tuna exports from all SWIOFC MS by commodity type and market destination in 2017

Value (US$)	Year
Product/ Trading partner	2017
030233 [SKJ (fresh or chilled)]	**51**
Mozambique	51
030346 [SBT (frozen)]	**2,167**
France	2,167
030194 [BFT (live)]	**3,977**
Japan	3,977
030235 [BFT (fresh or chilled)]	**22,042**
Botswana	97
Japan	6,987
Lesotho	421
USA	14,537
030195 [SBT (live)]	**145,877**
Japan	118,515
Namibia	809
United States Minor Outlying Islands	2,343
USA	24,210
030345 [SBT (frozen)]	**204,566**
Botswana	24
Ethiopia	77
Namibia	50,763
Rep. of Korea	153,702
030236 [SBT (fresh or chilled)]	**222,333**
Botswana	714
Japan	195,594
United States Minor Outlying Islands	645
USA	25,361
Rest of the World	19
030459 [TUN (fresh or chilled meat)¹]	**333,031**
Botswana	79,462
France	16,896
Lesotho	116,562
Swaziland	47,703
USA	35,311
Rest of the World	37,097
030231 [ALB (frozen or chilled)]	**372,991**
France	76,749
Mauritius	11,173
Spain	284,407
Swaziland	562
Rest of the World	100
030510 [TUN (meals)¹]	**827,426**
Australia	283,197
Botswana	4,280
Japan	531,904
Mozambique	1,647
Saint Helena	4,723
Rest of the World	1,675
030239 [TUN (fresh or chilled)]	**1,362,417**
France	33,600
Japan	178,490
Mauritius	758,227
Namibia	59,228
Rep. of Korea	266,071
Rest of the World	66,801
030344 [BET (frozen)]	**1,925,519**
China	144,796
Japan	931,945
Spain	347,689
Thailand	163,481
Rest of the World	337,608
030234 [BET (fresh or chilled)]	**3,042,186**
France	117,263
Japan	827,838
Thailand	289,237
USA	1,541,505
Rest of the World	266,343
030349 [TUN (frozen)]	**4,707,098**
Areas, nes	482,478
Mauritius	168,886
Portugal	841,201
Spain	1,791,835
Sri Lanka	811,763
Rest of the World	610,935
030341 [ALB (frozen)]	**8,311,837**
France	1,462,631
Indonesia	701,268
Japan	591,676
Seychelles	991,748
Spain	3,966,192
Rest of the World	598,322
030569 [TUN (salted)¹]	**13,133,651**
China, Hong Kong SAR	12,688,436
France	87,982
Netherlands	124,742
Portugal	67,530
Zambia	70,707
Rest of the World	94,254
030487 [SKJ (frozen fillets)]	**20,623,034**
Canada	1,470,732
France	6,915,396
Italy	1,178,051
Japan	4,896,229
Spain	2,312,563
Rest of the World	3,850,063
160419 [TUN (minced)¹]	**20,629,570**
Australia	3,638,292
Germany	12,474,847
Italy	2,344,371
Mauritius	907,455
Portugal	305,937
Rest of the World	958,668
160420 [TUN (not minced)¹]	**20,951,379**
France	1,522,920
Namibia	1,380,178
Portugal	2,483,801
Swaziland	2,615,022
United Kingdom	6,904,961
Rest of the World	6,044,497
030232 [YFT (fresh or chilled)]	**28,452,943**
France	4,166,845
Germany	2,019,428
Spain	2,182,471
Sri Lanka	1,960,781
USA	10,049,974
Rest of the World	8,073,444
030449 [TUN (fresh or chilled fillets)¹]	**54,750,459**
France	8,349,301
Germany	6,552,062
Italy	4,254,823
Netherlands	15,422,475
Switzerland	3,546,134
Rest of the World	16,625,664
030342 [YFT (frozen)]	**64,493,857**
Mauritius	10,673,234
Spain	13,884,169
Thailand	23,540,236
Rest of the World	16,396,218
030343 [SKJ (frozen)]	**77,255,835**
Japan	210,095
Spain	737,697
Thailand	76,224,287
Rest of the World	83,756
160414 [SKJ (canned)]	**600,645,164**
France	104,574,991
Italy	48,326,205
Spain	54,497,891
United Kingdom	137,627,005
Rest of the World	255,619,072
Grand Total	**922,419,410**

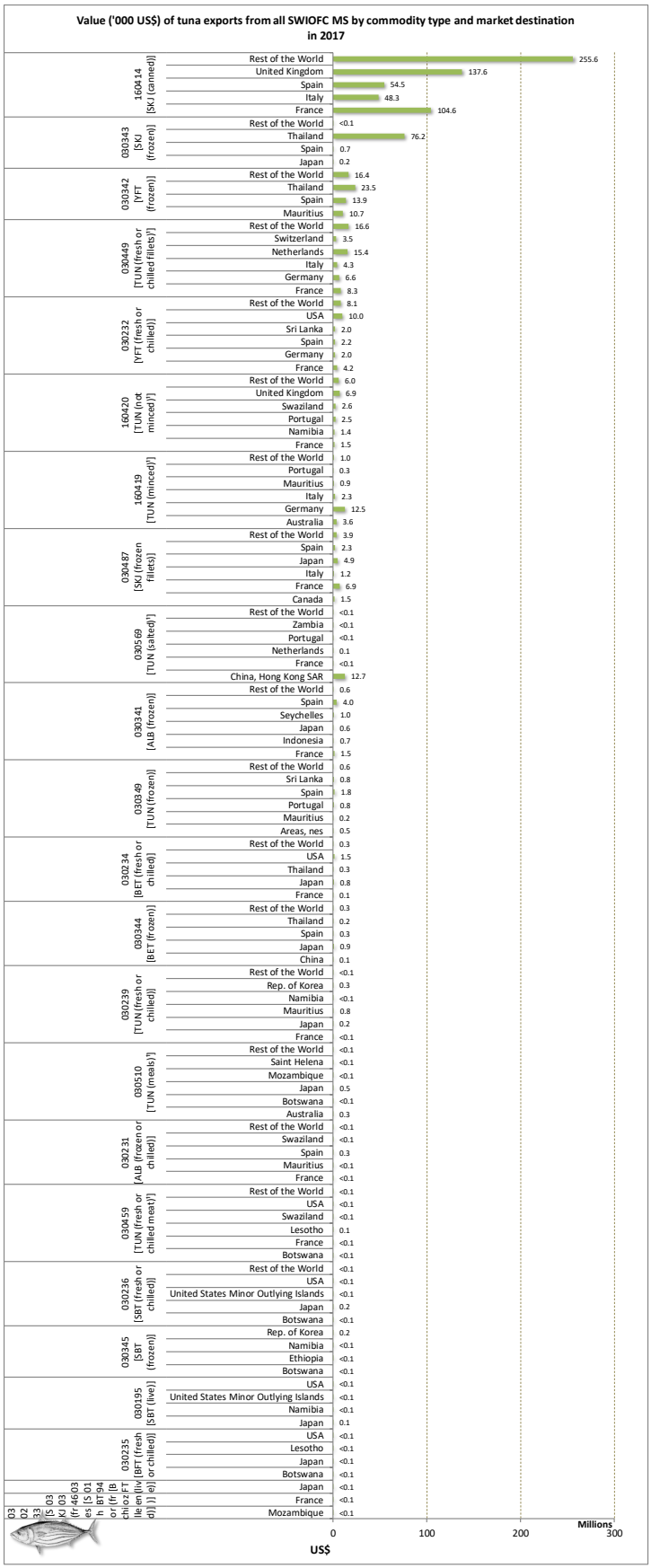


Figure 5-22: Tuna exports value (USD) for all SWIOFC MS in 2017 by product and market destination (does not include Somalia and Yemen). Source UN ComTrade (2019) and FAO (2019b)

5.7.3 Average Price of Tuna Exports

The figures and maps below gives an indication of the lucrative markets and tuna forms (best value for the volume exported). China and Iran top the list for the price they are willing to pay to import tuna form the SWIO. However, a high export price does not necessary translate into a high volume exported and that the some exported commodity might include live tuna in small quantity so those high prices have to be taken in context. They could also be the results of misreporting volume vs values or other reporting errors.

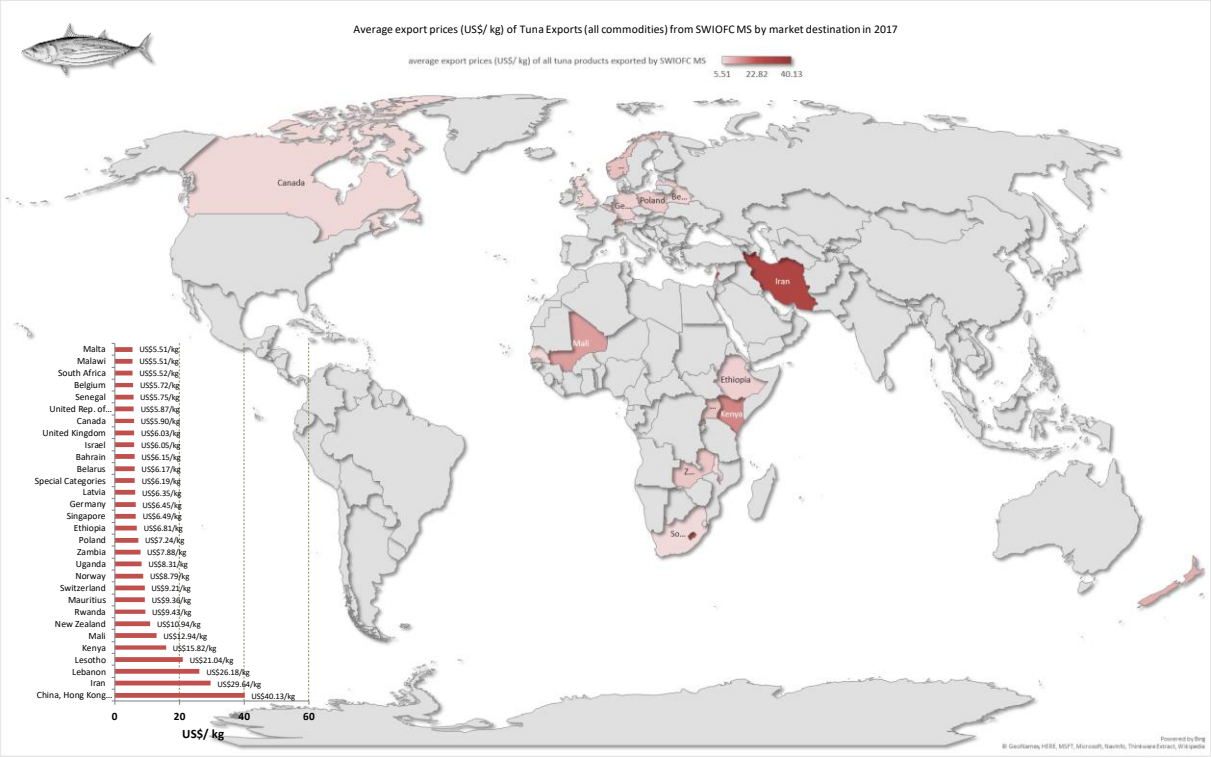


Figure 5-23

Figure 5-24: Geographic distribution by market destination of the average price of tuna exports for all SWIOFC MS and products combined in 2017 (does not include Somalia and Yemen). Source UN ComTrade (2019) and FAO (2019b)

Average price (US$/ kg) of tuna exports from all SWIOFC MS by commodity type and market destination in 2017	
Average of Average price	Year
Product/ Trading partner	2017
030233 [SKJ (fresh or chilled)]	**0.20**
Mozambique	0.20
030341 [ALB (frozen)]	**2.44**
France	3.44
Indonesia	1.95
Japan	2.00
Seychelles	3.59
Spain	3.59
Rest of the World	2.17
030342 [YFT (frozen)]	**2.69**
Mauritius	1.53
Spain	1.87
Thailand	1.52
Rest of the World	2.78
030510 [TUN (meals)']	**2.75**
Australia	1.41
Botswana	2.02
Japan	1.45
Mozambique	2.53
Saint Helena	6.86
Rest of the World	2.66
030345 [SBT (frozen)]	**2.96**
Botswana	2.18
Ethiopia	0.51
Namibia	2.11
Rep. of Korea	7.05
030346 [SBT (frozen)]	**3.01**
France	3.01
030349 [TUN (frozen)]	**3.19**
Areas, nes	0.78
Mauritius	1.99
Portugal	2.53
Spain	2.02
Sri Lanka	1.36
Rest of the World	3.47
030344 [BET (frozen)]	**3.73**
China	1.98
Japan	2.35
Spain	2.26
Thailand	1.52
Rest of the World	4.27
030195 [SBT (live)]	**3.85**
Japan	9.10
Namibia	2.13
United States Minor Outlying Islands	1.92
USA	2.26
160419 [TUN (minced)']	**3.86**
Australia	5.03
Germany	6.48
Italy	3.61
Mauritius	3.85
Portugal	4.78
Rest of the World	3.71
030343 [SKJ (frozen)]	**4.56**
Japan	2.22
Spain	2.08
Thailand	1.53
Rest of the World	6.23
160414 [SKJ (canned)]	**4.65**
France	6.78
Italy	6.22
Spain	5.36
United Kingdom	5.86
Rest of the World	4.58
030459 [TUN (fresh or chilled meat)']	**4.95**
Botswana	3.52
France	3.26
Lesotho	2.96
Swaziland	3.79
USA	4.03
Rest of the World	5.29
030232 [YFT (fresh or chilled)]	**5.43**
France	5.36
Germany	11.69
Spain	5.56
Sri Lanka	1.97
USA	6.26
Rest of the World	5.34
030234 [BET (fresh or chilled)]	**5.63**
France	5.66
Japan	8.34
Thailand	2.03
USA	4.27
Rest of the World	5.82
030239 [TUN (fresh or chilled)]	**6.81**
France	3.06
Japan	2.85
Mauritius	2.74
Namibia	8.86
Rep. of Korea	2.86
Rest of the World	7.79
030487 [SKJ (frozen fillets)]	**7.02**
Canada	8.34
France	7.09
Italy	6.68
Japan	6.98
Spain	7.58
Rest of the World	6.96
030236 [SBT (fresh or chilled)]	**7.12**
Botswana	6.21
Japan	6.06
United States Minor Outlying Islands	3.00
USA	2.41
Rest of the World	19.00
160420 [TUN (not minced)']	**8.13**
France	3.27
Namibia	2.85
Portugal	2.90
Swaziland	2.39
United Kingdom	3.05
Rest of the World	8.66
030449 [TUN (fresh or chilled fillets)']	**8.62**
France	6.76
Germany	7.69
Italy	5.57
Netherlands	5.46
Switzerland	14.19
Rest of the World	8.68
030194 [BFT (live)]	**8.96**
Japan	8.96
030569 [TUN (salted)']	**11.93**
China, Hong Kong SAR	79.57
France	4.86
Netherlands	2.70
Portugal	2.20
Zambia	5.35
Rest of the World	9.01
030231 [ALB (frozen or chilled)]	**20.21**
France	6.03
Mauritius	3.01
Spain	5.04
Swaziland	1.12
Rest of the World	100.00
030235 [BFT (fresh or chilled)]	**26.16**
Botswana	10.78
Japan	6.72
Lesotho	84.20
USA	2.93
Average	**5.77**

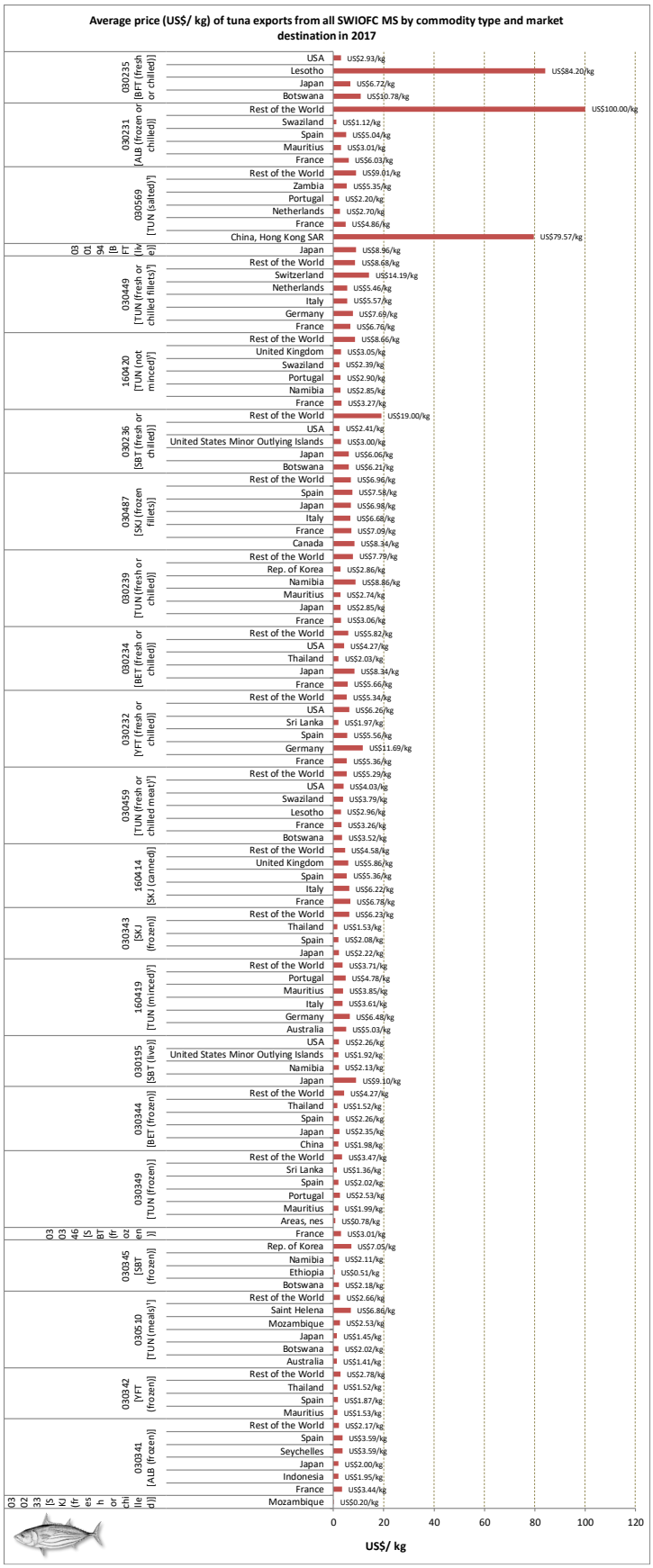


Figure 5-25: Average price of tuna exports (USD / kg) for all SWIOFC MS in 2017 by product and market destination (does not include Somalia and Yemen). Source UN ComTrade (2019) and FAO (2019b)

6 SWIOFC COUNTRIES CHARACTERISATION

In this section we tried to present each country in the context of their attachment to the Tuna fisheries sector and how it might influence their economy. This section might need to be developed further. The graphics and tables presented below for each SWIOF MS is an attempt to graphically represent key characteristics of tuna production, processing and exports in these countries.

6.1 Comoros

The Union of the Comoros consists of three islands: Grande Comore, Anjouan and Moheli and they have a large amount of autonomy within the Union. Anjouan has economic and legislative independence and is a self-governing island within the new Union of the Comoros (Breuil & Grima, 2014b).

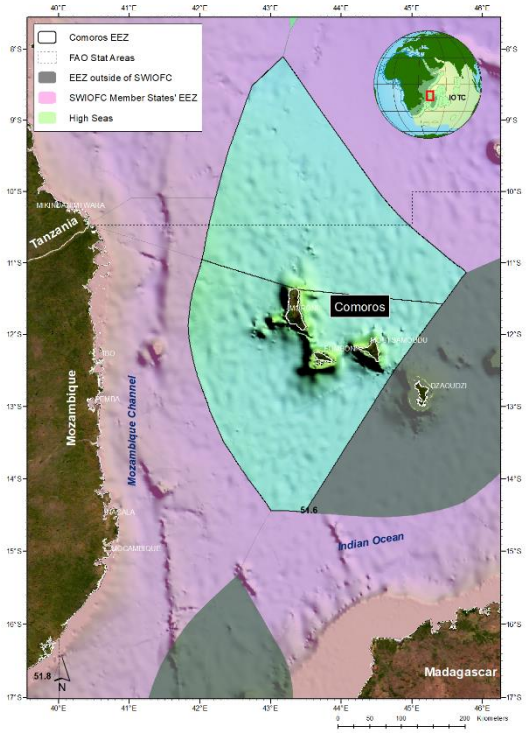


Figure 6-1: Comoros EEZ and surrounding waters.

Fisheries constitute a major contributor to Comoros national economy. With approximately 8,500 people engaged across the industry, the subsector is an important source of livelihood, generating income for poor families and contributing significantly to reductions in unemployment. However, fisheries in Comoros are almost entirely artisanal and are mainly conducted within an area of 160,000 km^2 covering 427km of coastline (FAO, 2018). Comoros EEZ is surrounded by several other EEZs including France, Madagascar,
Mozambique, Seychelles and Tanzania, and there is no maritime boundary with the high seas (Figure 6-1). Due to the narrowness of the continental shelf, most of the fisheries (traditional, artisanal or industrial) work in the oceanic surface waters and target pelagic resources, in particular tuna and tuna-like species that seasonally migrate in Comorian waters. The Comoros EEZ straddles the important tuna fishing grounds at the mouth of the Mozambique Channel. Pelagic fishing involves both domestic artisanal and foreign industrial (Distant Water Fishing Nation - DWFN) fleets. The main tuna and tuna-like species occurring in the Comorian waters are *Thunnus albacares*, *Katsuwonus pelamis*, *Thunnus alalunga*, *Thunnus obesus*, *Istiophorus platypterus* and *Euthynnus affinis* (Breuil & Grima, 2014b). Considering all fish species combined, their annual production potential was estimated in 2015 to be 33,000 tonnes, but only 64 percent of this potential is being caught each year (FAO, 2015a) (Breuil & Grima, 2014b).

6.1.1 Fisheries Access Agreements

Comoros used to have a fisheries partnership agreement with the EU which covered the period 1/1/2005 – 31/12/2011 and was tacitly renewed for a period of 7 years covering the period 1/1/2014 – 30/12/2016.
This fisheries agreement allowed EU vessels mainly from Spain, France and Portugal to fish in the Comoros waters and was part of the tuna network fisheries agreements in the Indian Ocean.
The total contribution from the EU budget per year was €600,000 from which €300,000 was earmarked for fisheries policy development.
The fee for ship owners was €55 per tonne caught. The advances to be paid annually by tuna purse

seiners were €4,235 per year (with a reference catch of 77 t) and €2,475 per year (with a reference catch of 45 t) for surface longliners. The total reference tonnage was 6,000 t./year (EU, 2019).
The Protocol expired on 31/12/2016.

Table 6-1: Main features of the Tuna FPA between the EU and the Comoros

Duration of the Agreement:	7 years renewable (1/1/2005 - 31/12/2011, tacitly renewed from 1/1/2012 to 31/12/2018)
Duration of the Protocol:	3 years (1/1/2014 – 30/12/2016)
Initialisation:	05/07/2014
Nature of the FPA :	Tuna Fishery Agreement
Financial contribution:	€600,000 out of which €300,000 have been earmarked for the support of the Comoros fisheries policy in order to promote sustainability in its waters.
Fee for ship owners:	55 € per tonne caught.
Advances:	- Tuna seiners: €4,235 per year (ref catches: 77 t)
	- Surface longliners: €2,475 per year (ref catches: 45 t)
Reference tonnage:	6 000 t/year

EU Fleet	Spain	France	Portugal	Total
Tuna seiners	21	21	-	42 vessels
Surface longliners	8	9	3	20 vessels

There were also two private fisheries access agreements signed between the Comoros islands Government and two Spanish private entities sub-contracted their access rights to fishing vessels based in Victoria, Seychelles:

- Tuna access agreement between Comoros and La Asociación Nacional de Armadores de Buques Atuneros Congeladores (ANABAC), 2009. Source: Union of the Comoros (2009)
- Tuna access agreement between Comoros and Organización de Productores Asociados de Grandes Atuneros Congeladores (OPAGAC), 2012. Source: Union of the Comoros (2012)

6.1.2 Tuna Production

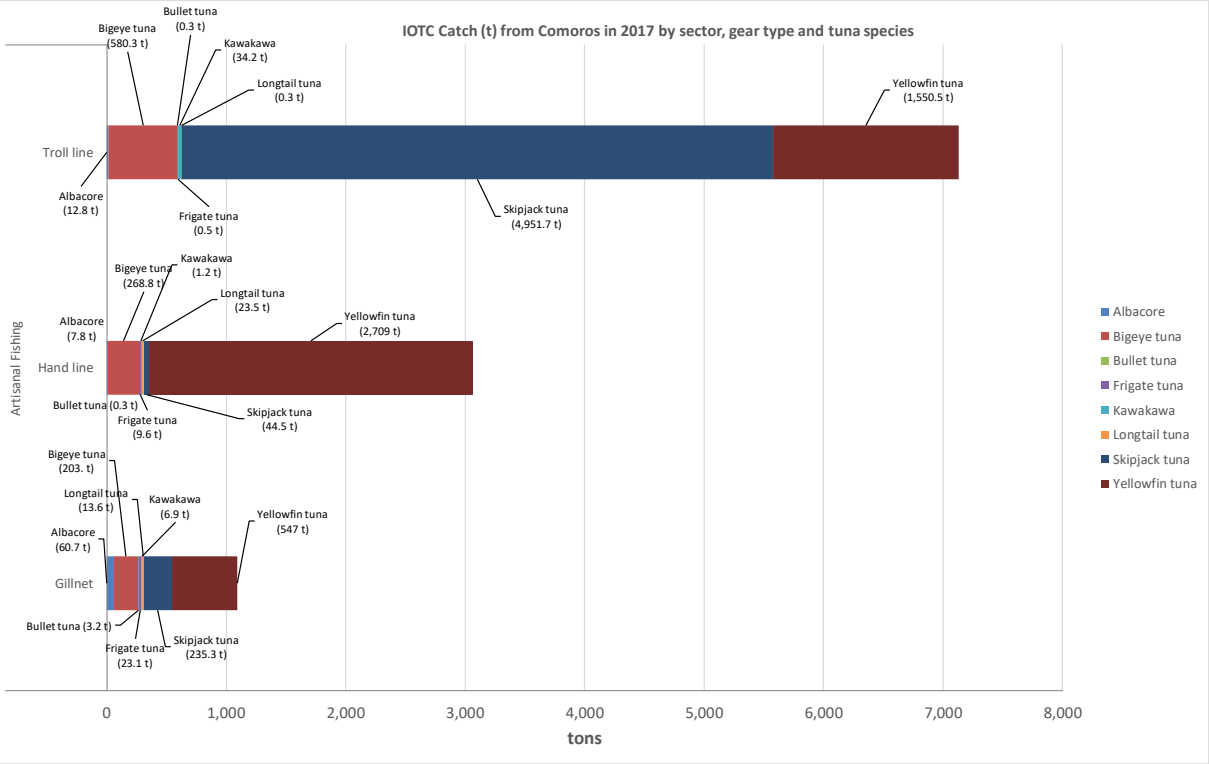


Figure 6-2: Tuna Catch in the IOTC area by Comoros in 2017 by species and fishing method. Source (IOTC, 2019)

6.1.3 IUU Tuna Landings

Table 6-2: Reported and unreported tuna landings (Mt and USD) for the Comoros by sector, method and tuna species in 2014. Source (SAU, 2019)

Country/sector/method/ species	Tuna Landings				Total Catch (metric tonnes)	Total Landed value (US$)[1]
	Reported		Unreported			
	Catch (metric tonnes)	Landed value (US$)[1]	Catch (metric tonnes)	Landed value (US$)[1]		
Comoros Isl.	**6,186.9**	**14,815,908.7**	**6,198.6**	**14,843,534.4**	**12,385.5**	**29,659,443.1**
Artisanal	**4,944.6**	**11,843,265.2**	**4,954.7**	**11,867,378.4**	**9,899.3**	**23,710,643.6**
small scale lines	4,944.6	11,843,265.2	4,954.7	11,867,378.4	9,899.3	23,710,643.6
ALB	11.2	29,601.6	11.2	29,661.9	22.4	59,263.5
BET	122.4	240,026.4	122.6	240,515.1	245.0	480,541.5
FRZ	7.0	12,390.0	7.0	12,415.2	14.0	24,805.2
KAW	122.4	216,648.0	122.6	217,089.1	245.0	433,737.1
SKJ	3,562.4	7,424,041.6	3,569.7	7,439,157.1	7,132.1	14,863,198.7
YFT	1,119.2	3,920,557.6	1,121.5	3,928,539.9	2,240.7	7,849,097.5
Industrial	**0.9**	**2,534.7**			**0.9**	**2,534.7**
longline	0.9	2,534.7			0.9	2,534.7
ALB	0.0	86.7			0.0	86.7
BET	0.5	908.2			0.5	908.2
BOP	0.0	80.5			0.0	80.5
YFT	0.4	1,459.2			0.4	1,459.2
Subsistence	**1,241.4**	**2,970,108.8**	**1,243.9**	**2,976,156.0**	**2,485.3**	**5,946,264.8**
small scale lines	1,241.4	2,970,108.8	1,243.9	2,976,156.0	2,485.3	5,946,264.8
ALB	2.8	7,400.4	2.8	7,415.5	5.6	14,815.9
BET	30.6	60,006.6	30.7	60,128.8	61.3	120,135.4
FRZ	7.0	12,390.0	7.0	12,415.2	14.0	24,805.2
KAW	30.6	54,162.0	30.7	54,272.3	61.3	108,434.3
SKJ	890.6	1,856,010.4	892.4	1,859,789.3	1,783.0	3,715,799.7
YFT	279.8	980,139.4	280.4	982,135.0	560.2	1,962,274.4
Grand Total	**6,186.9**	**14,815,908.7**	**6,198.6**	**14,843,534.4**	**12,385.5**	**29,659,443.1**

[1] value estimated applying 2017 ex-vessel prices from Poseidon (2019)

6.1.4 Tuna Export Markets

There is no trade data available on the UN ComTrade (UN Comtrade, 2019) nor the FAO FishStat

database (FAO, 2019a) for the Comoros .islands

6.1.4.1 Tuna exports volume

There is no trade data

6.1.4.2 Tuna exports value

There is no trade data

6.1.4.3 Average prices of tuna exports

There is no trade data

6.1.4.4 Exports tariff for main tuna products exported by Comoros

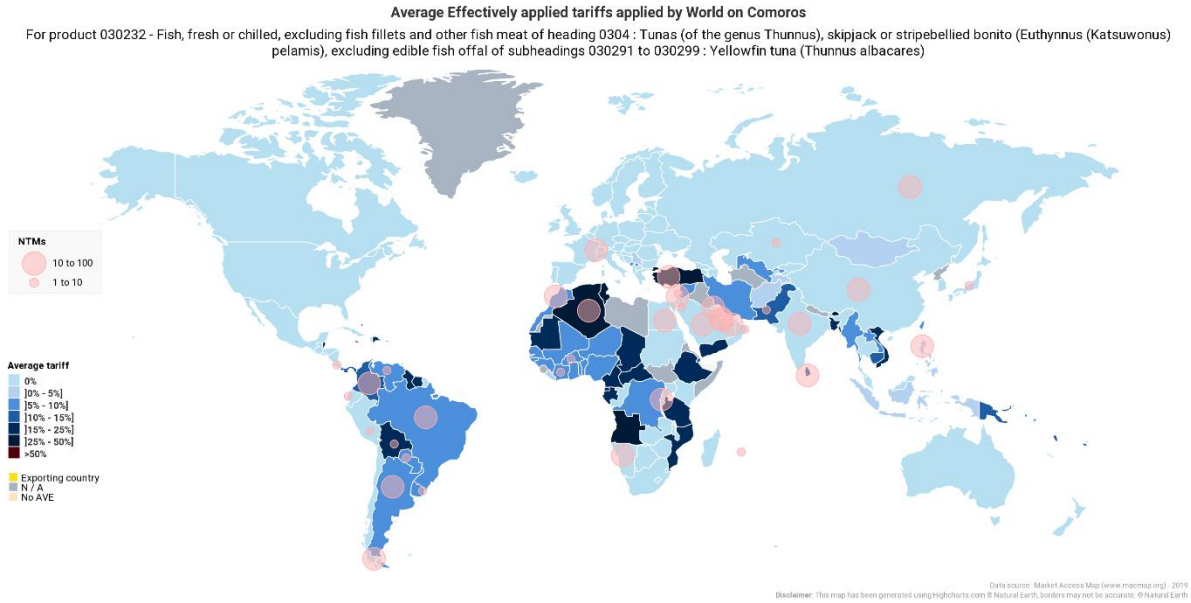


Figure 6-3: Tuna exports tariffs and NTMs faced by Comoros on the International markets for commodity: 30232 - Yellowfin tuna (fresh or chilled). Source: ITC (2019)

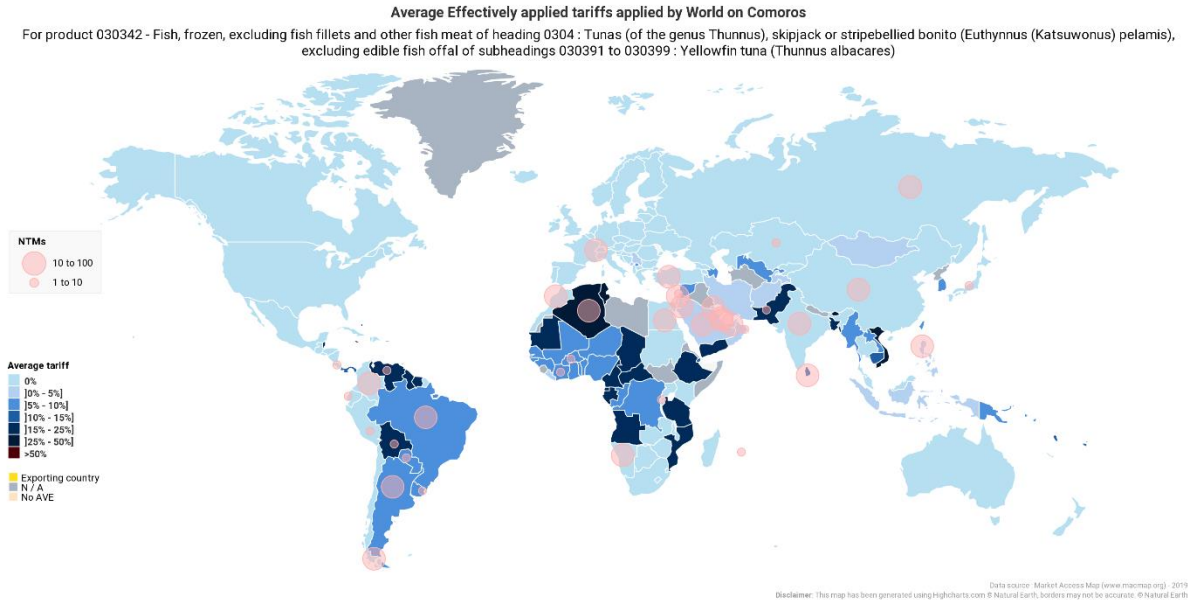


Figure 6-4: Tuna exports tariffs and NTMs faced by Comoros on the International markets for commodity: 30342 - Yellowfin tuna (frozen). Source: ITC (2019)

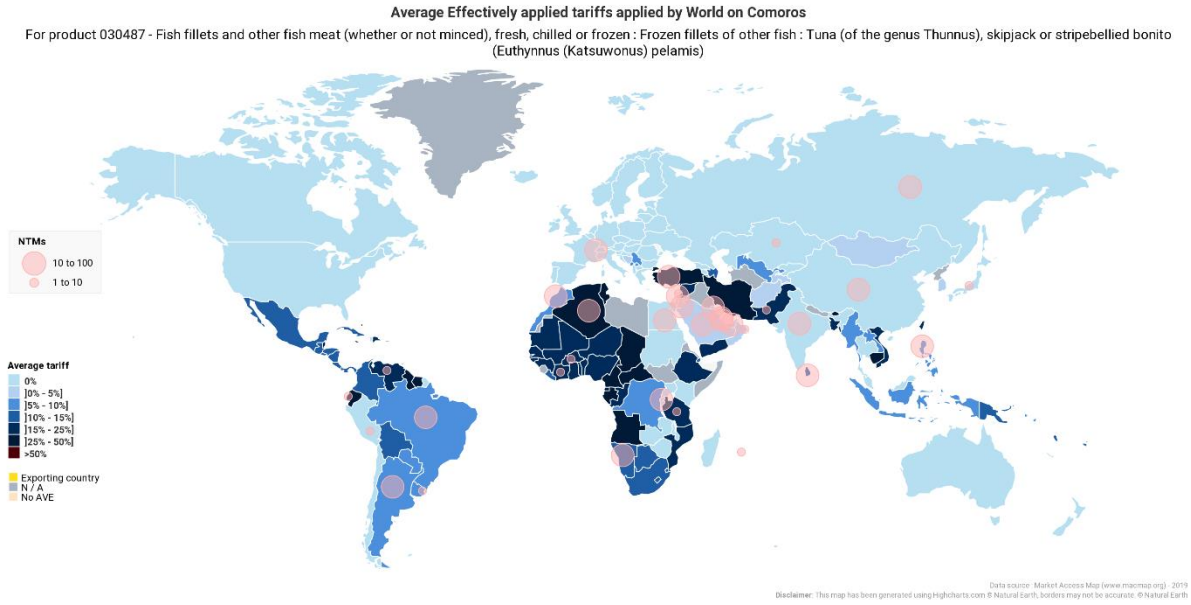


Figure 6-5: Tuna exports tariffs and NTMs faced by Comoros on the International markets for commodity: 30487 - Skipjack tuna (frozen fillets). Source: ITC (2019)

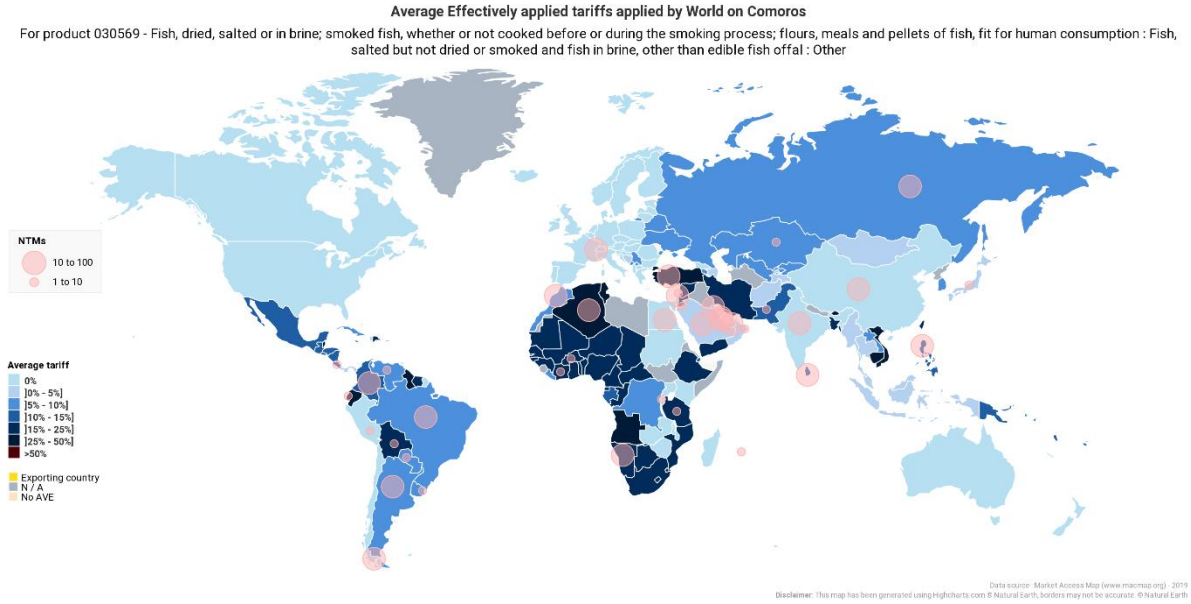


Figure 6-6: Tuna exports tariffs and NTMs faced by Comoros on the International markets for commodity: 30569 - Tunas nei (salted). Source: ITC (2019)

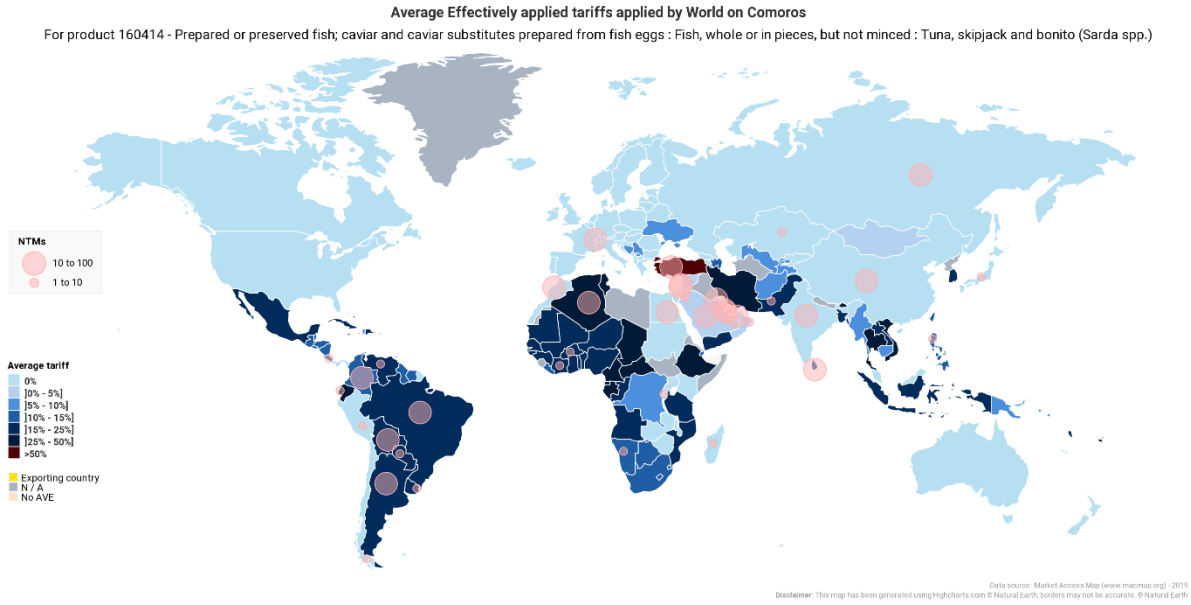


Figure 6-7: Tuna exports tariffs and NTMs faced by Comoros on the International markets for commodity: 160414 - Skipjack tuna (canned). Source: ITC (2019)

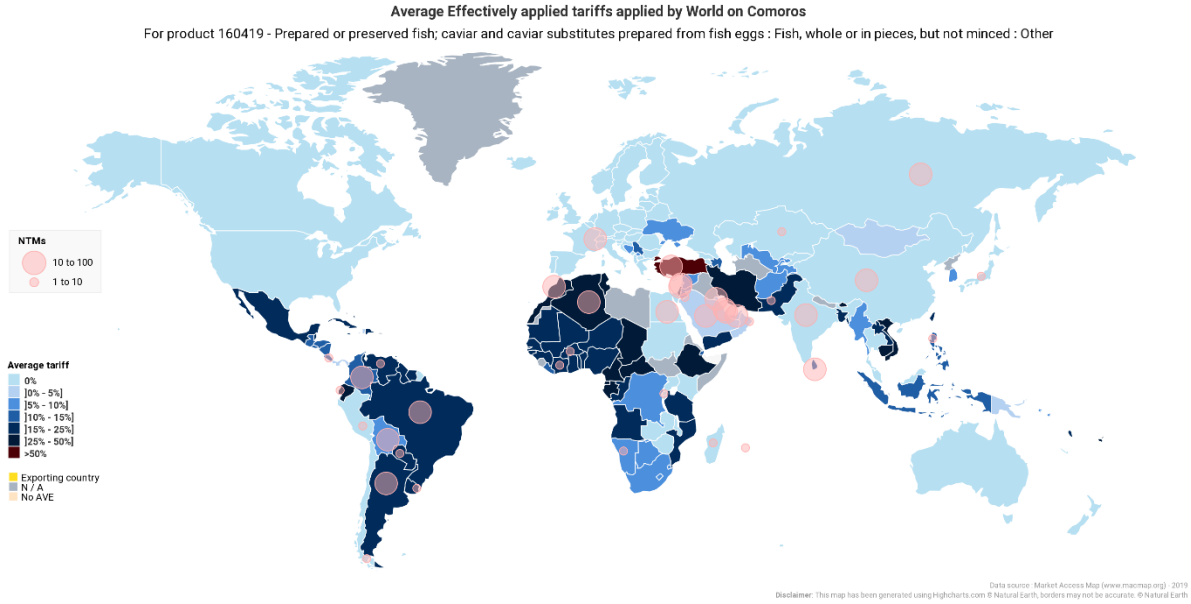


Figure 6-8: Tuna exports tariffs and NTMs faced by Comoros on the International markets for commodity: 160419 - Tunas nei (prep minced). Source: ITC (2019)

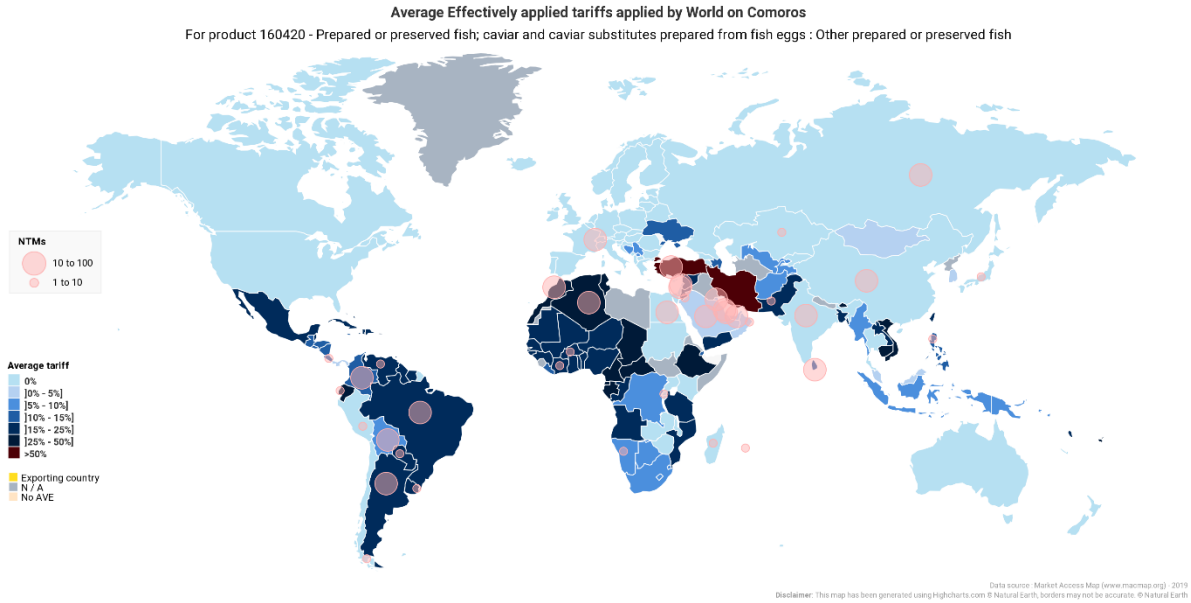


Figure 6-9: Tuna exports tariffs and NTMs faced by Comoros on the International markets for commodity: 160420 - Tunas nei (prep not minced). Source: ITC (2019)

6.2 Kenya

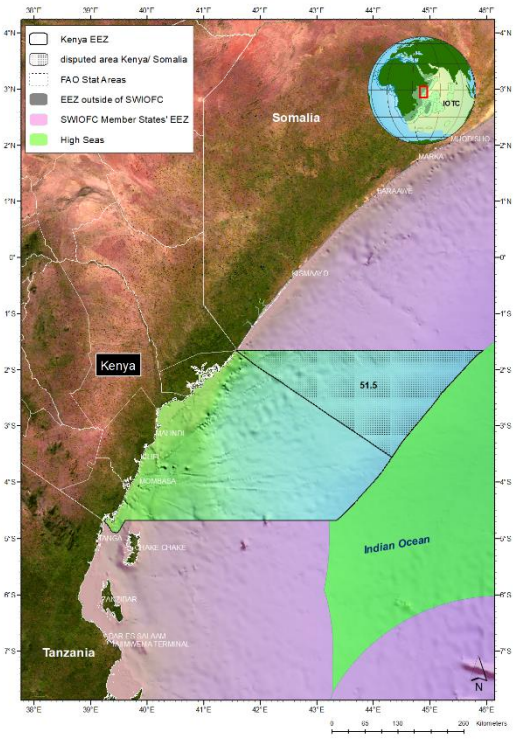


Figure 6-10: Kenya EEZ and surrounding waters.

Kenya's fisheries and aquaculture sector contributes approximately 0.54 percent to the country's GDP (2013). Fish consumption has been declining from a modest 6.0 kg/caput in 2000 to 4.5 kg/caput in 2011. The value of fish exports was about USD 62.9 million in 2012, or about 5 times greater than the USD 12.3 million in fish imports. In 2013, around 129 300 people derived their livelihood from fishing and fish farming activities (including 48 300 in inland waters, 13 100 in coastal waters fishing and around 67 900 in fish farming). (FAO, 2015b)

The tuna fishery in Kenya did not yet reach its potential and is still underdeveloped. Although, in 2013, aware it was missing on a high value fishery worth several US$ billion across the world oceans, Kenya launched its first Tuna Fisheries Development and Management Strategy. The Strategy ran from 2013 to 2018 and was intended to building an effective governance system for the tuna fisheries sector. This included the provision of an institutional framework to ensure compliance with relevant national laws and international standards and agreements. The objective was also to develop the country's tuna supply chain including enabling the current rudimentary tuna fishing fleet to fish beyond 20 nautical miles (FAO, 2016), According to FAO (2016), if the strategy were to be successful, Kenya's tuna fishery would be transformed into a productive and sustainable modern, commercially-oriented coastal and offshore fishery with direct positive impacts on employment, wealth creation and foreign exchange earnings (van Hoof & Steins, 2017).

6.2.1 Fisheries Access Agreements

While the inshore fishery is operated by local artisanal and therefore small scale fishers, Kenya's offshore fishing grounds are targeted by Distant Water Fishing Nations (DWFN) with a major focus on tuna species (skipjack, yellowfin and bigeye). Foreign fishing vessels are authorized to operate in Kenya's EEZ in accordance with the Regional and International Agreement and Cooperation provision of the National Oceans and Fisheries Policy (van Hoof & Steins, 2017). This policy states, inter alia, "The Government will continue to grant fishing rights to other distant Water Fishing Nations to fish in its Exclusive Economic Zone (EEZ) taking into account the state of the stock and economic returns" (FAO, 2016). There is no current SFPA between the EU and Kenya, instead Kenya has authorised several foreign vessels, operating under Kenyan license, mostly long-liners and purse-seiners targeting tuna, to fish in the 12nm to 200nm offshore area of its EEZ. Although several vessels operating under foreign flags were granted a licence, there is no evidence of tuna catch by foreign vessels in Kenya's EEZ the past several years (IOTC, 2019).

Kenya's needs from a possible FPA/Protocol include maximizing revenue and providing support for its domestic tuna sector in line with its Tuna Fisheries Development and Management Strategy and the new Fisheries Bill which stipulate as a priority bringing in financial support for the artisanal sector, promote value addition, improve MCS, etc. (POSEIDON, MRAG, COFREPECHE and NFDS, 2014).

The EU's could also benefit from a possible FPA/Protocol with Kenya; this includes increased fishing opportunities for 22-40 purse seiners, and around five longliners. Both fleets would target highly migratory species such as tuna and tuna-like species. This would reinforce EU fishing fleet's existing fishing opportunities in the SWIO. Additional fishing opportunities under an SFPA with Kenya would greatly reduce the uncertainty faced by the EU purse seine fleet which, at the moment, is forced to negotiate yearly authorisations under private agreements. This would also meet the extra pressure on the demand from EU processors and consumers (POSEIDON, MRAG, COFREPECHE and NFDS, 2014).

Although it is legitimate for Kenya to want to support its local tuna-processing sector, and therefore demand that the tuna caught in its water be landed locally, there are several factors faced by the DFWN purse seine fleet to take into account which require some flexibility in their landing location choices. One of those factors is the unpredictable nature of migratory movements through fishing grounds often associated with tuna species which can affect catch rate and landing frequencies to such an extent that some flexibility is needed to choose the best landing location. Moreover, as it is traditional with such a high value species, the market demand that the tuna value chain be equipped to handle several types of products with various degrees of value additions which might not be offered everywhere, hence the importance for the fleet to have the flexibility to choose where and when to catch and land tuna fish (POSEIDON, MRAG, COFREPECHE and NFDS, 2014).

As a consequence of failing to attract foreign tuna fishing fleets to Kenya and without a well-developed local industrial fleet, tuna catch, at the moment, can only come from Kenya's artisanal fleet with sporadic catch from semi-industrial local vessels.

6.2.2 Tuna Production

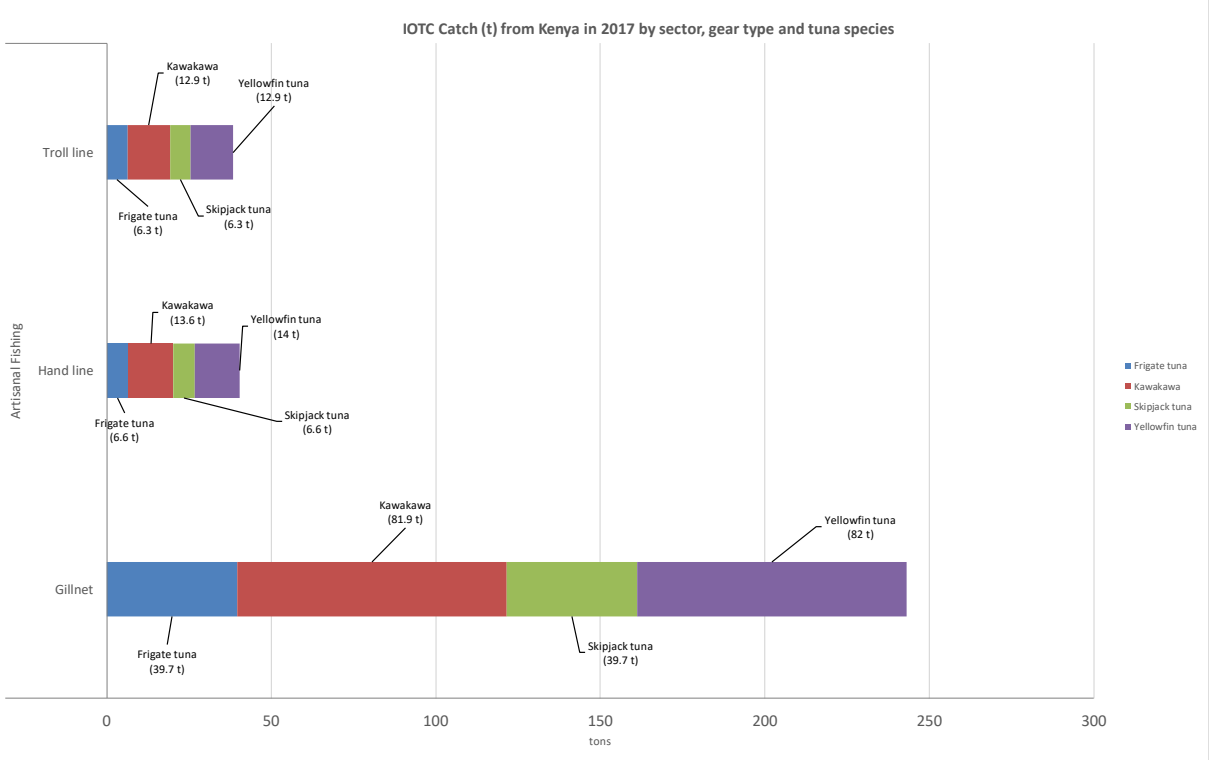


Figure 6-11: Tuna Catch in the IOTC area by Kenya in 2017 by species and fishing method. Source (IOTC, 2019)

In 2017, reported tuna catches in Kenya were exclusively caught by artisanal fishers using Gillnet, handlines or troll lines.

6.2.3 IUU Tuna Landings

Table 6-3: Reported and unreported tuna landings (Mt and USD) for Kenya by sector, method and tuna species in 2014. Source (SAU, 2019)

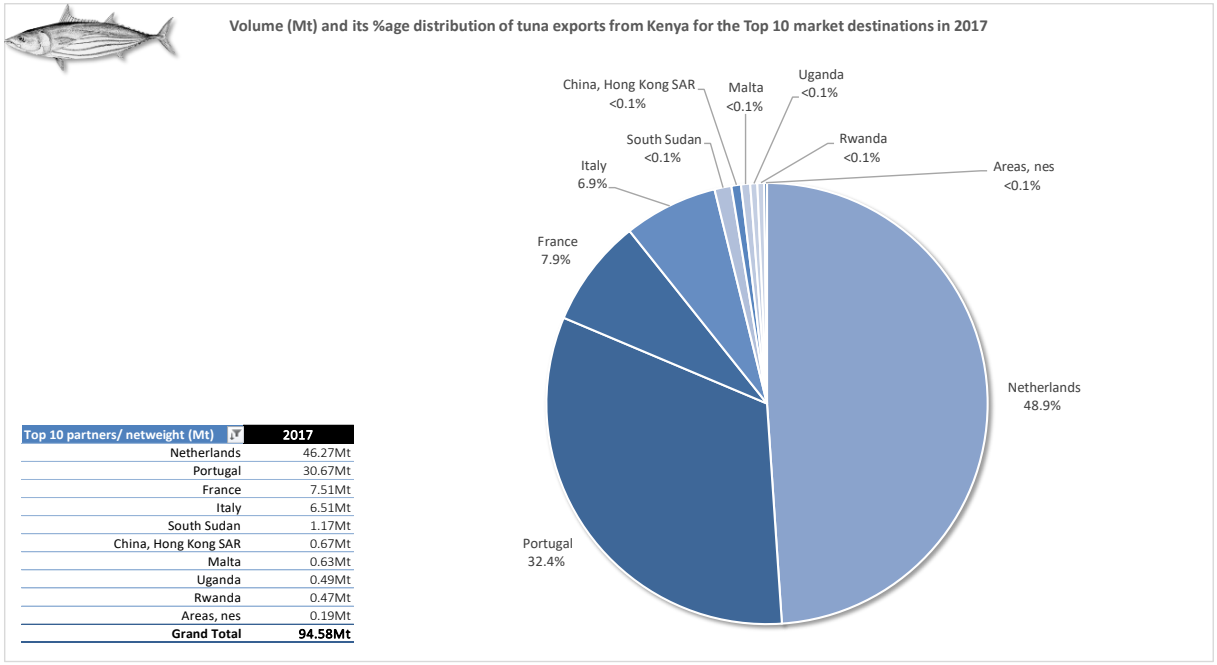
Tuna Landings						
	Reported		Unreported		Total Catch (metric tonnes)	Total Landed value (US$)[1]
Country/sector/method/ species	Catch (metric tonnes)	Landed value (US$)[1]	Catch (metric tonnes)	Landed value (US$)[1]		
Kenya	**62.0**	**146,144.9**	**13.9**	**28,990.4**	**75.9**	**175,135.2**
Artisanal	**31.5**	**65,646.0**	**12.5**	**26,091.3**	**44.0**	**91,737.3**
small scale encircling nets	6.3	13,129.2	2.5	5,218.3	8.8	18,347.5
SKJ	6.3	13,129.2	2.5	5,218.3	8.8	18,347.5
small scale gillnets	6.3	13,129.2	2.5	5,218.3	8.8	18,347.5
SKJ	6.3	13,129.2	2.5	5,218.3	8.8	18,347.5
small scale lines	6.3	13,129.2	2.5	5,218.3	8.8	18,347.5
SKJ	6.3	13,129.2	2.5	5,218.3	8.8	18,347.5
small scale seine nets	12.6	26,258.4	5.0	10,436.5	17.6	36,694.9
SKJ	12.6	26,258.4	5.0	10,436.5	17.6	36,694.9
Industrial	**26.2**	**70,367.4**			**26.2**	**70,367.4**
longline	7.8	18,849.0			7.8	18,849.0
ALB	0.7	1,918.6			0.7	1,918.6
BET	3.3	6,450.8			3.3	6,450.8
TUX	1.6	2,827.4			1.6	2,827.4
YFT	2.2	7,652.2			2.2	7,652.2
purse seine	18.4	51,518.4			18.4	51,518.4
BET	0.4	755.9			0.4	755.9
SKJ	8.7	18,189.3			8.7	18,189.3
YFT	9.3	32,573.1			9.3	32,573.1
Recreational	**0.8**	**2,837.4**			**0.8**	**2,837.4**
recreational fishing gear	0.8	2,837.4			0.8	2,837.4
YFT	0.8	2,837.4			0.8	2,837.4
Subsistence	**3.5**	**7,294.0**	**1.4**	**2,899.0**	**4.9**	**10,193.0**
subsistence fishing gear	3.5	7,294.0	1.4	2,899.0	4.9	10,193.0
SKJ	3.5	7,294.0	1.4	2,899.0	4.9	10,193.0
Grand Total	**62.0**	**146,144.9**	**13.9**	**28,990.4**	**75.9**	**175,135.2**

[1] value estimated applying 2017 ex-vessel prices from Poseidon (2019)

6.2.4 Tuna Export Markets

6.2.4.1 Tuna exports volume

In 2017, most of Kenya's total export of tuna in volume (94.6Mt) went to Europe with about half going to the Netherlands (49%), followed by Portugal (32.5%), France (8%) and Italy (7%). In term of volume, Kenya exported essentially salted tuna (82.5%) and frozen tuna (15%).



Top 10 partners/ netweight (Mt)	2017
Netherlands	46.27Mt
Portugal	30.67Mt
France	7.51Mt
Italy	6.51Mt
South Sudan	1.17Mt
China, Hong Kong SAR	0.67Mt
Malta	0.63Mt
Uganda	0.49Mt
Rwanda	0.47Mt
Areas, nes	0.19Mt
Grand Total	**94.58Mt**

Figure 6-12: Share of tuna exports volume (% and Metric tonnes) between the top 10 market destination for Kenya and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

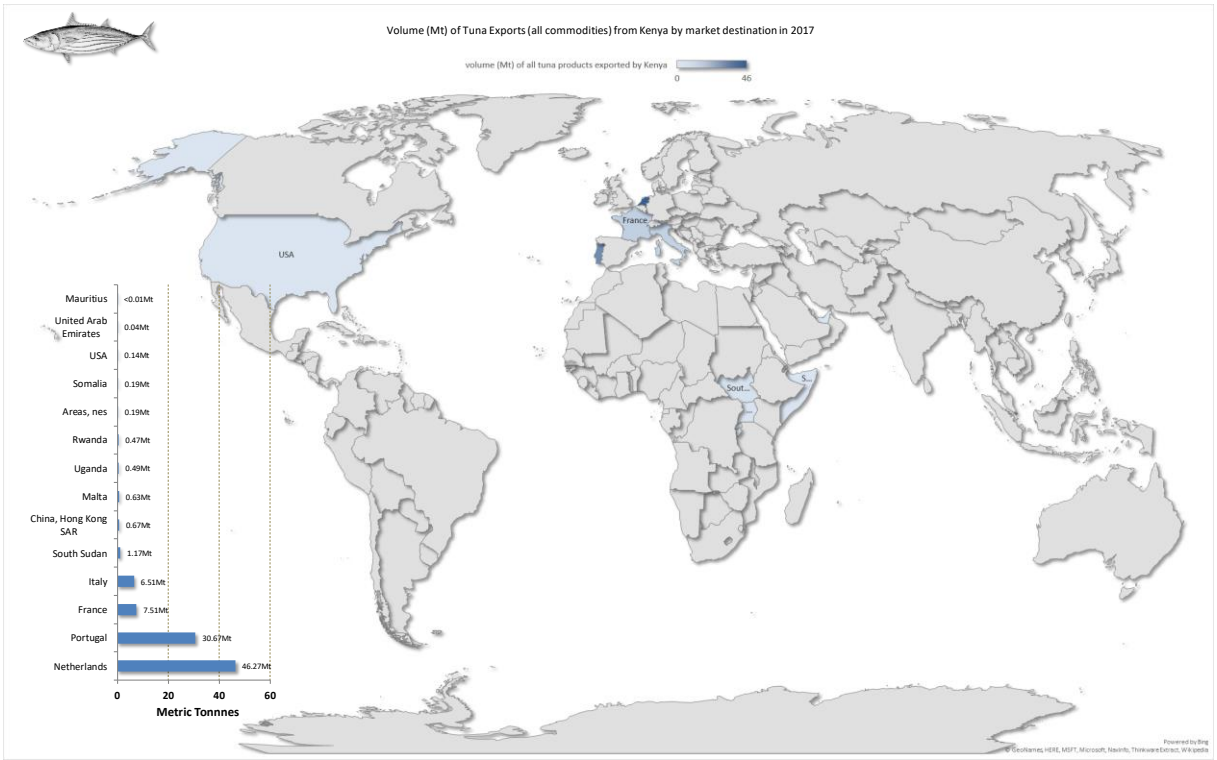


Figure 6-13: Geographic distribution by market destination of tuna exports volume (Mt) for Kenya and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

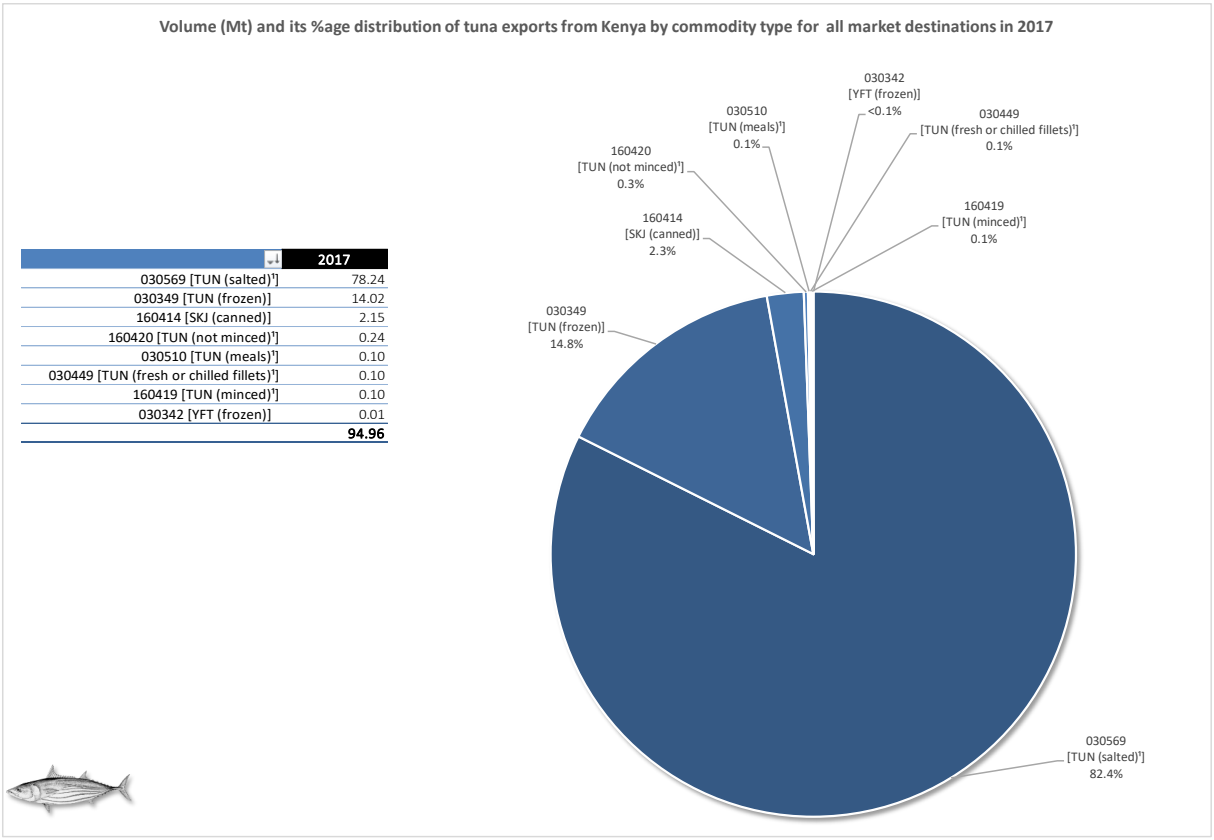


Figure 6-14: Share of tuna exports volume (% and Metric tonnes) by product for Kenya in 2017. Source UN ComTrade (2019) and FAO (2019b)

Volume (Mt) of tuna exports from Kenya by commodity type and market destination in 2017

Netweight (Mt) Product/ Trading partner	Year 2017
030342 [YFT (frozen)]	**0.01**
Mauritius	0.01
160419 [TUN (minced)¹]	**0.10**
Somalia	0.05
South Sudan	0.05
030510 [TUN (meals)¹]	**0.10**
South Sudan	0.10
030449 [TUN (fresh or chilled fillets)¹]	**0.10**
Rwanda	0.10
160420 [TUN (not minced)¹]	**0.24**
Uganda	0.05
South Sudan	0.05
USA	0.14
160414 [SKJ (canned)]	**2.15**
Rest of the World	0.04
Somalia	0.14
Areas, nes	0.19
Rwanda	0.37
Uganda	0.44
South Sudan	0.97
030349 [TUN (frozen)]	**14.02**
Areas, nes	0.00
Italy	6.51
France	7.51
030569 [TUN (salted)¹]	**78.24**
Malta	0.63
China, Hong Kong SAR	0.67
Portugal	30.67
Netherlands	46.27
Grand Total	**94.96**

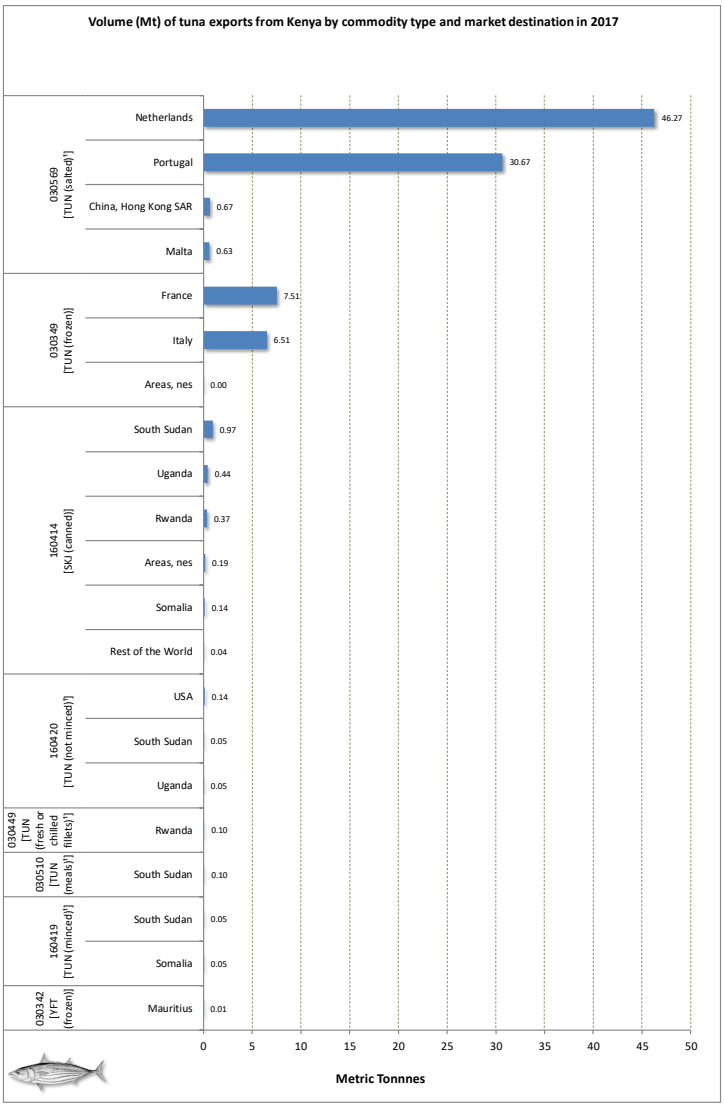


Figure 6-15: Tuna exports volume (Mt) for Kenya in 2017 by product and market destination. Source UN ComTrade (2019)

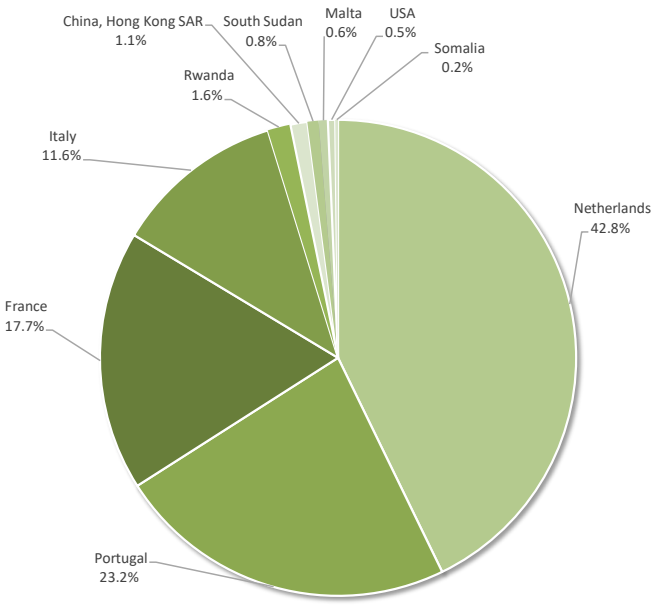
6.2.4.2 Tuna exports value

All exports values are expressed c.i.f.

In term of value, Kenya export markets targeted the Netherlands (43%), Portugal (23%), France (18%), and Italy (11,5%), while export of salted tuna accounted some 67.5% of the tuna exported followed by frozen tuna (29%) and canned skipjack (2.5%).



Value (million US$) and its %age distribution of tuna exports from Kenya for the Top 10 market destinations in 2017



Top 10 partners/ Value (US$)	2017
Netherlands	US$0.12M
Portugal	US$0.07M
France	US$0.05M
Italy	US$0.03M
Rwanda	<US$0.01M
China, Hong Kong SAR	<US$0.01M
South Sudan	<US$0.01M
Malta	<US$0.01M
USA	<US$0.01M
Somalia	<US$0.01M
Grand Total	**US$0.29M**

Figure 6-16: Share of tuna exports value (% and million USD) between the top 10 market destination for Kenya and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)



Figure 6-17: Geographic distribution by market destination of tuna exports value (million USD) for Kenya and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

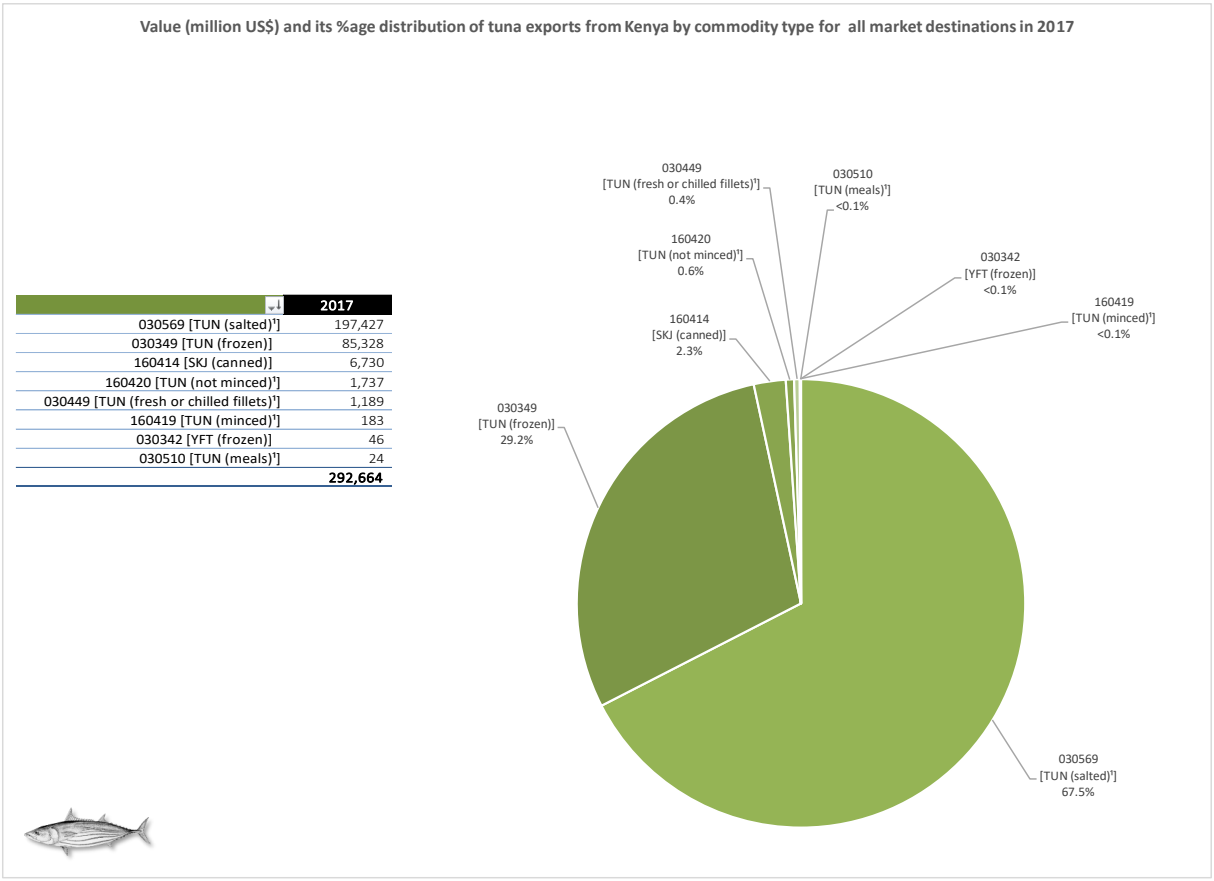


Figure 6-18: Share of tuna exports value (% and million USD) by product for Kenya in 2017. Source UN ComTrade (2019) and FAO (2019b)

Value ('000 US$) of tuna exports from Kenya by commodity type and market destination in 2017

Value (US$)	Year
Product/ Trading partner	2017
030510 [TUN (meals)[1]]	**24**
South Sudan	24
030342 [YFT (frozen)]	**46**
Mauritius	46
160419 [TUN (minced)[1]]	**183**
Somalia	67
South Sudan	116
030449 [TUN (fresh or chilled fillets)[1]]	**1,189**
Rwanda	1,189
160420 [TUN (not minced)[1]]	**1,737**
Uganda	48
South Sudan	238
USA	1,451
160414 [SKJ (canned)]	**6,730**
Rest of the World	97
Uganda	472
Somalia	474
Areas, nes	504
South Sudan	1,823
Rwanda	3,360
030349 [TUN (frozen)]	**85,328**
Areas, nes	11
Italy	33,830
France	51,487
030569 [TUN (salted)[1]]	**197,427**
Malta	1,814
China, Hong Kong SAR	3,341
Portugal	67,530
Netherlands	124,742
Grand Total	**292,664**

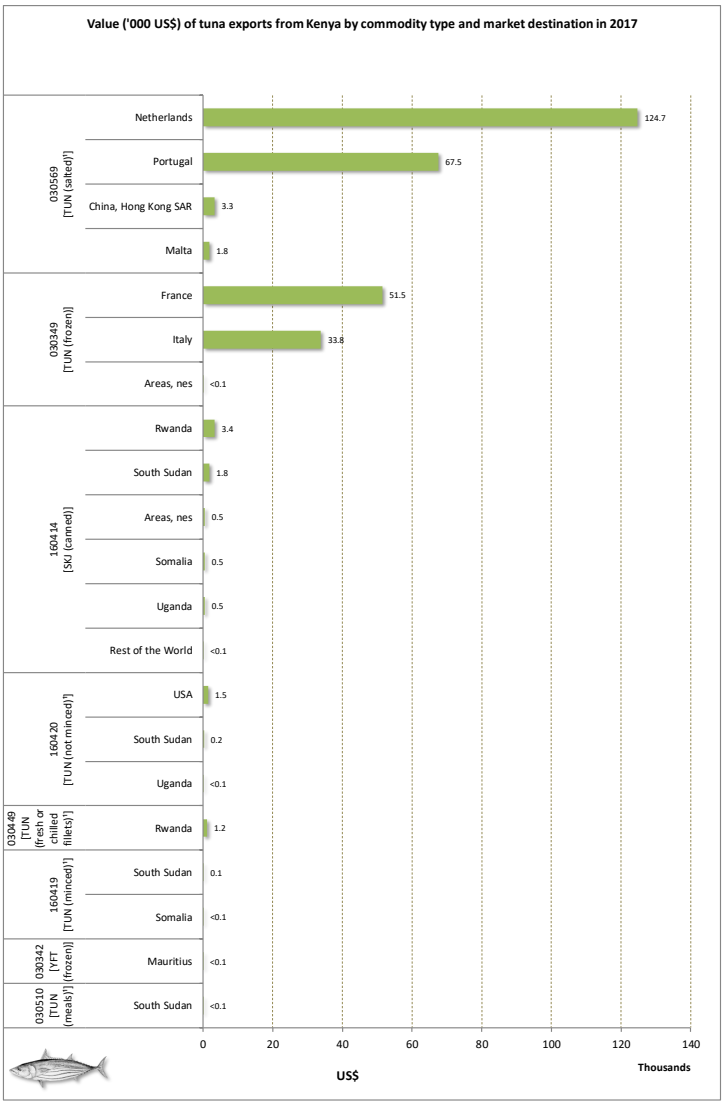


Figure 6-19: Tuna exports value (USD) for Kenya in 2017 by product and market destination. Source UN ComTrade (2019)

6.2.4.3 Average prices of tuna exports

In 2017, Rwanda was paying the highest prices for its import of tuna from Kenya at US$11.89/ kg for fresh or chilled tuna fillets followed by the USA with US$10.36/ kg for prepared tuna (not minced).

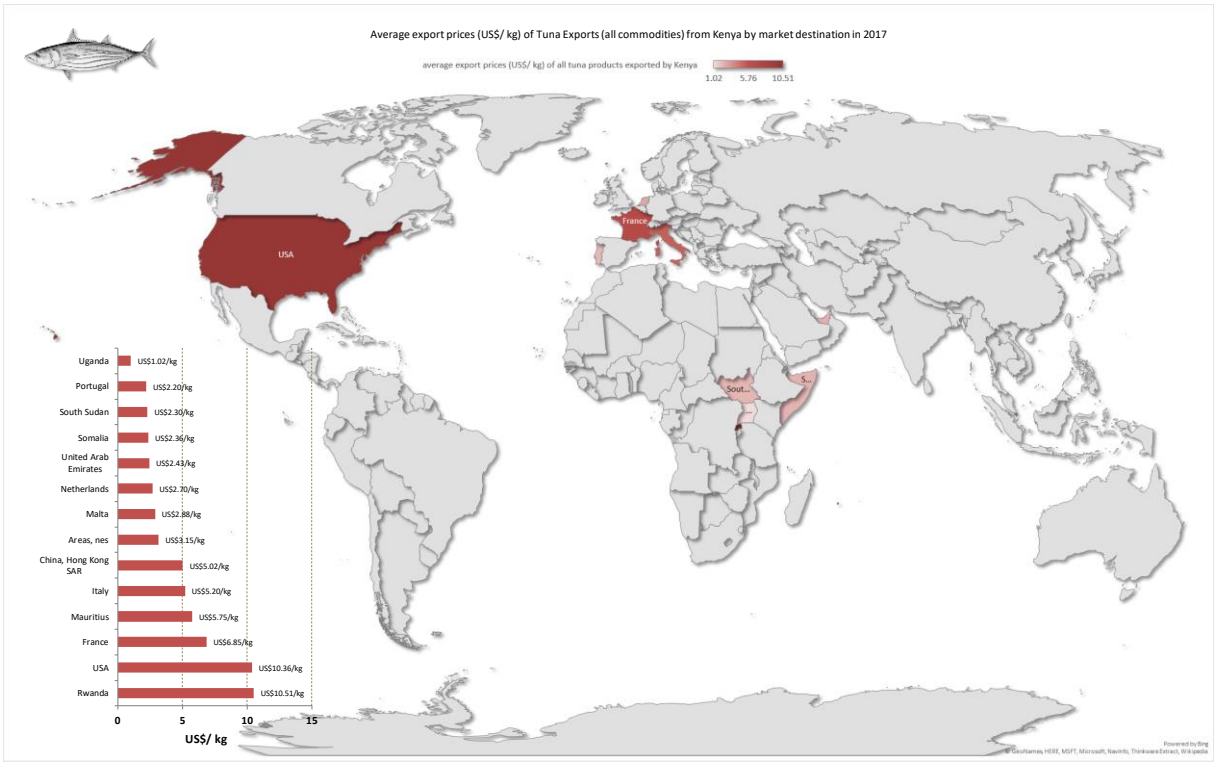


Figure 6-20: Geographic distribution by market destination of the average price of tuna exports for Kenya and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

Average price (US$/ kg) of tuna exports from Kenya by commodity type and market destination in 2017

Average of Average price Product/ Trading partner	Year 2017
030510 [TUN (meals)¹]	**0.24**
South Sudan	0.24
160419 [TUN (minced)¹]	**1.83**
Somalia	1.34
South Sudan	2.32
030569 [TUN (salted)¹]	**3.20**
Portugal	2.20
Netherlands	2.70
Malta	2.88
China, Hong Kong SAR	5.02
160414 [SKJ (canned)]	**3.42**
Uganda	1.07
South Sudan	1.88
Rest of the World	2.43
Areas, nes	2.64
Somalia	3.39
Rwanda	9.13
030349 [TUN (frozen)]	**5.24**
Areas, nes	3.67
Italy	5.20
France	6.85
160420 [TUN (not minced)¹]	**5.36**
Uganda	0.96
South Sudan	4.76
USA	10.36
030342 [YFT (frozen)]	**5.75**
Mauritius	5.75
030449 [TUN (fresh or chilled fillets)¹]	**11.89**
Rwanda	11.89
Average	**4.13**

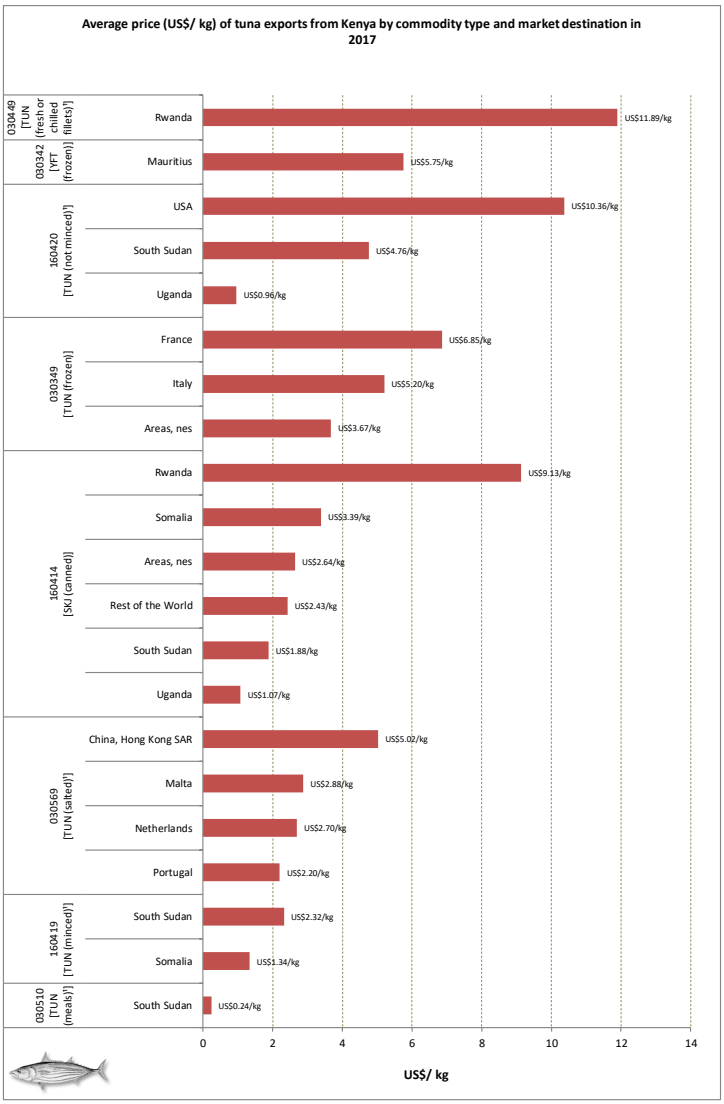


Figure 6-21: Average price of tuna exports (USD / kg) for Kenya in 2017 by product and market destination. Source UN ComTrade (2019)

6.2.4.4 Exports tariff for main tuna products exported by Kenya

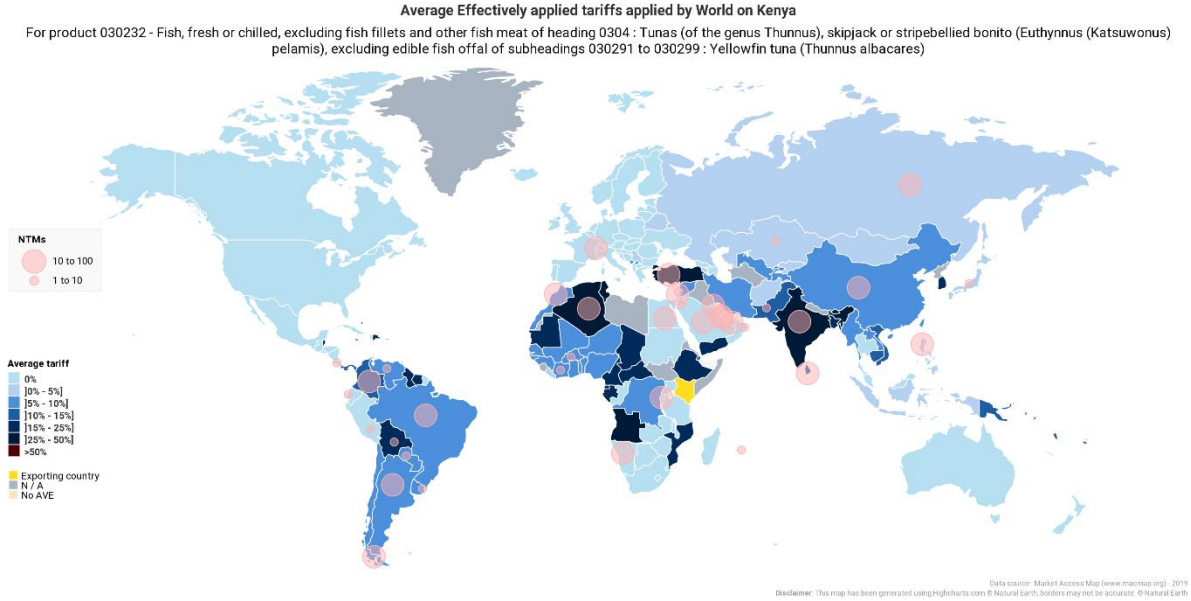


Figure 6-22: Tuna exports tariffs and NTMs faced by Kenya on the International markets for commodity: 30232 - Yellowfin tuna (fresh or chilled). Source: ITC (2019)

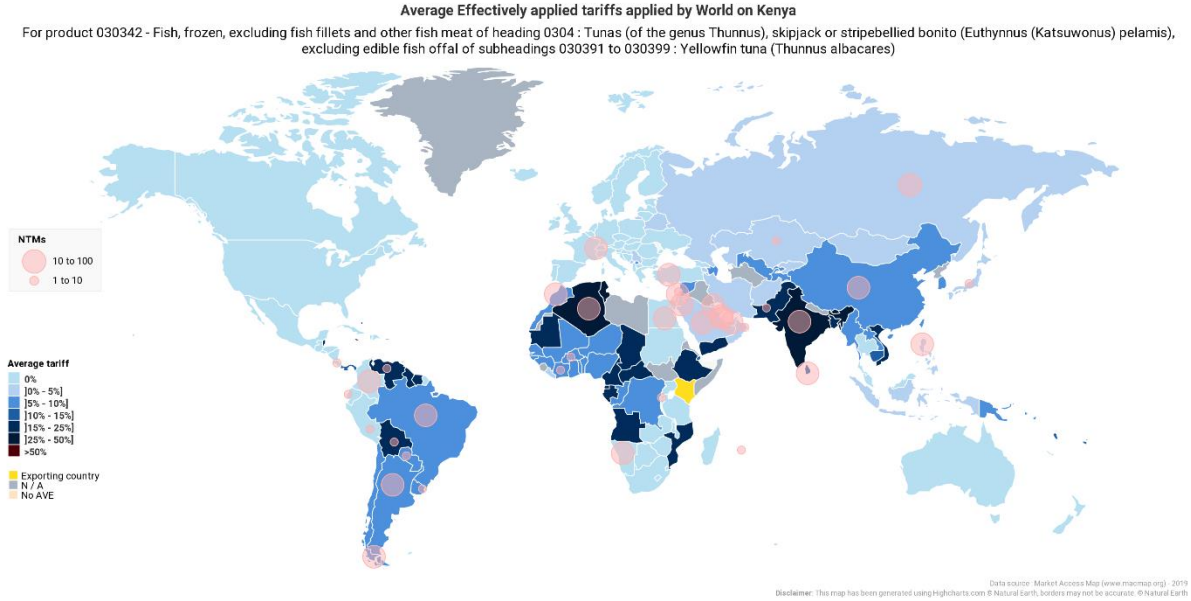


Figure 6-23: Tuna exports tariffs and NTMs faced by Kenya on the International markets for commodity: 30342 - Yellowfin tuna (frozen). Source: ITC (2019)

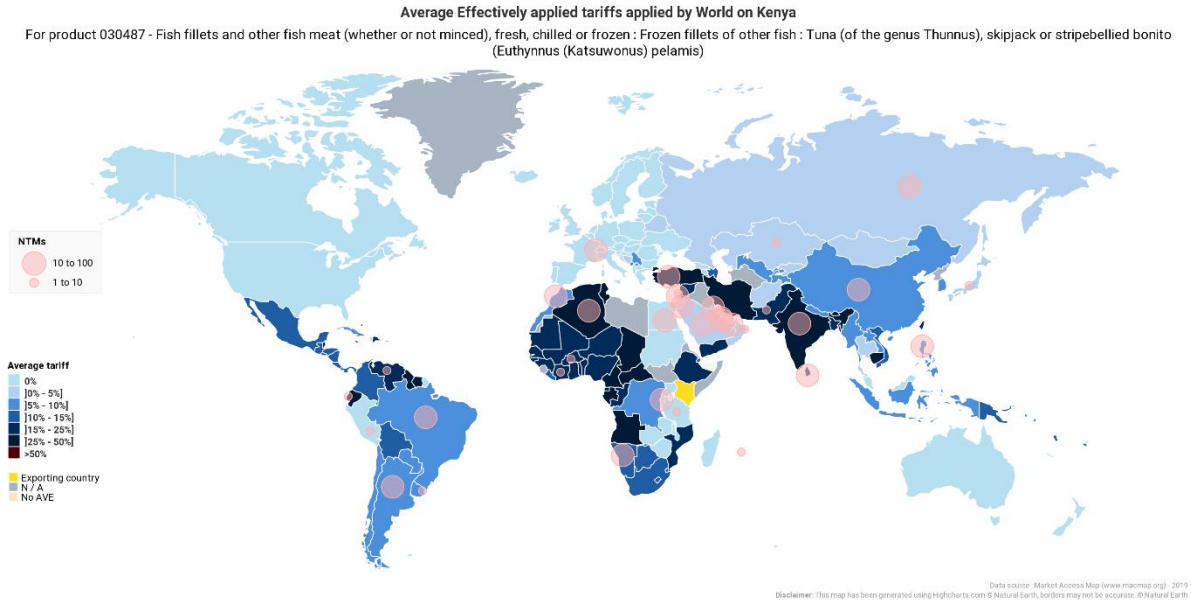


Figure 6-24: Tuna exports tariffs and NTMs faced by Kenya on the International markets for commodity: 30487 - Skipjack tuna (frozen fillets). Source: ITC (2019)

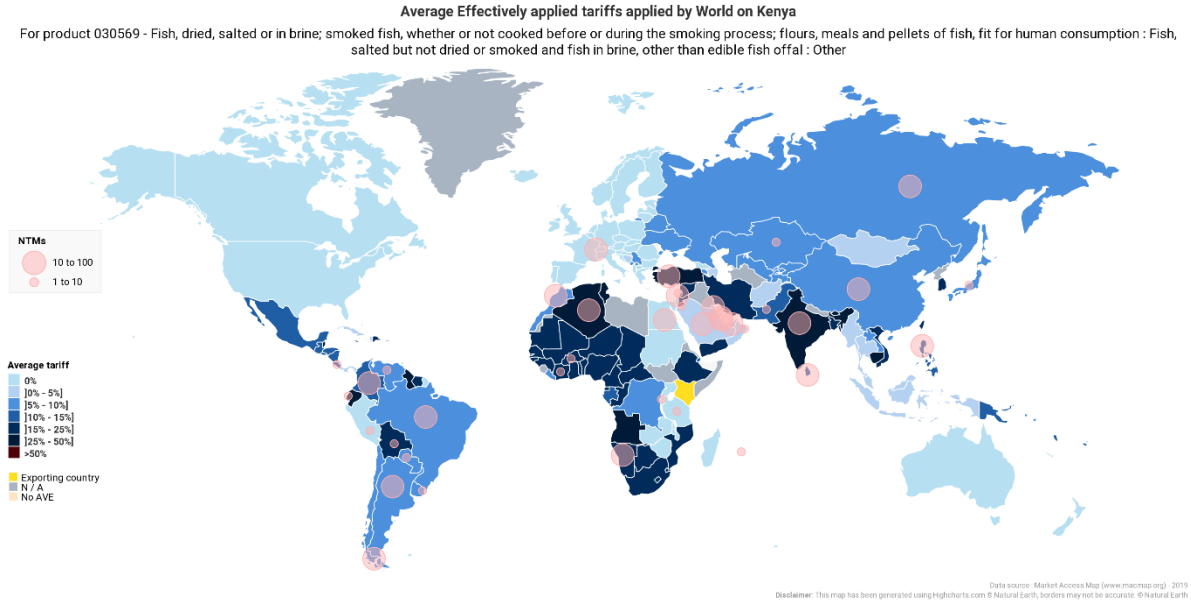


Figure 6-25: Tuna exports tariffs and NTMs faced by Kenya on the International markets for commodity: 30569 - Tunas nei (salted). Source: ITC (2019)

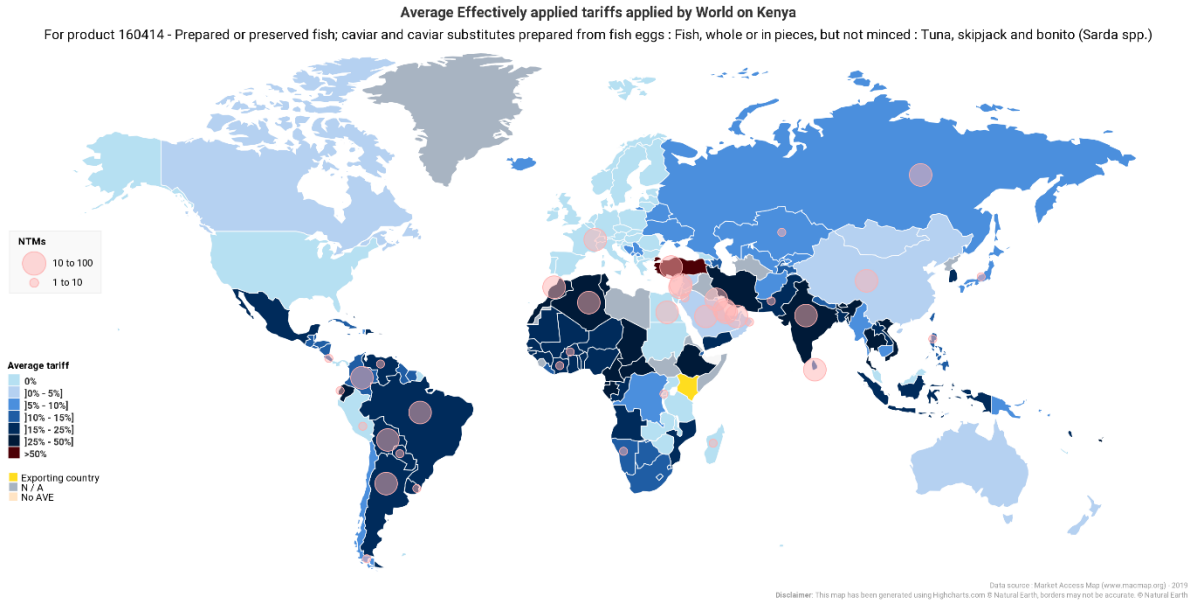


Figure 6-26: Tuna exports tariffs and NTMs faced by Kenya on the International markets for commodity: 160414 - Skipjack tuna (canned). Source: ITC (2019)

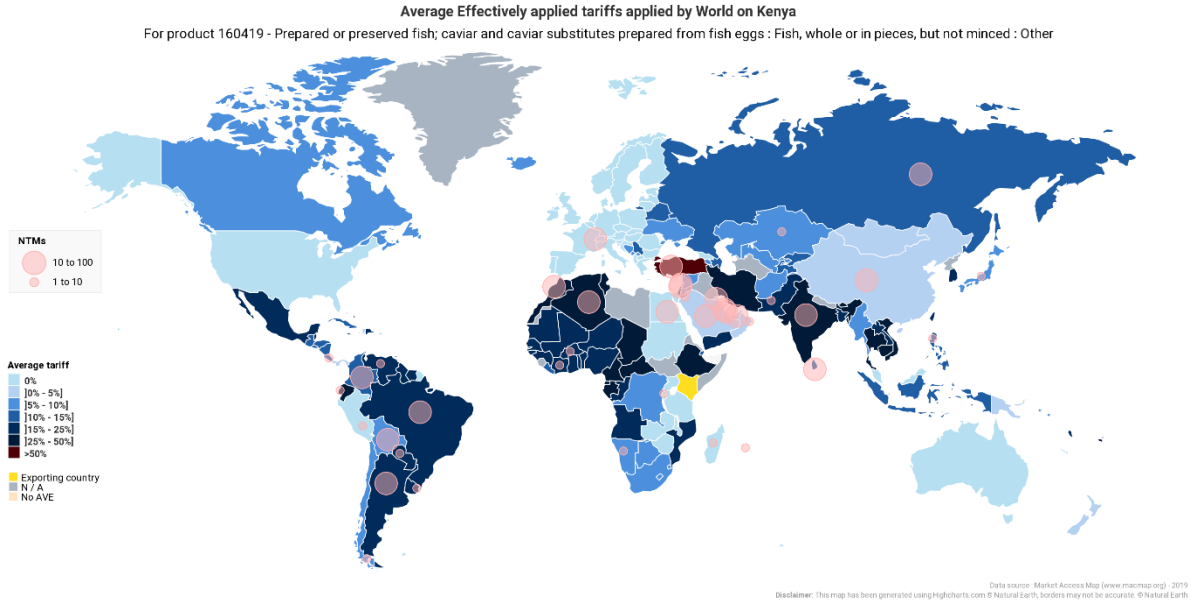


Figure 6-27: Tuna exports tariffs and NTMs faced by Kenya on the International markets for commodity: 160419 - Tunas nei (prep minced). Source: ITC (2019)

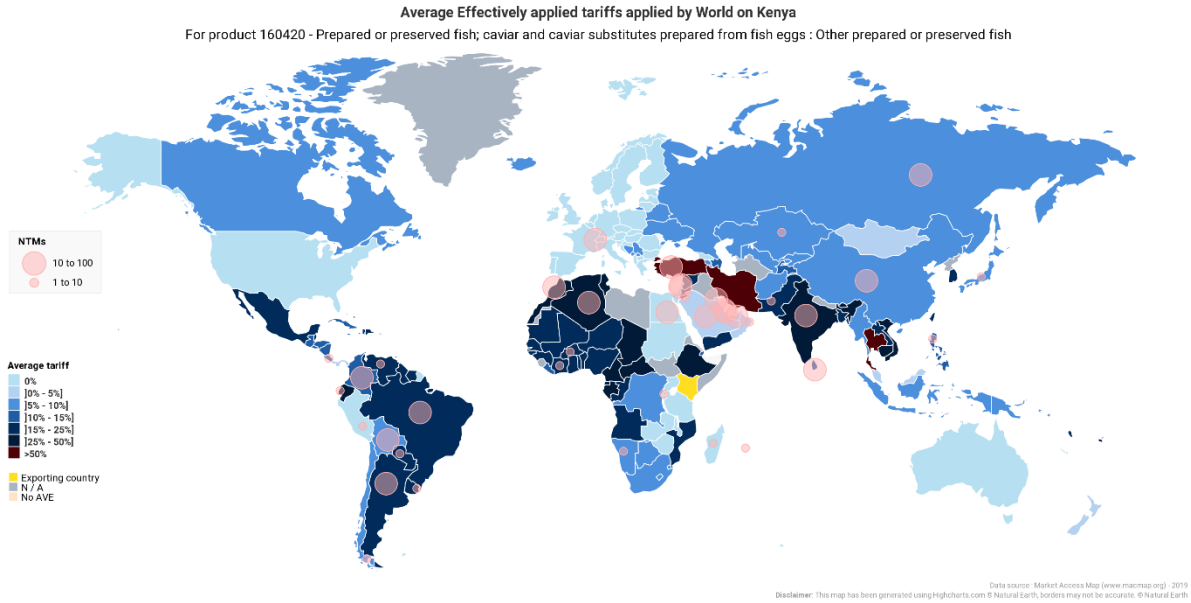


Figure 6-28: Tuna exports tariffs and NTMs faced by Kenya on the International markets for commodity: 160420 - Tunas nei (prep not minced). Source: ITC (2019)

6.3 Madagascar

Madagascar lies in the tropical Western Indian Ocean, surrounded by waters of the Southern Equatorial Current (SEC) and forming part of the Agulhas Large Marine Ecosystem (LME).

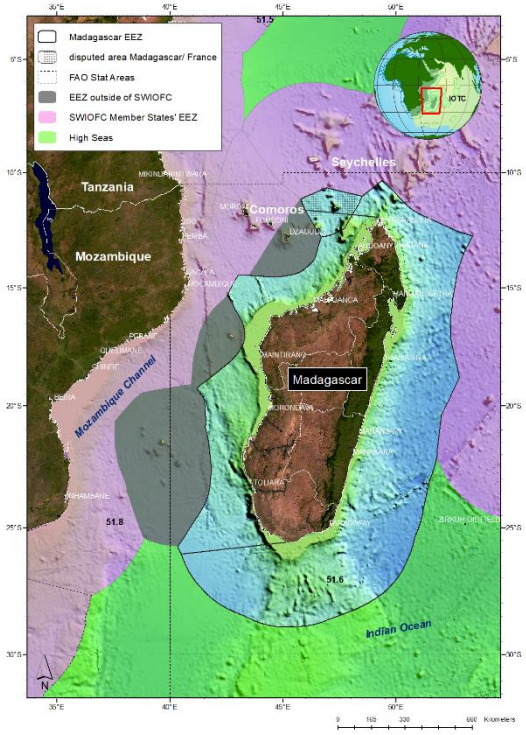


Figure 6-29: Madagascar EEZ and surrounding waters.

Madagascar's long coastline is estimated at 5,600 km, east and west coasts, large latitudinal range and upstream location in relation to eastern and southern Africa.

Madagascar includes the smaller offshore islands and the main island. The island has a central high plateau that is 1,000 to 2,000 metres in altitude and fall steeply into a narrow coastal line.

Madagascar continental shelf has a breadth of 20 to 30 km in the North West and 2 to 5 km along certain areas on the east coast. The surface area is 177,000 km². The west side of the continental shelf is conducive to traditional fishing There are basically two types of fisheries in Madagascar the industrial fisheries which targets off-shore tuna, bill-fish, sharks (as by catch) and the near shore shrimp fishery. (FAO, 2018)

The state, through the Ministry of Fisheries and Fish Resources, plays a key role in defining and implementing management measures. This is the department that sets national policy as well as global and sectoral strategies through the master plan. It is also responsible for issuing operating permits and fishing licenses after consulting the various decentralized bodies (local and regional authorities, decentralized services); implement regulations and legal mechanisms for the development of the sector; set rates and collect fees depending on the species and size of the area to operate.

Decentralised representatives of the Ministry for Fisheries and Aquaculture are in charge of giving priority, according to the local or regional context, the production of information as detailed as possible for the preparation of the development plan; being in permanent contact with the various operators and other body affecting the fisheries sector, as well as with local communities to develop local resource management plans; ensuring the implementation of regulations; making permanent controls and monitoring in accordance with existing legislation; ensuring the collection of all the information from the operators both statistical and any other information deemed useful.

6.3.1 Fisheries Access Agreements

The latest fisheries partnership agreement between the EU and Madagascar was signed on 19/12/2014 and covered the period 1/1/2015 – 31/12/2018 with a financial contribution of €6,107,500 on the whole duration of the protocol out of which €2,800,000 was dedicated to the support of the fisheries policy of Madagascar.

This fisheries agreement allows EU vessels mainly from Spain, Portugal, Italy and France to fish in the Malagasy waters and was part of the tuna network fisheries agreements, in the south-west zone of the Indian Ocean (EU, 2019).

The Protocol expired on 31/12/2018

Table 6-4: Main features of the Tuna FPA between the EU and Madagascar

Duration of the Agreement:	6 years tacitly renewable (01/01/007– 31/12/2012, renewed for the period 01/01/2013-21/12/2018)
Duration of the Protocol:	4 years (01/01/15– 31/12/2018)
Initialisation:	01/01/2015
Nature of the FPA :	Tuna Fishery Agreement, in the framework of the IOTC convention area
Financial contribution:	€1,566,250 per year for 2015 and 2016 and €1,487,500 per year for 2017 and 2018, out of which €700,000 has been earmarked for the support of the Malagasy fisheries policy in order to promote sustainability in its waters.
Fee for ship owners:	- €60 per tonne caught for 2015 and 2016
	- €70 per tonne caught for 2017 and 2018
Advances:	- Tuna seiners: €11,400/year for the first two years and €13,300/year for the last two years (ref catches: 190 t/an)
	- Surface longliners >100 GT: €3,000/year for the first two years and €4,200/year for the last two years (ref catches: 60 t/an)
	- Surface longliners = or < 100 GT: €2,400/year for the first two years and €2,800/year for the last two years (ref catches: 40 t)
Reference tonnage:	15,750 t/year

We also identified several private Tuna agreements some of which may have expired, no further information was found:

- Tuna acces agreement, Compagnie Française du Thon Océanique (CFTO), 2011. Source: Republic of Madagascar (2011a)
- Tuna access agreement, La Société COPEFRITO, 2011. Source: Republic of Madagascar (2011b)
- Tuna access agreement, La Société de Pesch de Sainte Marie (SPSM)2011 ,. Source: Republic of Madagascar (2011c)
- Tuna access agreement, La Société Intertun Ltd, 2011. Source: Republic of Madagascar (2011d)
- Tuna access agreement, La Société Mad Ocean, 2010. Source: Republic of Madagascar (2010b)
- Tuna and fish agreement, La Société Barrosso,2010. Source: Republic of Madagascar (2010c)
- Tuna access agreement, SAPMER2010 ,. Source: Republic of Madagascar (2010d)
- Tuna access agreement, La Asociación Nacional de Armadores de Buques Atuneros Congeladores (ANABAC), 2009. Source: Republic of Madagascar (2009a)
- Tuna access agreement, La Société Mada Jono Sarl, 2009. Source: Republic of Madagascar (2009b)
- Tuna access agreement, La Société Dae Young Fisheries, 2009. Source: Republic of Madagascar (2009c)
- Tuna access agreement, L'Association Japonais des Coopératives de Pech au Thon (Japan Tuna), 2008. Source: Republic of Madagascar (2008)

6.3.2 Tuna Production

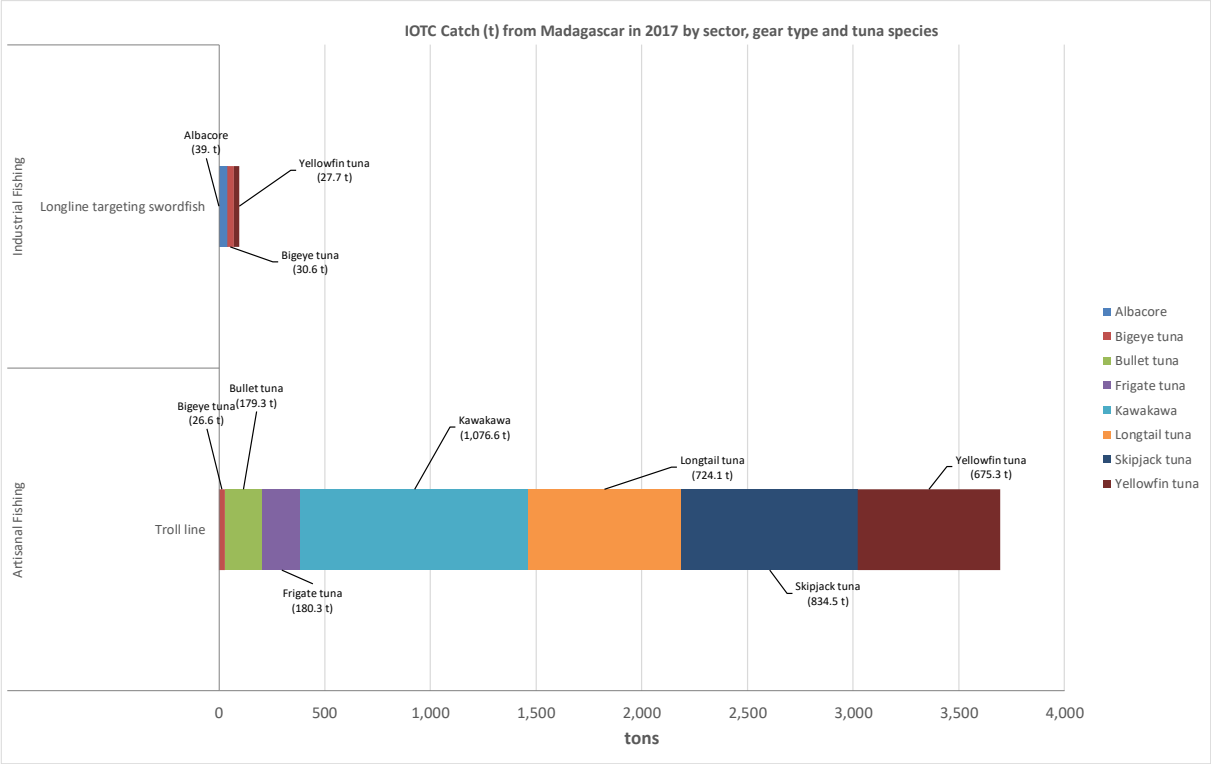


Figure 6-30: Tuna Catch in the IOTC area by Madagascar in 2017 by species and fishing method. Source (IOTC, 2019)

6.3.3 IUU Tuna Landings

Table 6-5: Reported and unreported tuna landings (Mt and USD) for Madagascar by sector, method and tuna species in 2014. Source (SAU, 2019)

Country/sector/method/ species	Tuna Landings					
	Reported		Unreported		Total Catch (metric tonnes)	Total Landed value (US$)[1]
	Catch (metric tonnes)	Landed value (US$)[1]	Catch (metric tonnes)	Landed value (US$)[1]		
Madagascar	**5,110.3**	**12,408,643.4**	**332.1**	**754,288.6**	**5,442.4**	**13,162,932.0**
Artisanal	**1,583.0**	**3,595,311.0**	**166.1**	**377,144.3**	**1,749.1**	**3,972,455.3**
small scale encircling nets	651.4	1,801,640.1	68.3	188,990.1	719.7	1,990,630.2
BET	10.5	20,590.5	1.1	2,159.9	11.6	22,750.4
FRZ	36.0	63,720.0	3.8	6,684.2	39.8	70,404.2
KAW	163.4	289,241.6	17.1	30,341.1	180.6	319,582.8
SKJ	83.5	174,014.0	8.8	18,253.9	92.3	192,267.9
YFT	358.0	1,254,074.0	37.6	131,551.0	395.6	1,385,625.0
small scale gillnets	312.8	592,454.8	32.8	62,147.9	345.6	654,602.6
ALB	12.2	32,156.5	1.3	3,373.2	13.4	35,529.7
BET	10.5	20,590.5	1.1	2,159.9	11.6	22,750.4
FRZ	36.0	63,720.0	3.8	6,684.2	39.8	70,404.2
KAW	170.6	301,973.8	17.9	31,676.7	188.5	333,650.5
SKJ	83.5	174,014.0	8.8	18,253.9	92.3	192,267.9
small scale lines	353.0	674,329.2	37.0	70,736.4	390.1	745,065.6
ALB	24.3	64,313.0	2.6	6,746.4	26.9	71,059.4
BET	10.5	20,590.5	1.1	2,159.9	11.6	22,750.4
FRZ	36.0	63,720.0	3.8	6,684.2	39.8	70,404.2
KAW	198.7	351,691.7	20.8	36,892.1	219.5	388,583.8
SKJ	83.5	174,014.0	8.8	18,253.9	92.3	192,267.9
small scale seine nets	265.8	526,886.9	27.9	55,269.9	293.7	582,156.8
BET	21.0	41,181.0	2.2	4,319.8	23.2	45,500.8
FRZ	72.0	127,440.0	7.6	13,368.3	79.6	140,808.3
KAW	5.8	10,237.9	0.6	1,073.9	6.4	11,311.8
SKJ	167.0	348,028.0	17.5	36,507.8	184.5	384,535.8
Industrial	**1,944.3**	**5,218,021.4**			**1,944.3**	**5,218,021.4**
longline	1,944.3	5,218,021.4			1,944.3	5,218,021.4
ALB	1,162.5	3,072,473.5			1,162.5	3,072,473.5
BET	470.5	922,595.7			470.5	922,595.7
BOP	35.3	257,145.3			35.3	257,145.3
SKJ	0.7	1,438.6			0.7	1,438.6
YFT	275.3	964,368.3			275.3	964,368.3
Subsistence	**1,583.0**	**3,595,311.0**	**166.1**	**377,144.3**	**1,749.1**	**3,972,455.3**
subsistence fishing gear	1,583.0	3,595,311.0	166.1	377,144.3	1,749.1	3,972,455.3
ALB	36.5	96,469.5	3.8	10,119.5	40.3	106,589.0
BET	52.5	102,952.5	5.5	10,799.6	58.0	113,752.1
FRZ	180.0	318,600.0	18.9	33,420.8	198.9	352,020.8
KAW	538.5	953,145.0	56.5	99,983.9	595.0	1,053,128.9
SKJ	417.5	870,070.0	43.8	91,269.4	461.3	961,339.4
YFT	358.0	1,254,074.0	37.6	131,551.0	395.6	1,385,625.0
Grand Total	**5,110.3**	**12,408,643.4**	**332.1**	**754,288.6**	**5,442.4**	**13,162,932.0**

[1] value estimated applying 2017 ex-vessel prices from Poseidon (2019)

6.3.4 Volume of Tuna processed

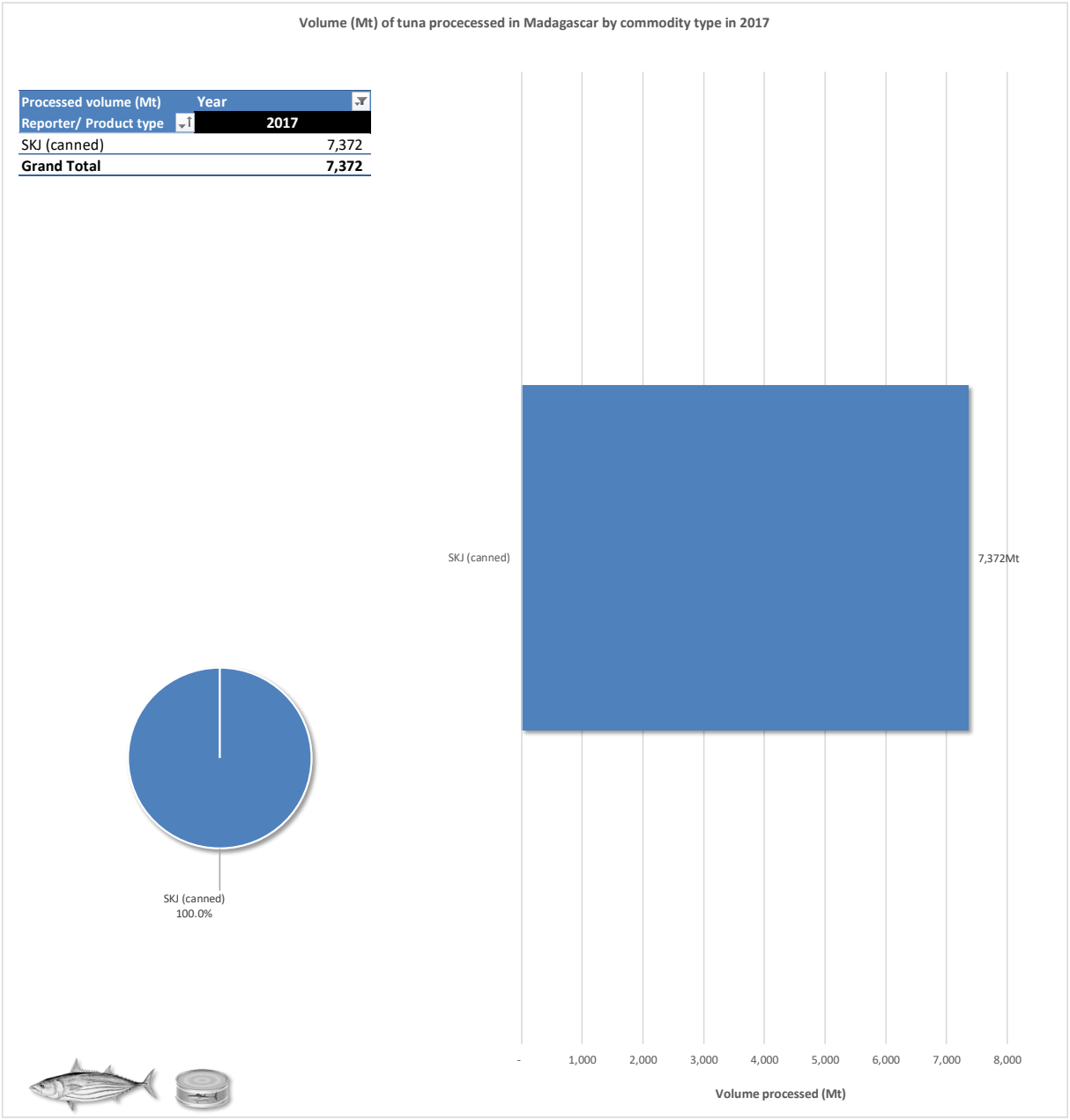
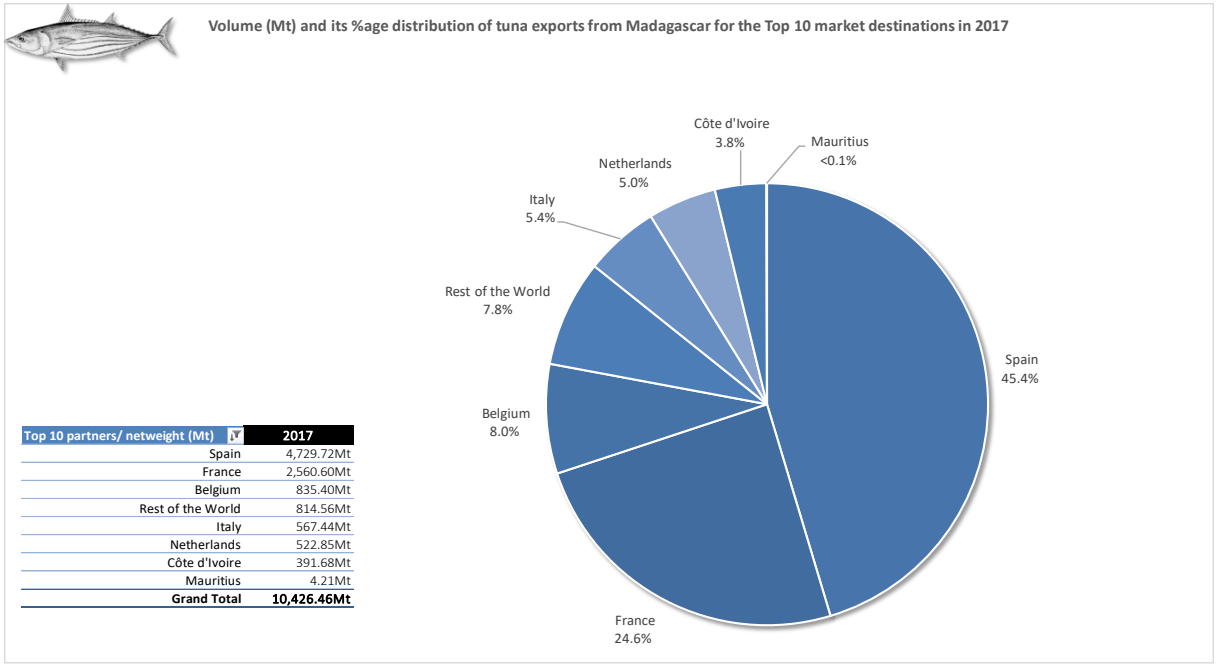


Figure 6-31: Tuna processed (metric tonnes) in Madagascar in 2017 by product type. Source FAO (2019b)

6.3.5 Tuna Export Markets

6.3.5.1 Tuna exports volume



Top 10 partners/ netweight (Mt)	2017
Spain	4,729.72Mt
France	2,560.60Mt
Belgium	835.40Mt
Rest of the World	814.56Mt
Italy	567.44Mt
Netherlands	522.85Mt
Côte d'Ivoire	391.68Mt
Mauritius	4.21Mt
Grand Total	**10,426.46Mt**

Figure 6-32: Share of tuna exports volume (% and Metric tonnes) between the top 10 market destination for Madagascar and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

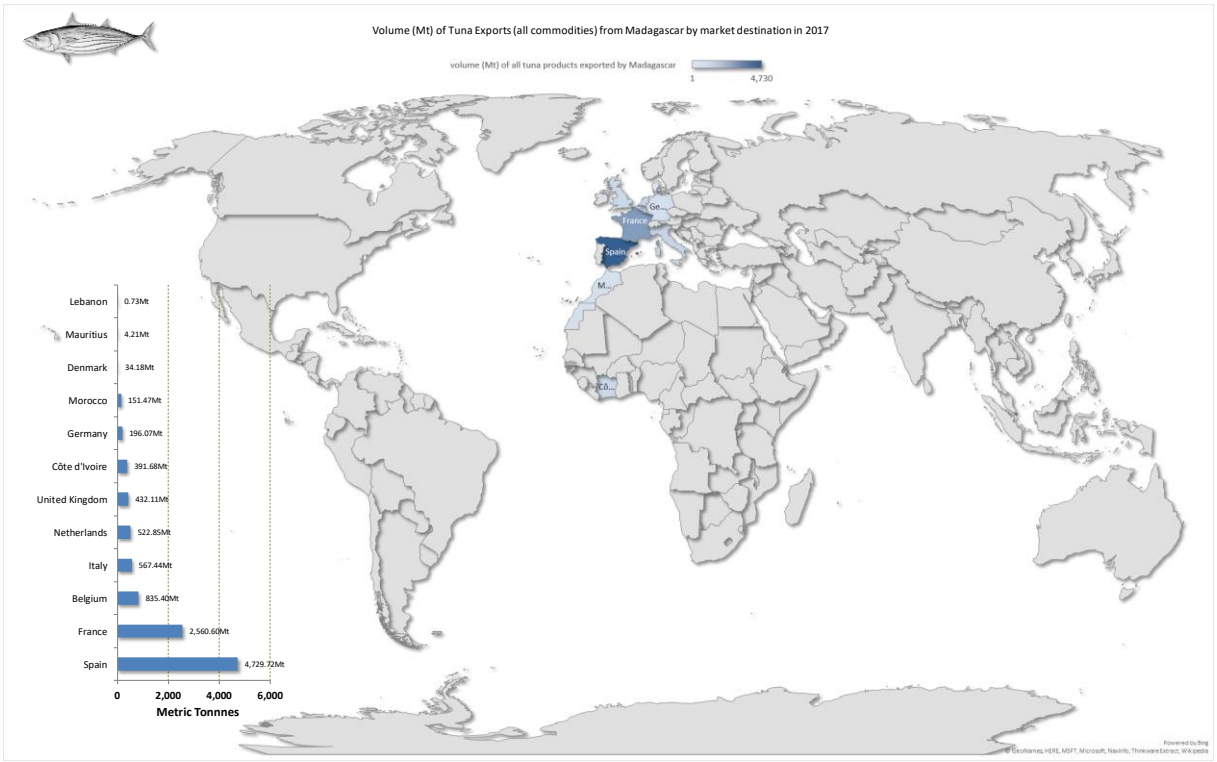


Figure 6-33: Geographic distribution by market destination of tuna exports volume (Mt) for Madagascar and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

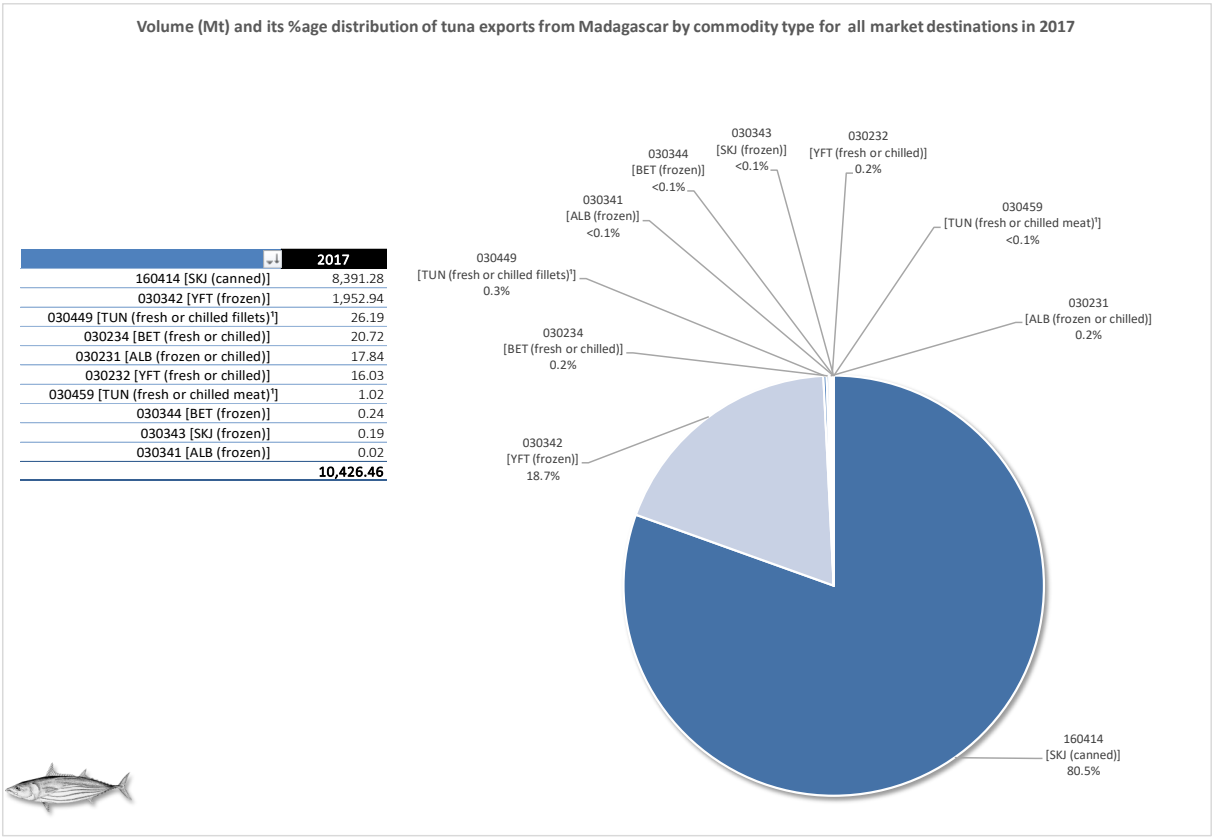


Figure 6-34: Share of tuna exports volume (% and metric tonnes) by product for Madagascar in 2017. Source UN ComTrade (2019) and FAO (2019b)

Volume (Mt) of tuna exports from Madagascar by commodity type and market destination in 2017

Netweight (Mt) Product/ Trading partner	Year 2017
030341 [ALB (frozen)]	**0.02**
France	0.02
030343 [SKJ (frozen)]	**0.19**
France	0.19
030344 [BET (frozen)]	**0.24**
France	0.24
030459 [TUN (fresh or chilled meat)¹]	**1.02**
France	1.02
030232 [YFT (fresh or chilled)]	**16.03**
France	16.03
030231 [ALB (frozen or chilled)]	**17.84**
France	17.84
030234 [BET (fresh or chilled)]	**20.72**
France	20.72
030449 [TUN (fresh or chilled fillets)¹]	**26.19**
Mauritius	4.21
France	21.99
030342 [YFT (frozen)]	**1,952.94**
France	0.11
Côte d'Ivoire	391.68
Spain	1,561.15
160414 [SKJ (canned)]	**8,391.28**
Netherlands	522.85
Italy	567.44
Rest of the World	814.56
Belgium	835.40
France	2,482.45
Spain	3,168.58
Grand Total	**10,426.46**

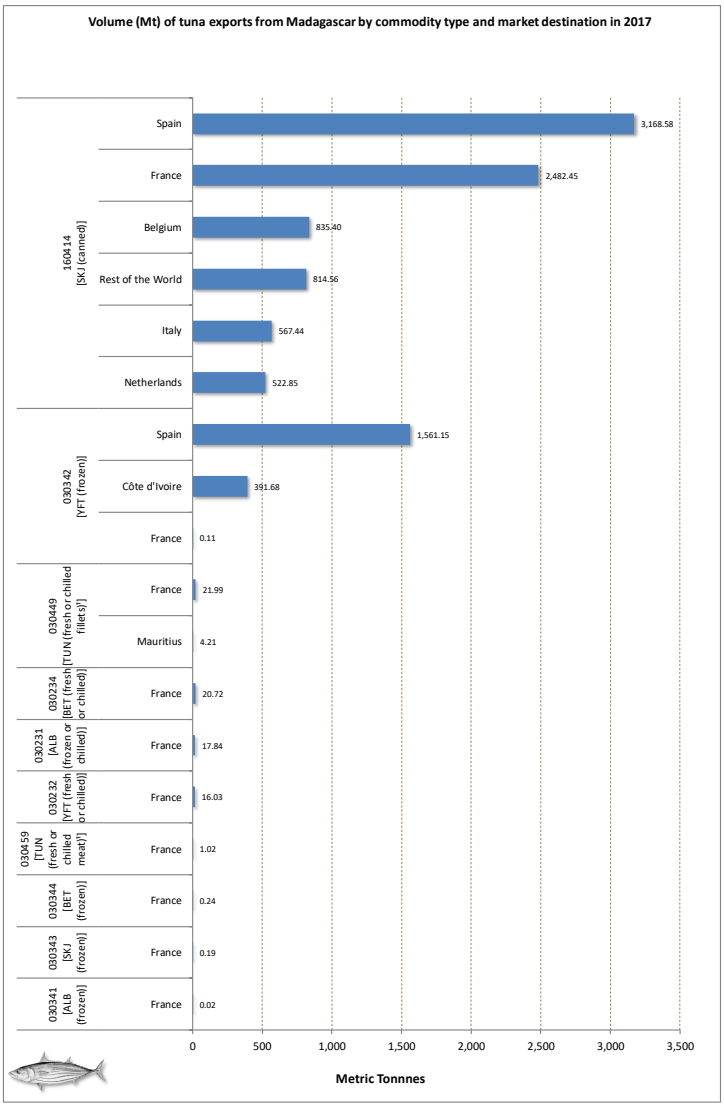
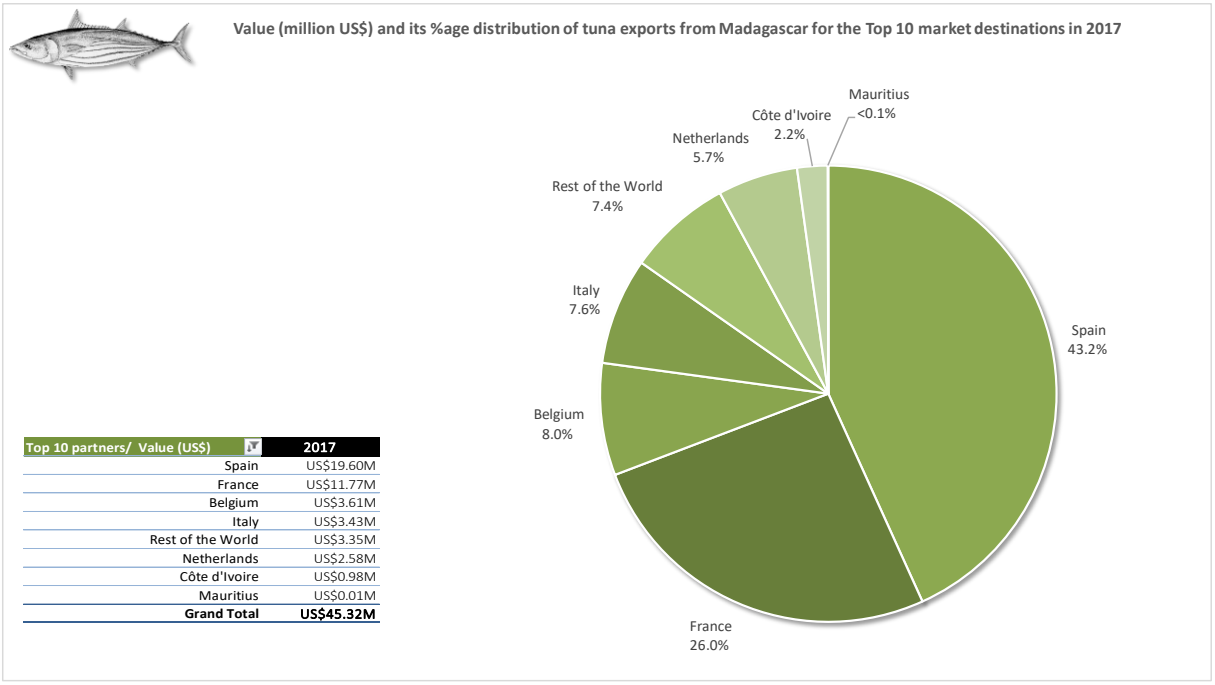


Figure 6-35: Tuna exports volume (Mt) for Madagascar in 2017 by product and market destination. Source UN ComTrade (2019)

6.3.5.2 Tuna exports value

All exports values are expressed c.i.f.



Top 10 partners/ Value (US$)	2017
Spain	US$19.60M
France	US$11.77M
Belgium	US$3.61M
Italy	US$3.43M
Rest of the World	US$3.35M
Netherlands	US$2.58M
Côte d'Ivoire	US$0.98M
Mauritius	US$0.01M
Grand Total	**US$45.32M**

Figure 6-36: Share of tuna exports value (% and million USD) between the top 10 market destination for Madagascar and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

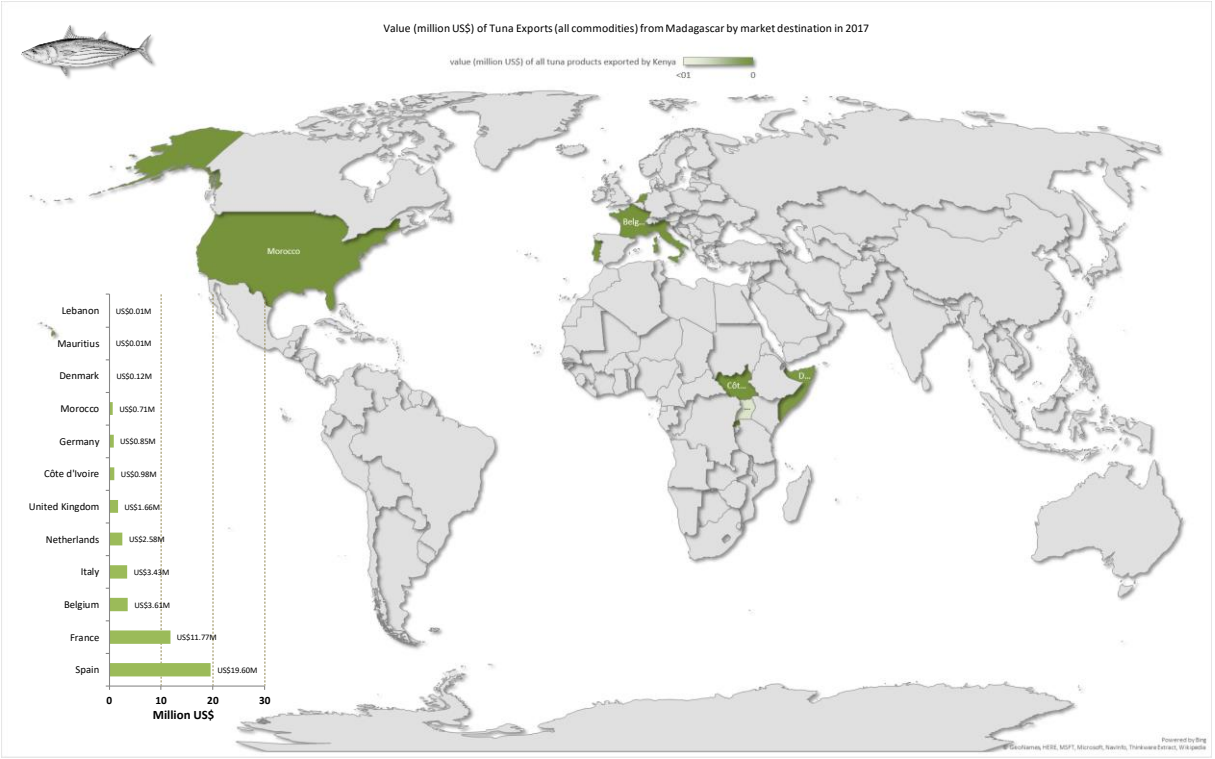
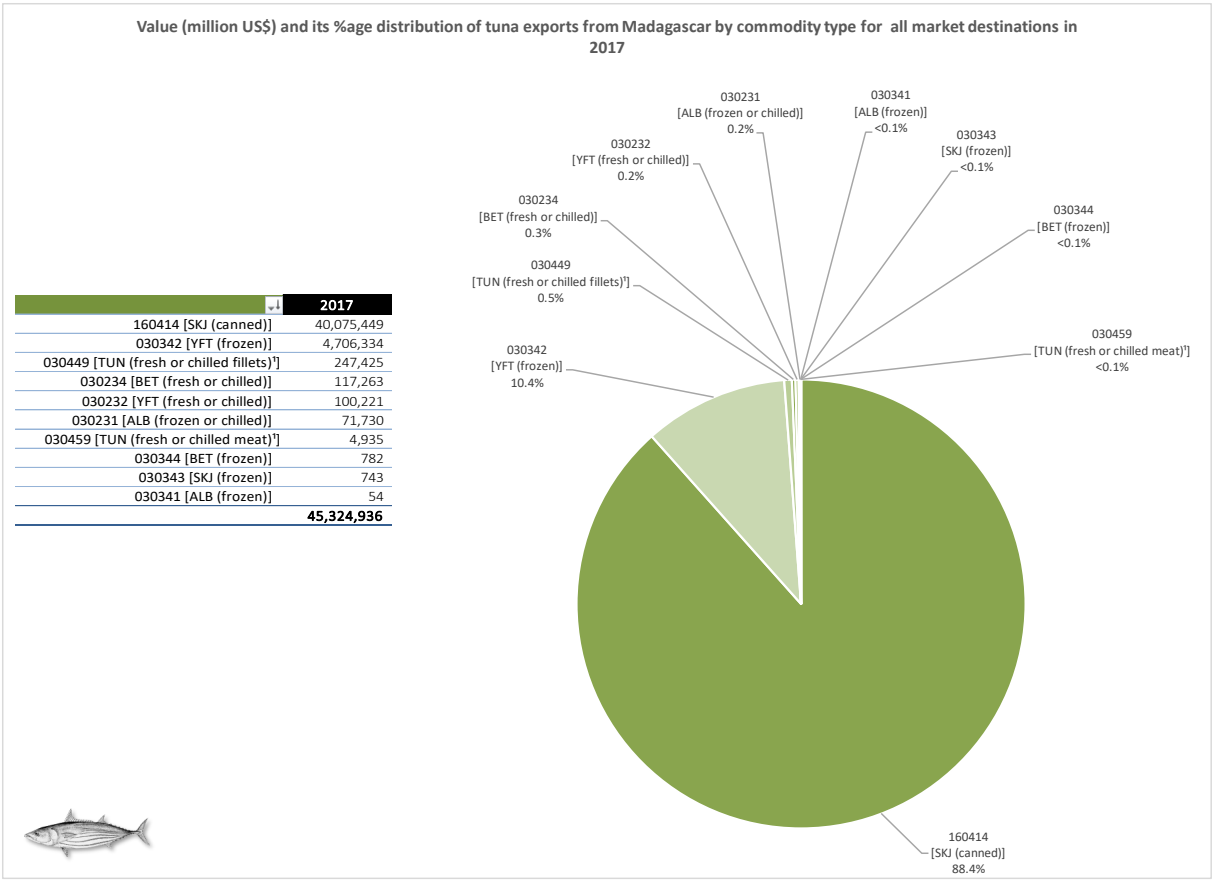


Figure 6-37: Geographic distribution by market destination of tuna exports value (million USD) for Madagascar and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)



	2017
160414 [SKJ (canned)]	40,075,449
030342 [YFT (frozen)]	4,706,334
030449 [TUN (fresh or chilled fillets)†]	247,425
030234 [BET (fresh or chilled)]	117,263
030232 [YFT (fresh or chilled)]	100,221
030231 [ALB (frozen or chilled)]	71,730
030459 [TUN (fresh or chilled meat)†]	4,935
030344 [BET (frozen)]	782
030343 [SKJ (frozen)]	743
030341 [ALB (frozen)]	54
	45,324,936

Figure 6-38: Share of tuna exports value (% and million USD) by product for Madagascar in 2017. Source UN ComTrade (2019) and FAO (2019b)

Value ('000 US$) of tuna exports from Madagascar by commodity type and market destination in 2017

Value (US$)	Year
Product/ Trading partner	2017
030341 [ALB (frozen)]	**54**
France	54
030343 [SKJ (frozen)]	**743**
France	743
030344 [BET (frozen)]	**782**
France	782
030459 [TUN (fresh or chilled meat)¹]	**4,935**
France	4,935
030231 [ALB (frozen or chilled)]	**71,730**
France	71,730
030232 [YFT (fresh or chilled)]	**100,221**
France	100,221
030234 [BET (fresh or chilled)]	**117,263**
France	117,263
030449 [TUN (fresh or chilled fillets)¹]	**247,425**
Mauritius	14,486
France	232,939
030342 [YFT (frozen)]	**4,706,334**
France	328
Côte d'Ivoire	980,825
Spain	3,725,181
160414 [SKJ (canned)]	**40,075,449**
Netherlands	2,575,367
Rest of the World	3,348,257
Italy	3,431,428
Belgium	3,606,482
France	11,243,642
Spain	15,870,273
Grand Total	**45,324,936**

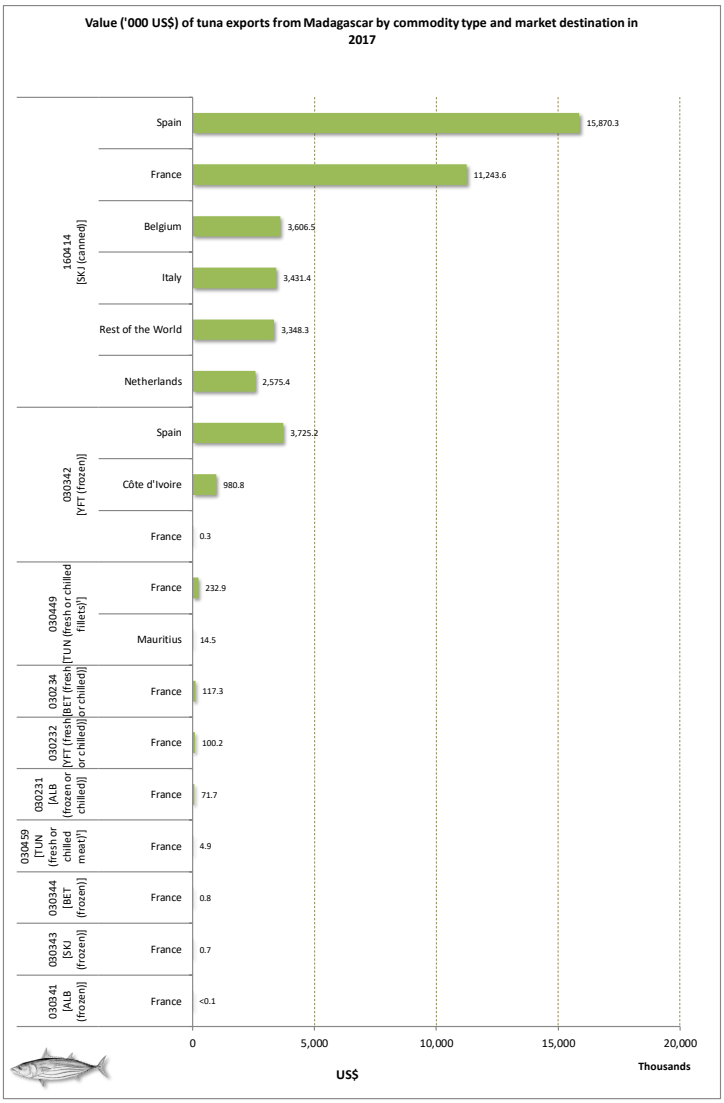


Figure 6-39: Tuna exports value (USD) for Madagascar in 2017 by product and market destination. Source UN ComTrade (2019)

6.3.5.3 Average prices of tuna exports

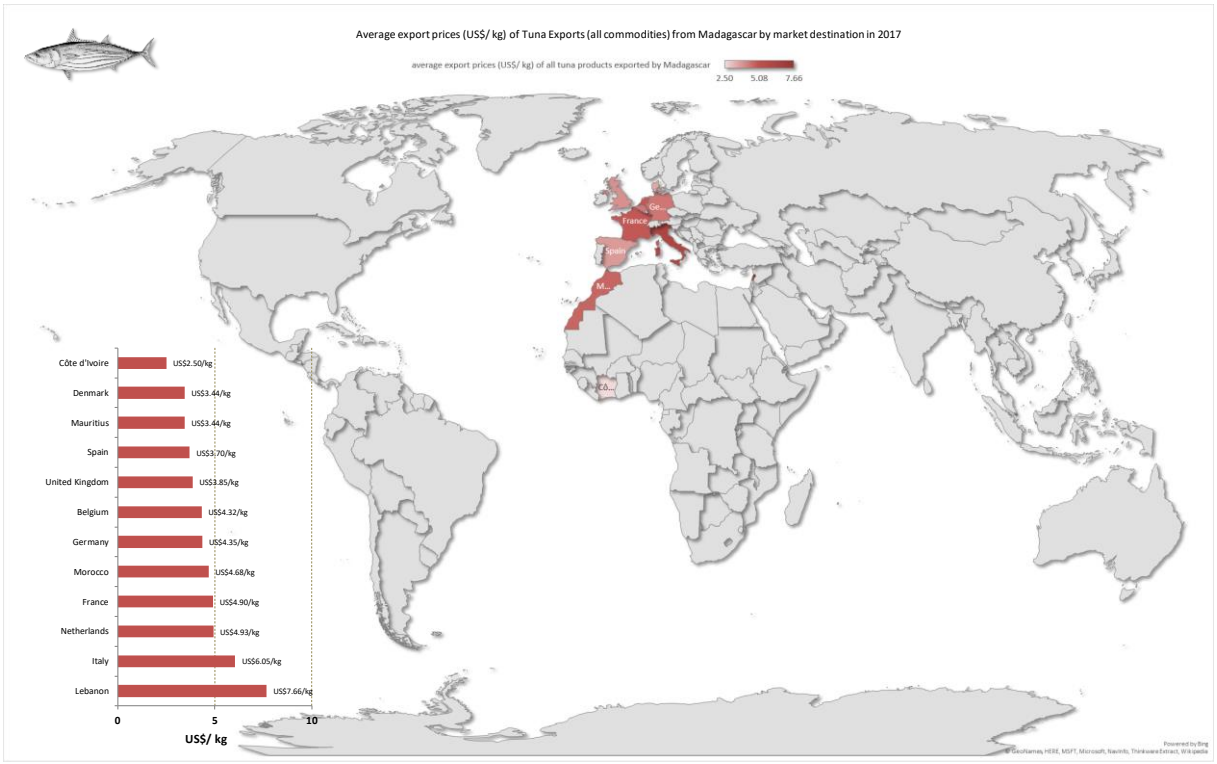


Figure 6-40: Geographic distribution by market destination of the average price of tuna exports for Madagascar and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

Average price (US$/ kg) of tuna exports from Madagascar by commodity type and market destination in 2017

Average of Average price	Year
Product/ Trading partner	2017
030342 [YFT (frozen)]	**2.61**
Spain	2.39
Côte d'Ivoire	2.50
France	2.93
030341 [ALB (frozen)]	**3.00**
France	3.00
030344 [BET (frozen)]	**3.29**
France	3.29
030343 [SKJ (frozen)]	**3.91**
France	3.91
030231 [ALB (frozen or chilled)]	**4.02**
France	4.02
030459 [TUN (fresh or chilled meat)¹]	**4.84**
France	4.84
160414 [SKJ (canned)]	**4.88**
Belgium	4.32
France	4.53
Rest of the World	4.80
Netherlands	4.93
Spain	5.01
Italy	6.05
030234 [BET (fresh or chilled)]	**5.66**
France	5.66
030232 [YFT (fresh or chilled)]	**6.25**
France	6.25
030449 [TUN (fresh or chilled fillets)¹]	**7.02**
Mauritius	3.44
France	10.59
Average	**4.62**

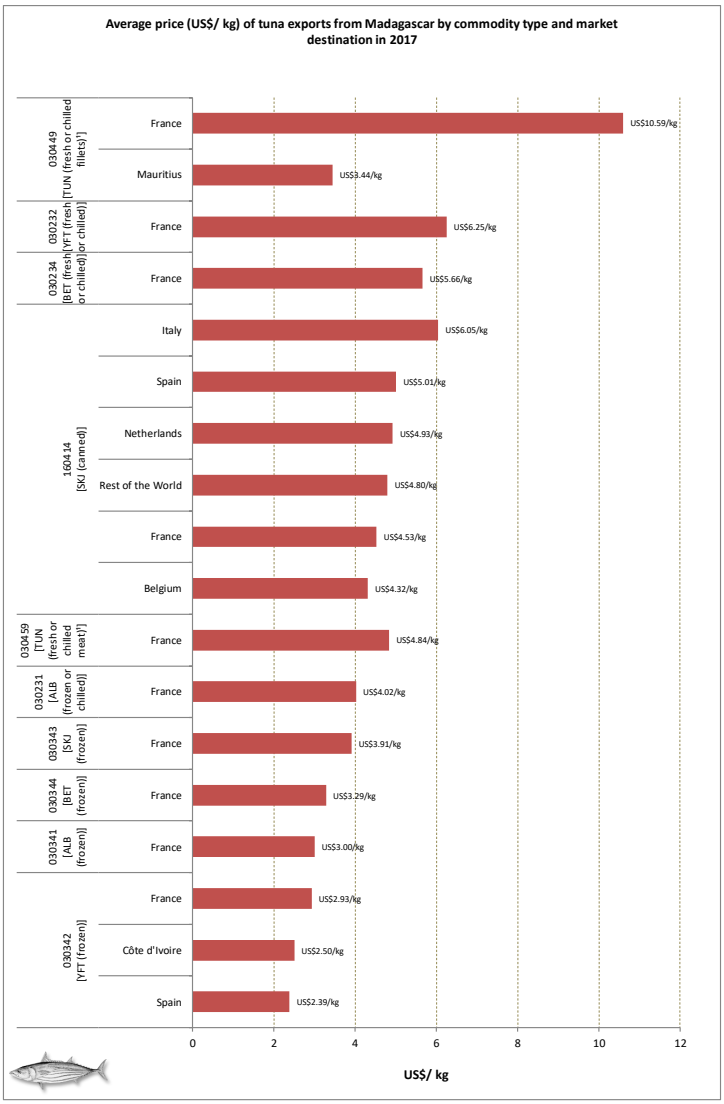


Figure 6-41: Average price of tuna exports (USD / kg) for Madagascar in 2017 by product and market destination. Source UN ComTrade (2019)

6.3.5.4 Exports tariff for main tuna products exported by Madagascar

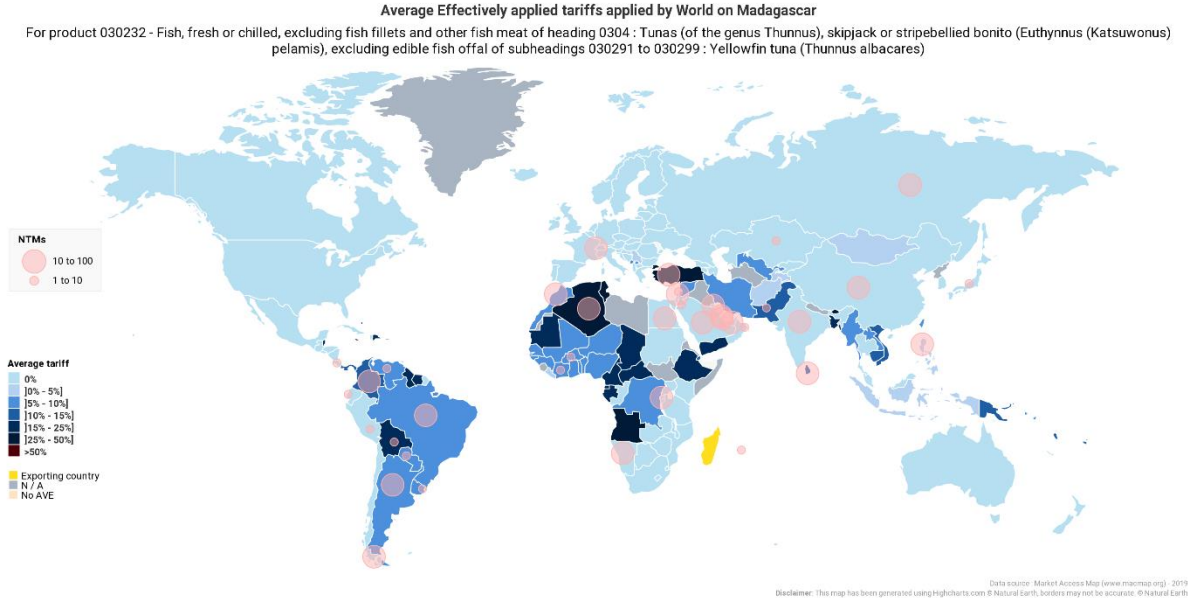


Figure 6-42: Tuna exports tariffs and NTMs faced by Madagascar on the International markets for commodity: 30232 - Yellowfin tuna (fresh or chilled). Source: ITC (2019)

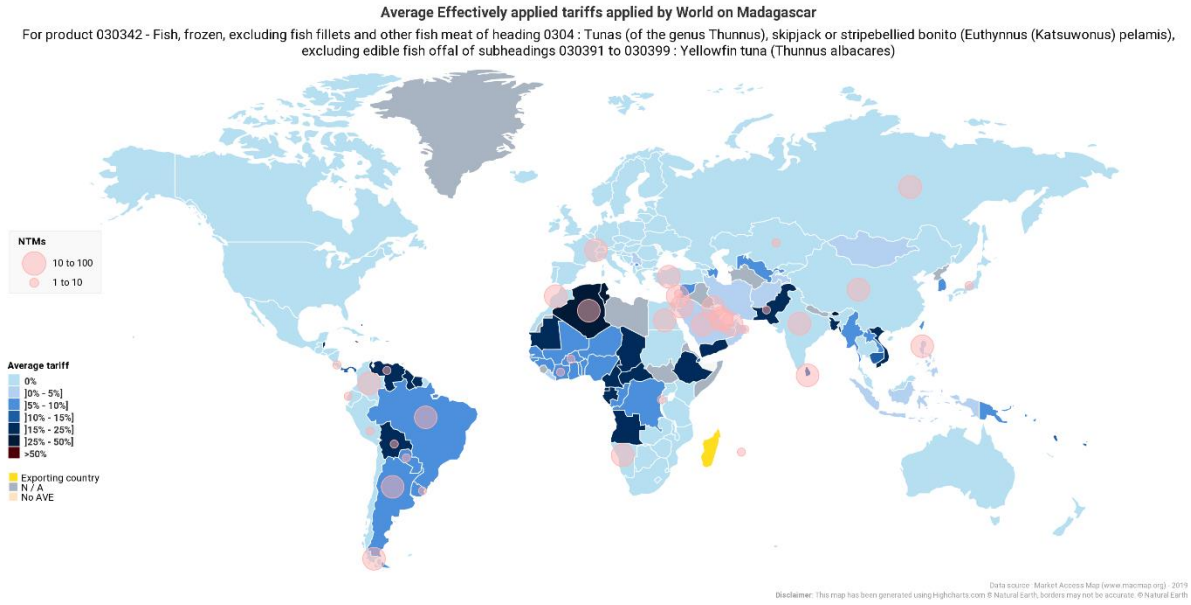


Figure 6-43: Tuna exports tariffs and NTMs faced by Madagascar on the International markets for commodity: 30342 - Yellowfin tuna (frozen). Source: ITC (2019)

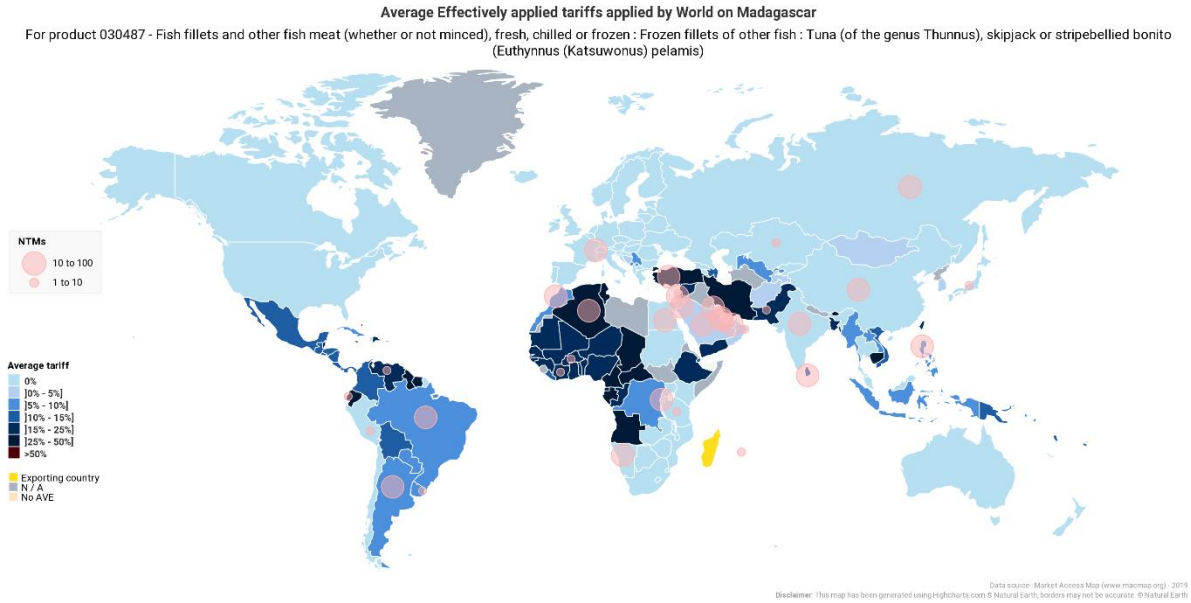


Figure 6-44: Tuna exports tariffs and NTMs faced by Madagascar on the International markets for commodity: 30487 - Skipjack tuna (frozen fillets). Source: ITC (2019)

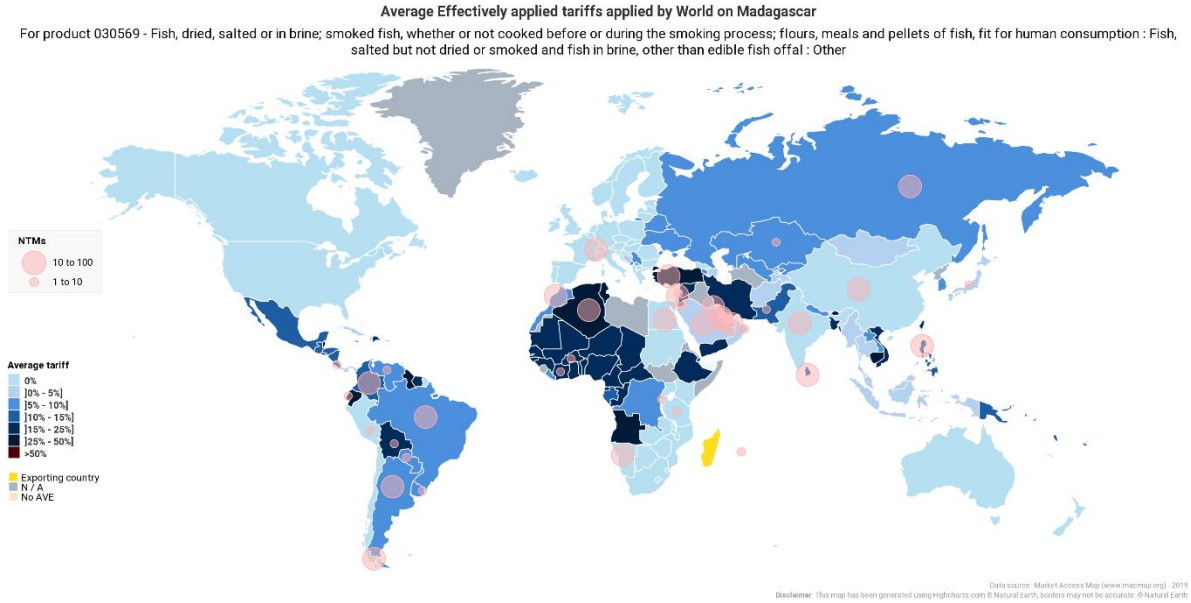


Figure 6-45: Tuna exports tariffs and NTMs faced by Madagascar on the International markets for commodity: 30569 - Tunas nei (salted). Source: ITC (2019)

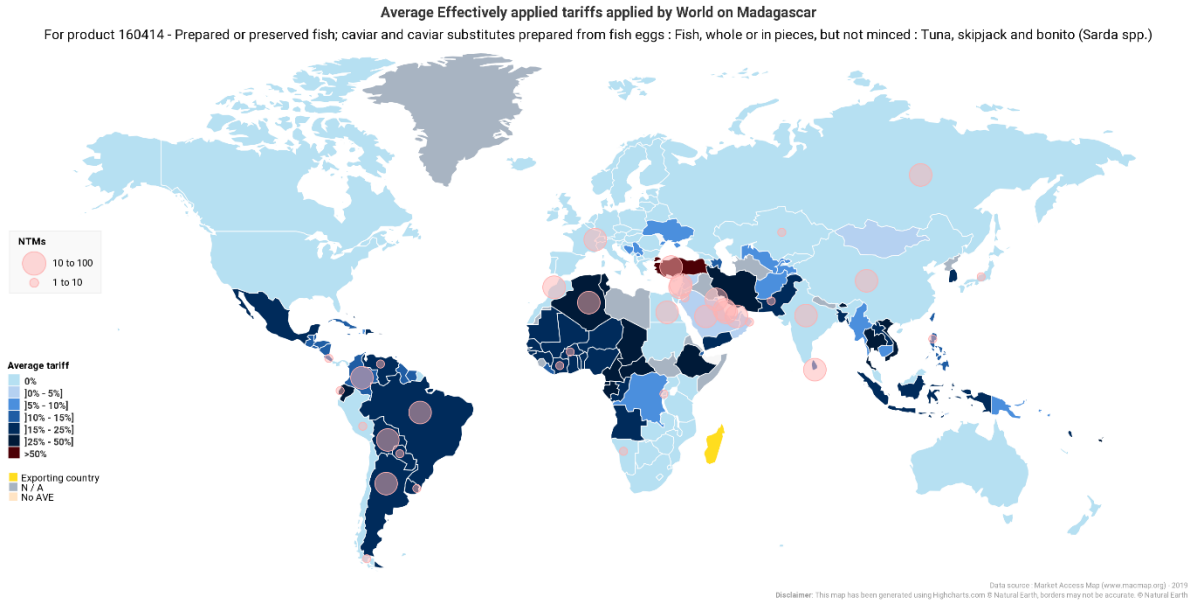


Figure 6-46: Tuna exports tariffs and NTMs faced by Madagascar on the International markets for commodity: 160414 - Skipjack tuna (canned). Source: ITC (2019)

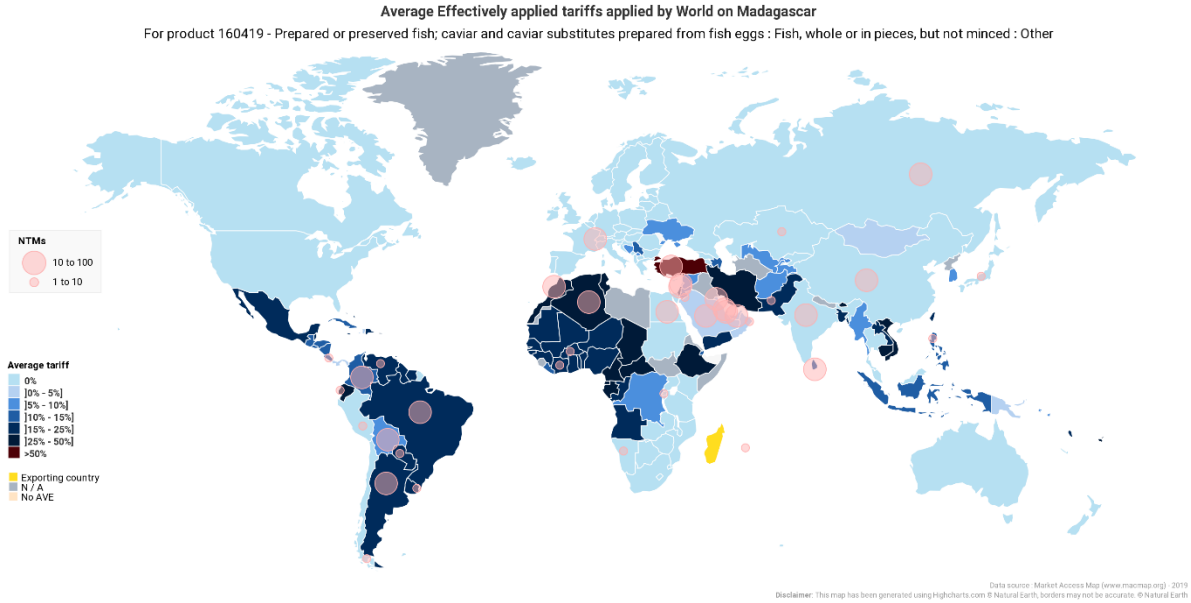


Figure 6-47: Tuna exports tariffs and NTMs faced by Madagascar on the International markets for commodity: 160419 - Tunas nei (prep minced). Source: ITC (2019)

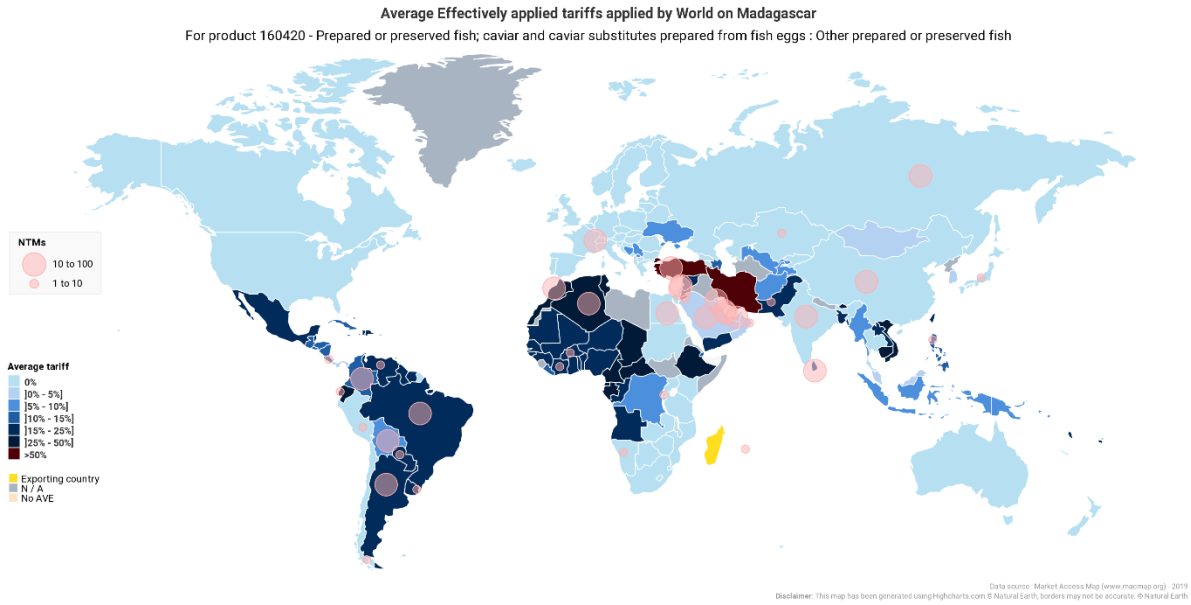


Figure 6-48: Tuna exports tariffs and NTMs faced by Madagascar on the International markets for commodity: 160420 - Tunas nei (prep not minced). Source: ITC (2019)

6.4 The Maldives

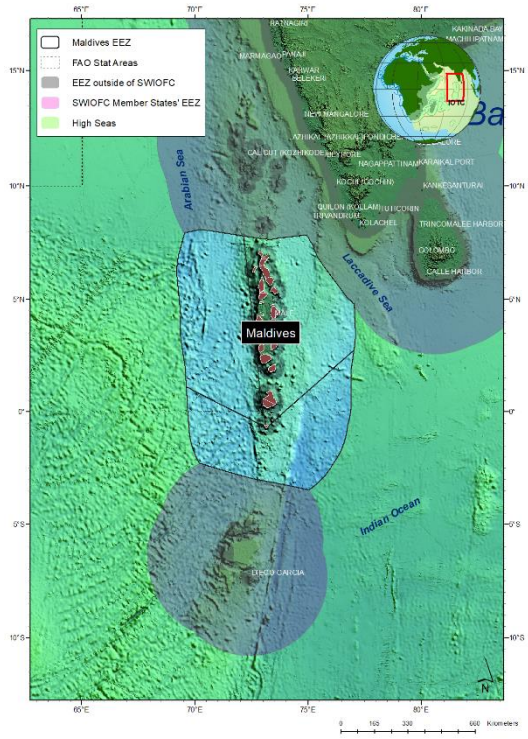


Figure 6-49: Maldives EEZ and surrounding waters.

The Maldives is composed of 26 ring-shaped atolls, which are made up of 1,190 coral islands. It's known for its beaches, blue lagoons and extensive reefs. The capital, Malé, has a busy fish market and restaurants. The closest neighbours to the Maldives are India, Sri Lanka and the Laccadives Islands. There are around 200 islands which are inhabited, 89 islands used exclusively as tourist resorts and the rest of the islands are uninhabited and mostly used for industrial and agricultural purposes. The 1 190 islands are grouped into 20 atolls for administrative purposes. The islands are scattered over an area of 750 km from north to south and 120 km from east to west covering around 90 000 sq km and about 99% of the country's territory consists of ocean. The fisheries sector has traditionally been the major contributor to the country's economy. Nevertheless, since 1978, the fisheries contribution to the GDP has shown a continual declining trend. This is mainly due to the introduction and rapid growth of the tourism sector in the economy and diversification of the fishery related businesses into other economic sectors such as export and labour. However, "the fisheries sector's contribution to the GDP has remained significant, both in terms of employment, value added production and export returns". Skipjack tuna is considered to be the most important species in the Maldivian fishery. It contributes about 65-75% of the total fish catch, followed by 10-17% of yellowfin tuna. The two species are caught predominantly by pole and line fishing. (FAO, 2018).

In 2017 there were around 17 589 fishers employed in the fisheries sector engaged in skipjack, yellowfin and reef fisheries. The sector is also the main domestic food provider – Maldives having perhaps the highest per capita fish consumption in the world at 142 kg in 2016.

In the past ten years, the fisheries sector has modernized and expanded, with new and larger vessels catching tunas (mainly skipjack and yellowfin, which, together represent over 90 percent of total catch). The annual fish harvest had been increasing up to a peak of over 186,000 tonnes in 2005 and 2006. Since then, annual fish catch declined considerably reaching the minimum level in 2009 with 117,000 tonnes, but increasing again since then up to 143,300 tonnes in 2017. Correspondingly, both number of fishers and number of boat actives reduced significantly. (FAO, 2018)

6.4.1 Fisheries Access Agreements

Maldives do not issue license to foreign fishing vessels as per government policy and has not signed any foreign access agreement.

However, in 2017, South Africa who recently joined the IOTC signed a Fisheries agreement with the Maldives. The voluntary MoU stipulates that South Africa and the Maldives will work together to improve the livelihood of their fishing communities and the management of tuna fisheries in the Indian Ocean. (SA news, 2017)

In the MoU, the governments of South Africa and Maldives agree among others to:

- Support activities that will ensure an improved understanding of the socio-economic conditions of the fishery and fishing communities;
- Work together with other South Western Indian Ocean countries in the Indian Ocean Tuna Commission and South West Indian Ocean Fisheries Commission to cooperate and coordinate

in the development and implementation of the Conservation and Management Measures;

- Support each other on the catch allocation criteria discussions in the Indian Ocean and work together to establish a sound allocation mechanism for Indian Ocean in the near future;
- Support each other on capacity building activities, especially on areas where each country has gained further knowledge;
- Exchange information with regard to activities of mutual interest. The parties will nominate a focal person or persons from within their respective organisations to coordinate this information exchange;

6.4.2 Tuna Production

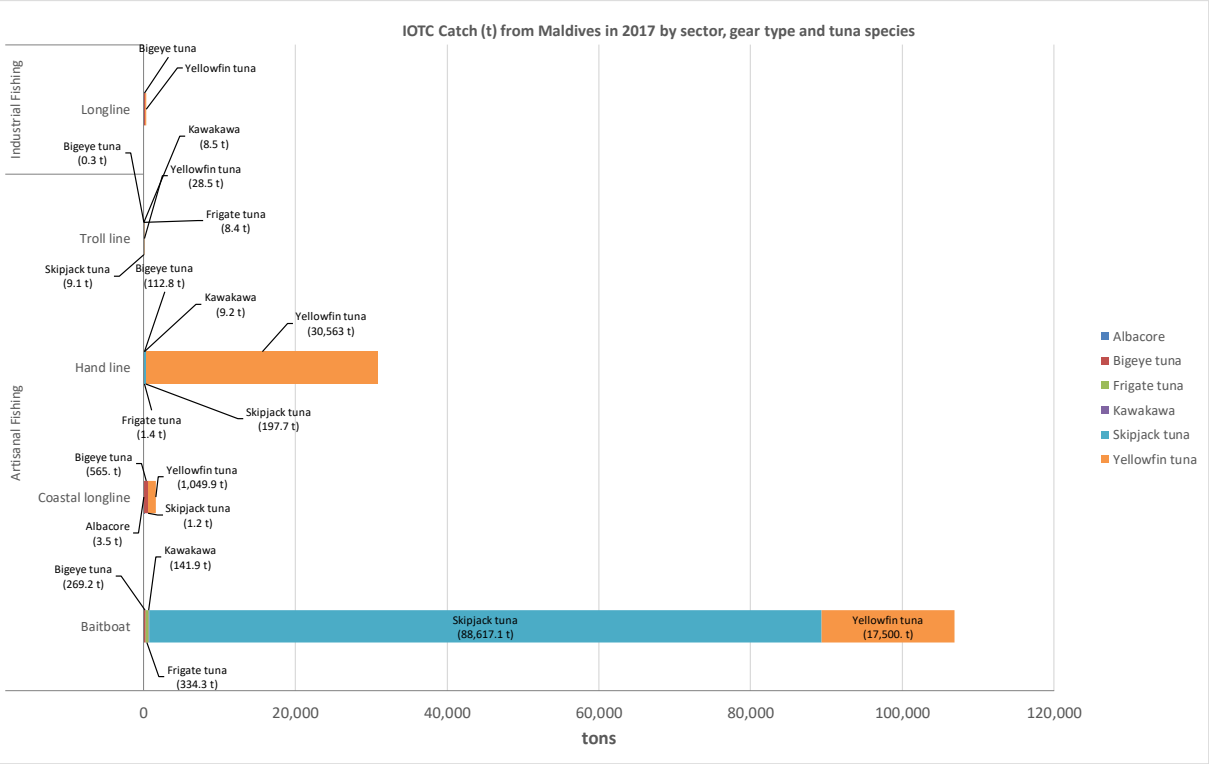


Figure 6-50: Tuna Catch in the IOTC area by the Maldives in 2017 by species and fishing method. Source (IOTC, 2019)

6.4.3 IUU Tuna Landings

Table 6-6: Reported and unreported tuna landings (Mt and USD) for the Maldives by sector, method and tuna species in 2014. Source (SAU, 2019)

Tuna Landings						
	Reported		Unreported			
Country/sector/method/ species	Catch (metric tonnes)	Landed value (US$)[1]	Catch (metric tonnes)	Landed value (US$)[1]	Total Catch (metric tonnes)	Total Landed value (US$)[1]
Maldives	**25,960.4**	**67,932,894.3**	**12,201.6**	**31,690,487.3**	**38,162.0**	**99,623,381.5**
Artisanal			**5,477.6**	**16,039,423.4**	**5,477.6**	**16,039,423.4**
small scale lines			5,477.6	16,039,423.4	5,477.6	16,039,423.4
SKJ			2,219.0	4,624,307.1	2,219.0	4,624,307.1
YFT			3,258.7	11,415,116.3	3,258.7	11,415,116.3
Industrial	**1,655.8**	**3,504,512.5**			**1,655.8**	**3,504,512.5**
lines	561.6	994,032.0			561.6	994,032.0
FRI	260.4	460,908.0			260.4	460,908.0
BLT	260.4	460,908.0			260.4	460,908.0
DOT	40.8	72,216.0			40.8	72,216.0
longline	1,093.8	2,507,740.6			1,093.8	2,507,740.6
ALB	1.7	4,438.9			1.7	4,438.9
BET	860.6	1,687,616.2			860.6	1,687,616.2
BOP	6.7	48,879.7			6.7	48,879.7
TUX	11.9	21,149.2			11.9	21,149.2
YFT	212.9	745,656.7			212.9	745,656.7
purse seine	0.4	2,739.9			0.4	2,739.9
BOP	0.4	2,739.9			0.4	2,739.9
Subsistence	**24,304.6**	**64,428,381.8**	**6,724.0**	**15,651,063.9**	**31,028.6**	**80,079,445.7**
subsistence fishing gear	24,304.6	64,428,381.8	6,724.0	15,651,063.9	31,028.6	80,079,445.7
FRI	65.1	115,227.0	117.1	207,208.2	182.2	322,435.2
BET	466.8	915,394.8	63.7	124,921.1	530.5	1,040,315.9
BLT	65.1	115,227.0	117.1	207,208.2	182.2	322,435.2
DOT	10.2	18,054.0	32.9	58,212.0	43.1	76,266.0
KAW	177.6	314,352.0	120.6	213,478.0	298.2	527,830.0
SKJ	13,699.6	28,549,966.4	5,026.8	10,475,885.0	18,726.4	39,025,851.4
YFT	9,820.2	34,400,160.6	1,245.8	4,364,151.4	11,066.0	38,764,312.0
Grand Total	**25,960.4**	**67,932,894.3**	**12,201.6**	**31,690,487.3**	**38,162.0**	**99,623,381.5**

[1] value estimated applying 2017 ex-vessel prices from Poseidon (2019)

6.4.4 Volume of Tuna processed

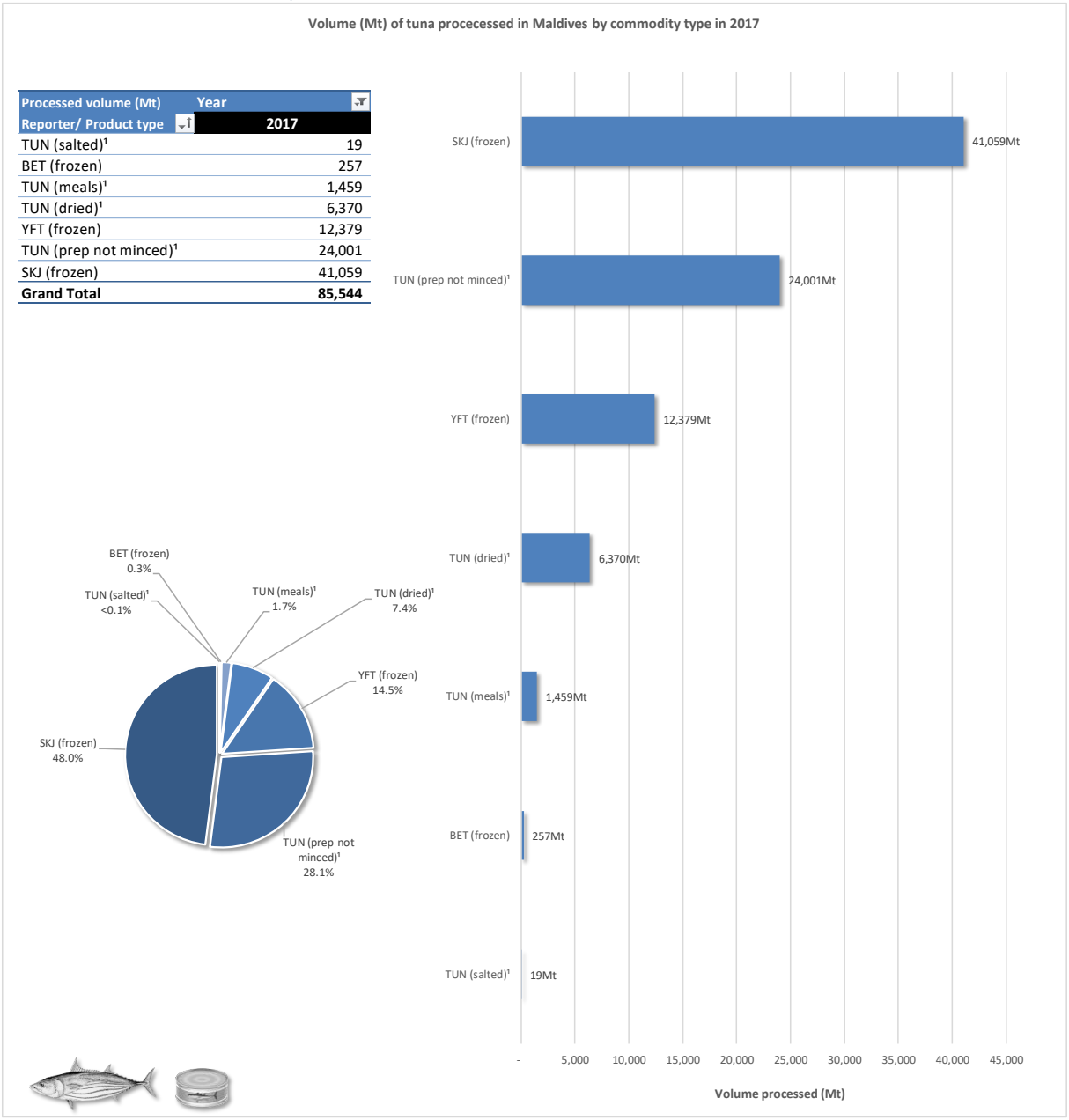
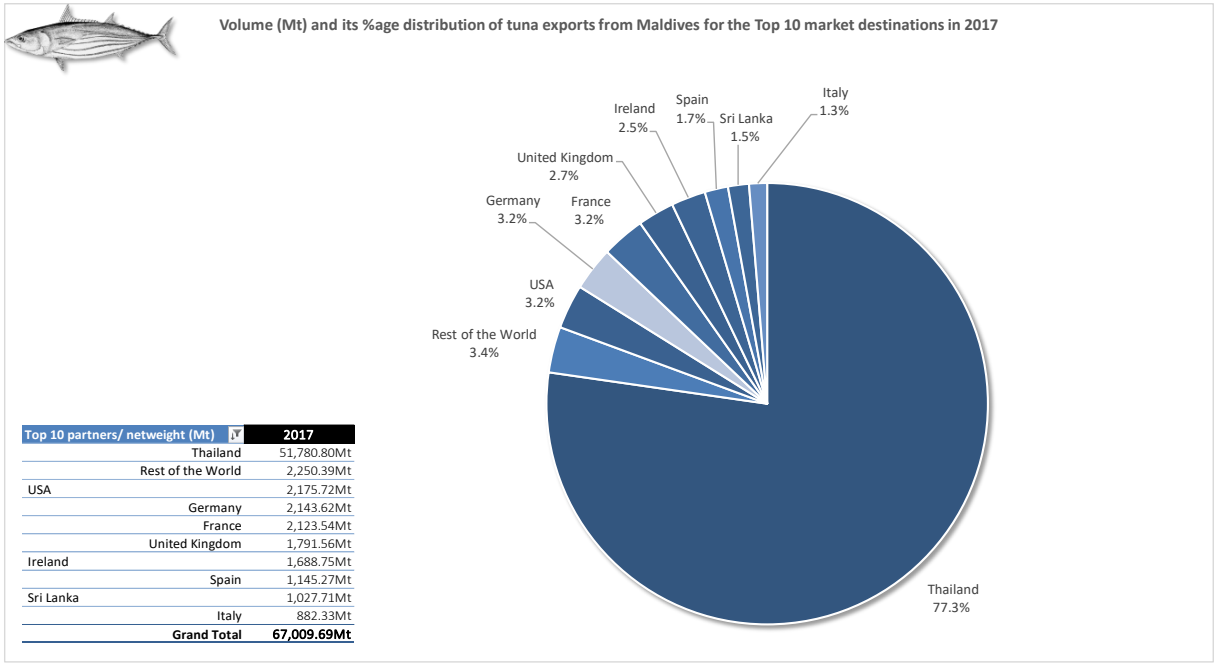


Figure 6-51: Tuna processed (metric tonnes) in the Maldives in 2017 by product type. Source FAO (2019b)

6.4.5 Tuna Export Markets

6.4.5.1 Tuna exports volume



Top 10 partners/ netweight (Mt)	2017
Thailand	51,780.80Mt
Rest of the World	2,250.39Mt
USA	2,175.72Mt
Germany	2,143.62Mt
France	2,123.54Mt
United Kingdom	1,791.56Mt
Ireland	1,688.75Mt
Spain	1,145.27Mt
Sri Lanka	1,027.71Mt
Italy	882.33Mt
Grand Total	**67,009.69Mt**

Figure 6-52: Share of tuna exports volume (% and Metric tonnes) between the top 10 market destination for the Maldives and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

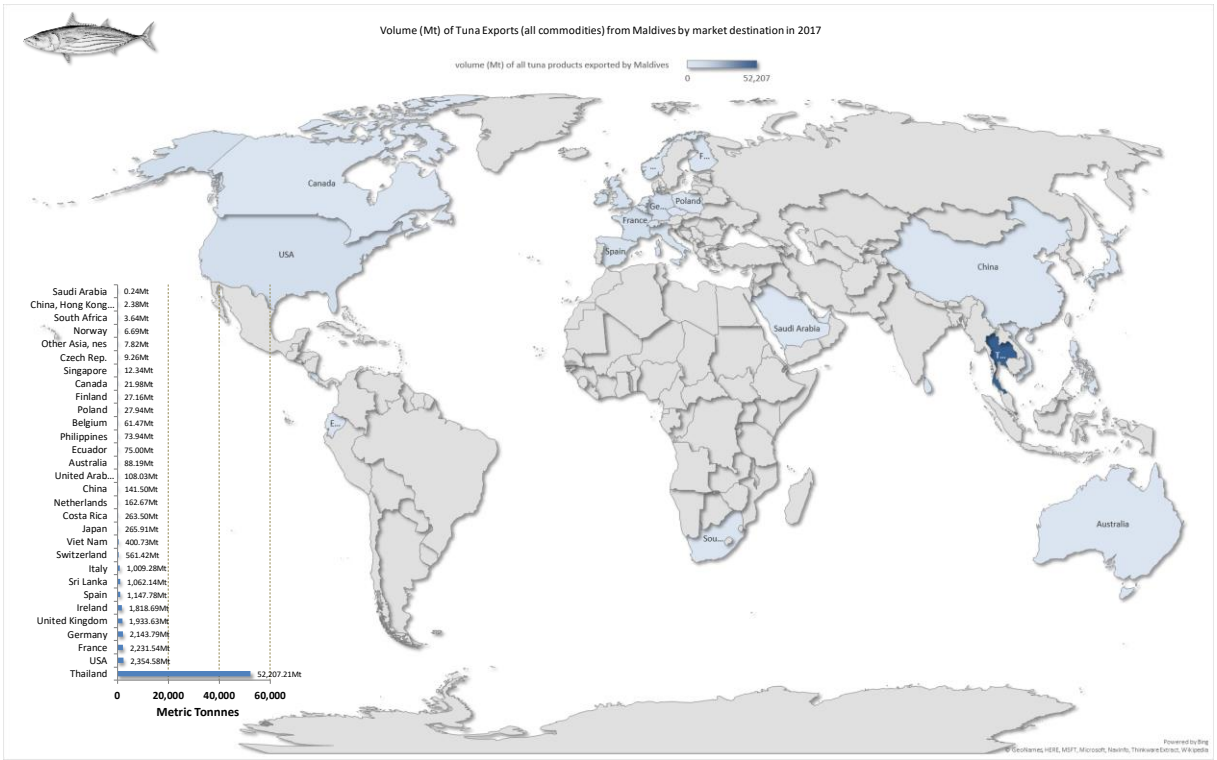


Figure 6-53: Geographic distribution by market destination of tuna exports volume (Mt) for the Maldives and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

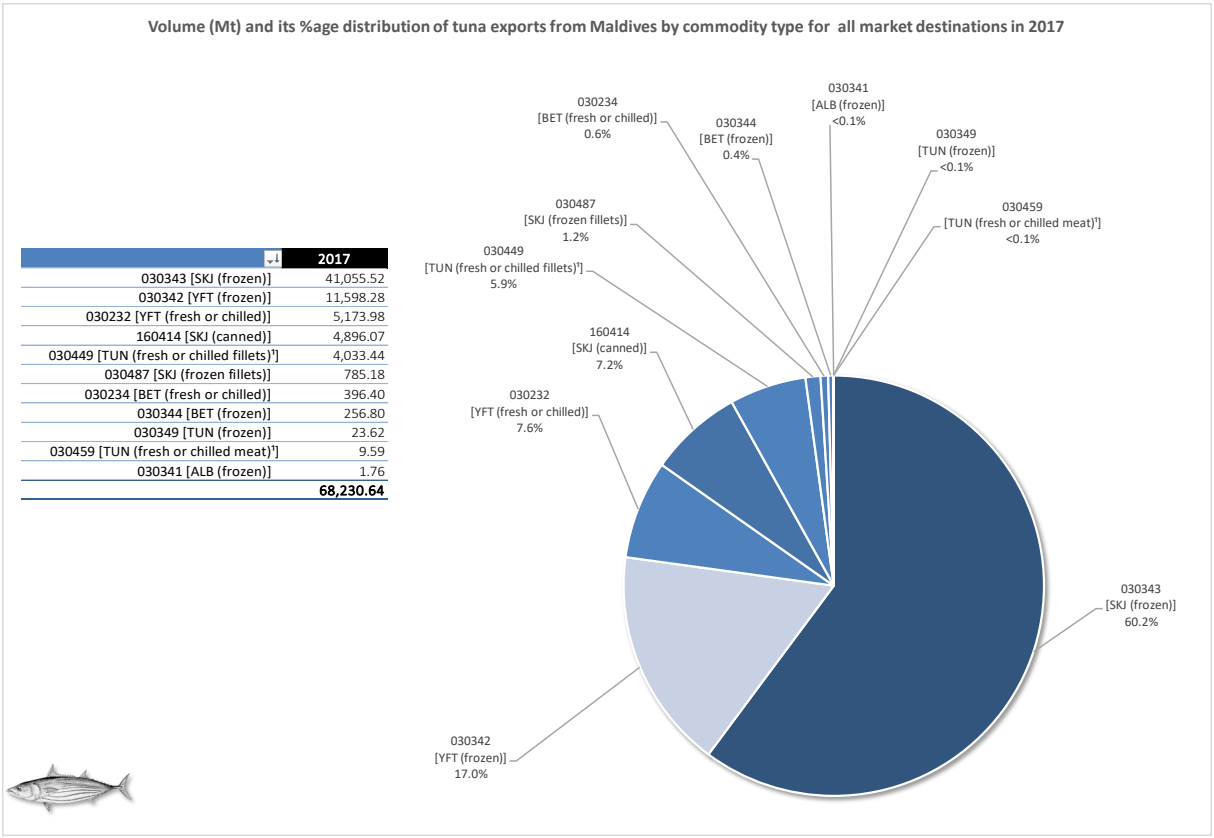


Figure 6-54: Share of tuna exports volume (% and metric tonnes) by product for the Maldives in 2017. Source UN ComTrade (2019) and FAO (2019b)

Volume (Mt) of tuna exports from Maldives by commodity type and market destination in 2017

Netweight (Mt) Product/ Trading partner	Year 2017
030341 [ALB (frozen)]	**1.76**
Viet Nam	1.76
030459 [TUN (fresh or chilled meat)[1]]	**9.59**
Rest of the World	0.16
China	0.30
Germany	0.39
Italy	1.06
USA	2.51
France	5.18
030349 [TUN (frozen)]	**23.62**
Viet Nam	4.39
Other Asia, nes	5.64
Sri Lanka	13.59
030344 [BET (frozen)]	**256.80**
Viet Nam	22.36
Thailand	107.63
Japan	126.82
030234 [BET (fresh or chilled)]	**396.40**
Rest of the World	6.34
France	7.74
Japan	11.82
Sri Lanka	20.85
Thailand	142.28
USA	207.37
030487 [SKJ (frozen fillets)]	**785.18**
France	97.44
USA	102.72
China	107.58
Italy	117.12
Rest of the World	150.50
Spain	209.82
030449 [TUN (fresh or chilled fillets)[1]]	**4,033.44**
Switzerland	249.92
United Kingdom	451.87
Rest of the World	480.14
Italy	764.16
Germany	851.48
France	1,235.87
160414 [SKJ (canned)]	**4,896.07**
USA	192.66
Rest of the World	261.58
Switzerland	294.33
Germany	1,119.05
United Kingdom	1,339.69
Ireland	1,688.75
030232 [YFT (fresh or chilled)]	**5,173.98**
Germany	172.69
Spain	392.80
France	777.30
Sri Lanka	993.27
Rest of the World	1,232.31
USA	1,605.61
030342 [YFT (frozen)]	**11,598.28**
USA	64.85
Costa Rica	95.50
Rest of the World	119.37
Spain	288.65
Viet Nam	295.96
Thailand	10,733.96
030343 [SKJ (frozen)]	**41,055.52**
Viet Nam	4.58
Spain	254.01
Thailand	40,796.94
Grand Total	**68,230.64**

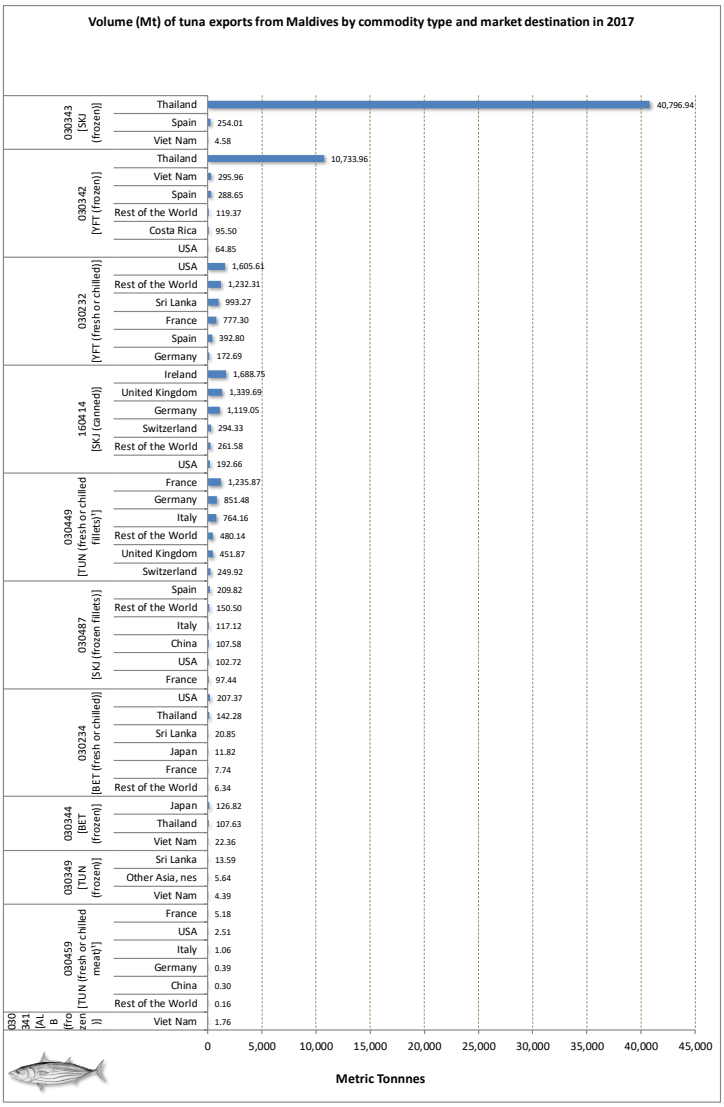
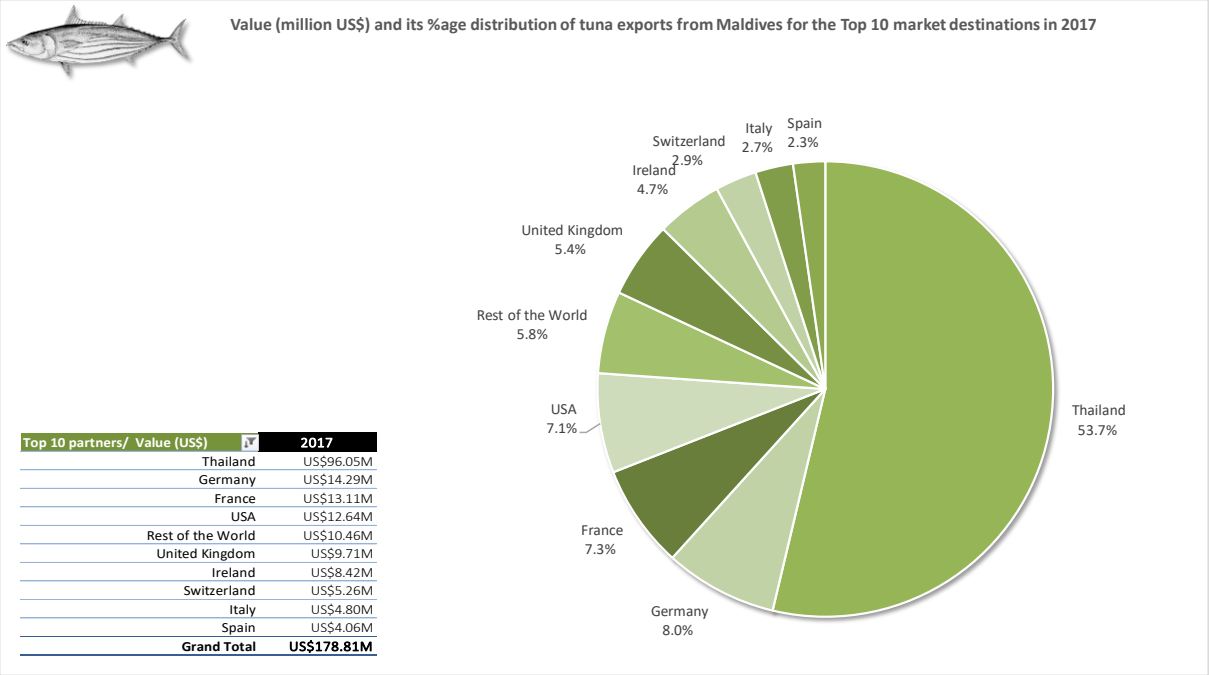


Figure 6-55: Tuna exports volume (Mt) for the Maldives in 2017 by product and market destination. Source UN ComTrade (2019)

6.4.5.2 Tuna exports value

All exports values are expressed c.i.f.



Top 10 partners/ Value (US$)	2017
Thailand	US$96.05M
Germany	US$14.29M
France	US$13.11M
USA	US$12.64M
Rest of the World	US$10.46M
United Kingdom	US$9.71M
Ireland	US$8.42M
Switzerland	US$5.26M
Italy	US$4.80M
Spain	US$4.06M
Grand Total	**US$178.81M**

Figure 6-56: Share of tuna exports value (% and million USD) between the top 10 market destination for the Maldives and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

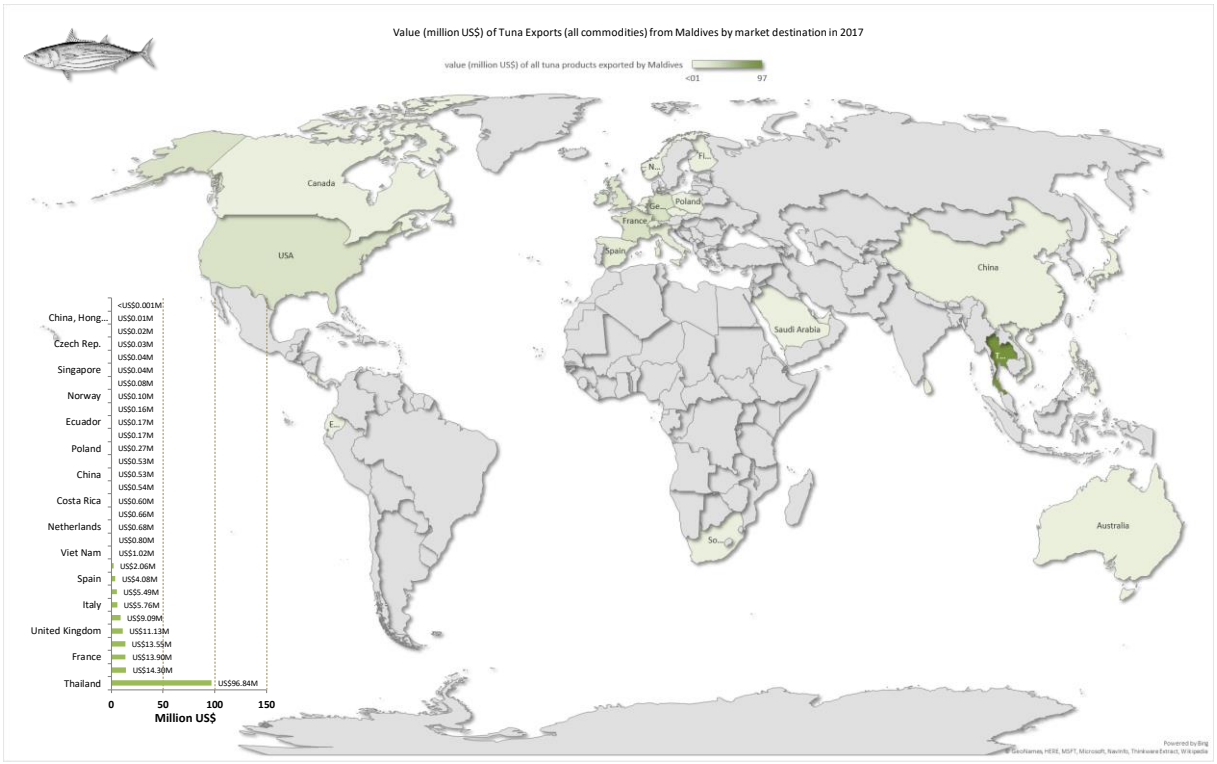
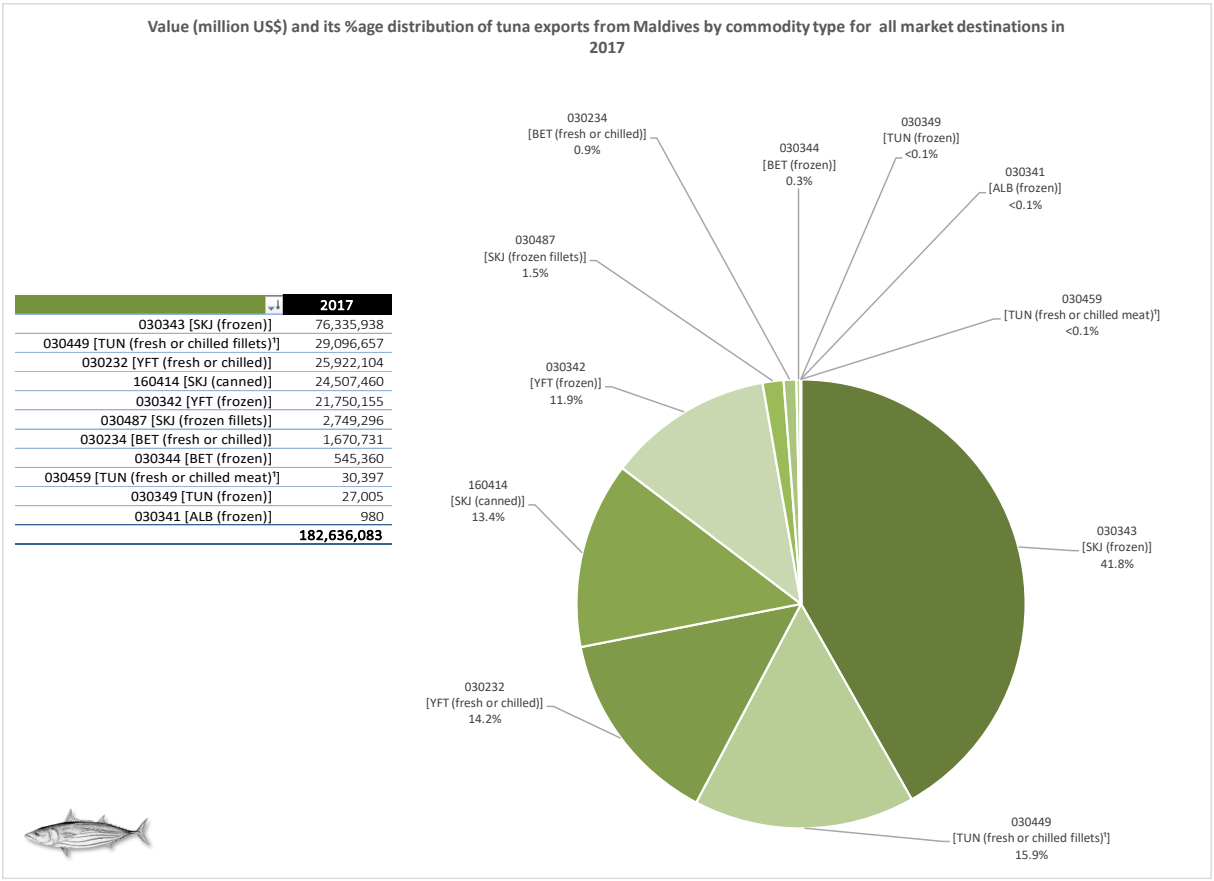


Figure 6-57: Geographic distribution by market destination of tuna exports value (million USD) for the Maldives and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)



	2017
030343 [SKJ (frozen)]	76,335,938
030449 [TUN (fresh or chilled fillets)¹]	29,096,657
030232 [YFT (fresh or chilled)]	25,922,104
160414 [SKJ (canned)]	24,507,460
030342 [YFT (frozen)]	21,750,155
030487 [SKJ (frozen fillets)]	2,749,296
030234 [BET (fresh or chilled)]	1,670,731
030344 [BET (frozen)]	545,360
030459 [TUN (fresh or chilled meat)¹]	30,397
030349 [TUN (frozen)]	27,005
030341 [ALB (frozen)]	980
	182,636,083

Figure 6-58: Share of tuna exports value (% and million USD) by product for the Maldives in 2017. Source UN ComTrade (2019) and FAO (2019b)

Value ('000 US$) of tuna exports from Maldives by commodity type and market destination in 2017

Value (US$)	Year
Product/ Trading partner	2017
030341 [ALB (frozen)]	**980**
Viet Nam	980
030349 [TUN (frozen)]	**27,005**
Viet Nam	4,386
Other Asia, nes	5,646
Sri Lanka	16,973
030459 [TUN (fresh or chilled meat)¹]	**30,397**
Rest of the World	592
Germany	1,076
China	1,272
Italy	3,742
USA	6,819
France	16,896
030344 [BET (frozen)]	**545,360**
Viet Nam	41,223
Thailand	163,481
Japan	340,656
030234 [BET (fresh or chilled)]	**1,670,731**
Rest of the World	26,213
Sri Lanka	42,154
France	63,002
Japan	65,253
Thailand	289,237
USA	1,184,872
030487 [SKJ (frozen fillets)]	**2,749,296**
USA	213,528
Rest of the World	315,097
China	447,309
France	516,537
Italy	538,444
Spain	718,381
030342 [YFT (frozen)]	**21,750,155**
USA	176,111
Costa Rica	205,906
Rest of the World	249,534
Spain	659,123
Viet Nam	694,504
Thailand	19,764,977
160414 [SKJ (canned)]	**24,507,460**
USA	1,007,483
Rest of the World	1,457,074
Switzerland	1,716,812
Germany	5,721,823
United Kingdom	6,188,550
Ireland	8,415,718
030232 [YFT (fresh or chilled)]	**25,922,104**
Sri Lanka	1,960,781
Germany	2,019,428
Spain	2,182,471
France	4,166,845
Rest of the World	5,542,605
USA	10,049,974
030449 [TUN (fresh or chilled fillets)¹]	**29,096,657**
Rest of the World	2,868,764
United Kingdom	3,525,573
Switzerland	3,546,134
Italy	4,254,823
Germany	6,552,062
France	8,349,301
030343 [SKJ (frozen)]	**76,335,938**
Viet Nam	2,570
Spain	501,124
Thailand	75,832,244
Grand Total	**182,636,083**

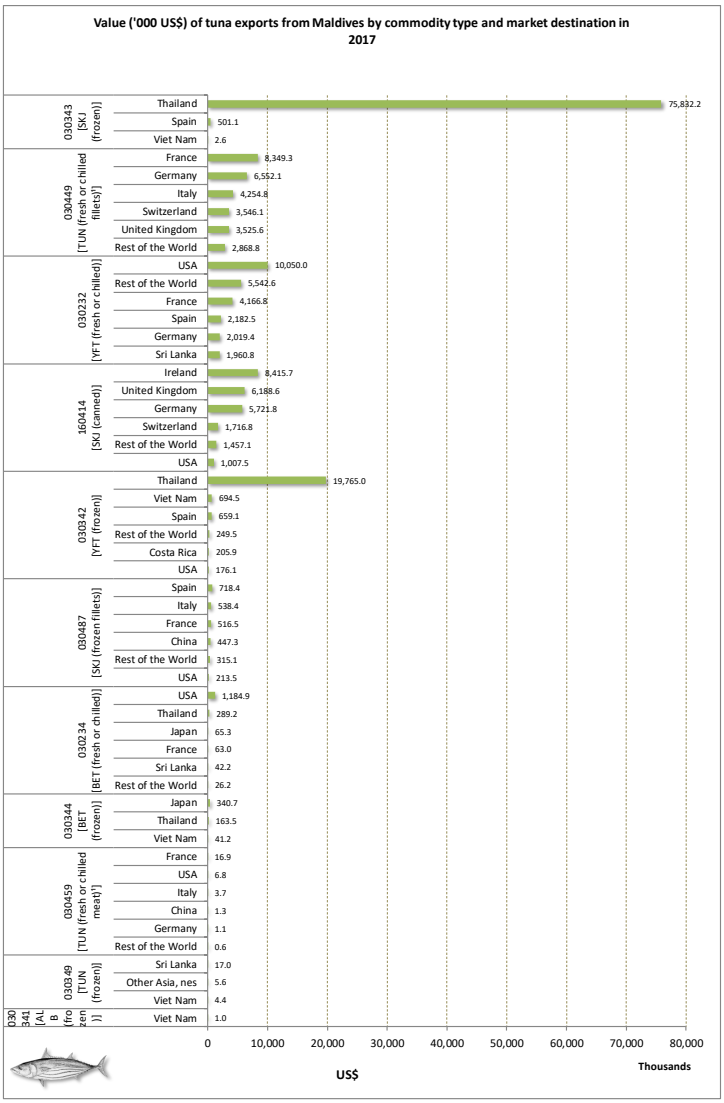


Figure 6-59: Tuna exports value (USD) for the Maldives in 2017 by product and market destination. Source UN ComTrade (2019)

6.4.5.3 Average prices of tuna exports

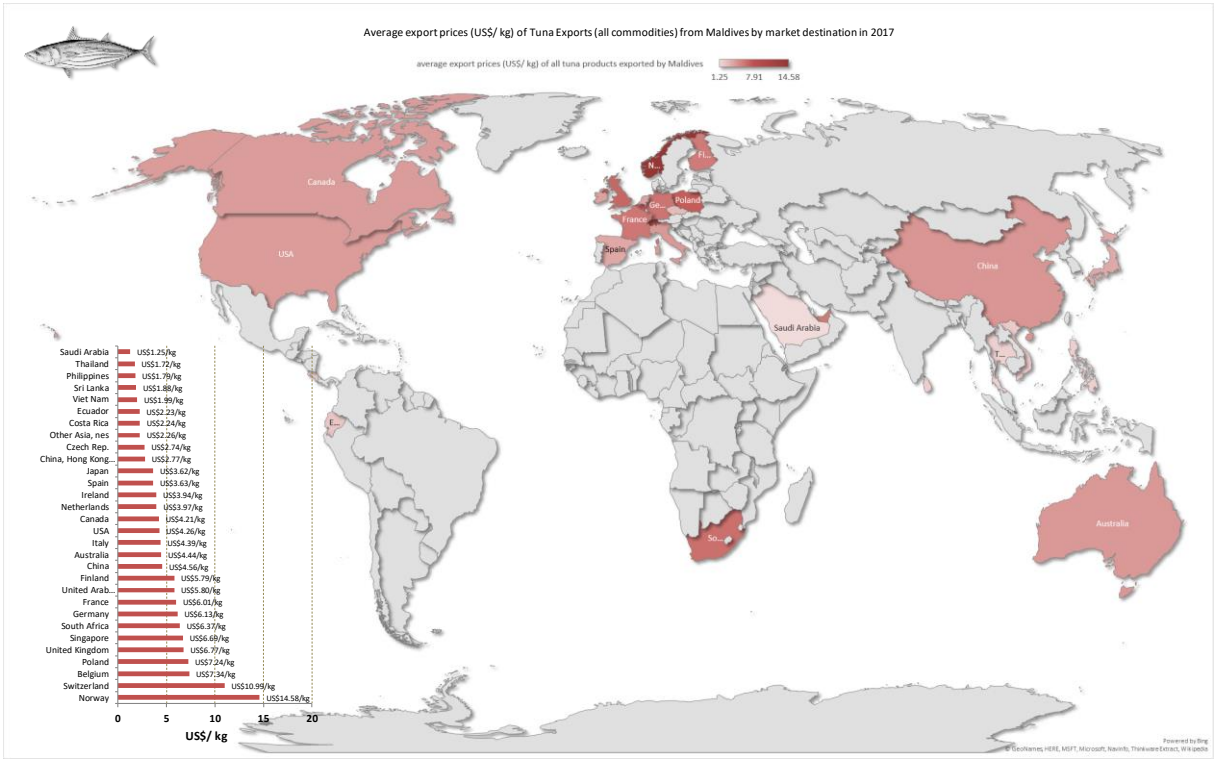


Figure 6-60: Geographic distribution by market destination of the average price of tuna exports for the Maldives and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

Average price (US$/ kg) of tuna exports from Maldives by commodity type and market destination in 2017	
Average of Average price	Year
Product/ Trading partner	2017
030341 [ALB (frozen)]	**0.56**
Viet Nam	0.56
030349 [TUN (frozen)]	**1.08**
Viet Nam	1.00
Other Asia, nes	1.00
Sri Lanka	1.25
030343 [SKJ (frozen)]	**1.46**
Viet Nam	0.56
Thailand	1.86
Spain	1.97
030344 [BET (frozen)]	**2.02**
Thailand	1.52
Viet Nam	1.84
Japan	2.69
030342 [YFT (frozen)]	**2.09**
Thailand	1.84
Rest of the World	1.98
Costa Rica	2.16
Spain	2.28
Viet Nam	2.35
USA	2.72
030487 [SKJ (frozen fillets)]	**3.12**
USA	2.08
Rest of the World	2.68
Spain	3.42
China	4.16
Italy	4.60
France	5.30
030234 [BET (fresh or chilled)]	**3.65**
Sri Lanka	2.02
Thailand	2.03
Rest of the World	2.61
Japan	5.52
USA	5.71
France	8.14
030459 [TUN (fresh or chilled meat)[1]]	**3.71**
USA	2.72
Germany	2.77
France	3.26
Italy	3.54
Rest of the World	4.04
China	4.31
160414 [SKJ (canned)]	**4.89**
United Kingdom	4.62
Rest of the World	4.66
Ireland	4.98
Germany	5.11
USA	5.23
Switzerland	5.83
030232 [YFT (fresh or chilled)]	**5.75**
Sri Lanka	1.97
France	5.36
Spain	5.56
Rest of the World	5.66
USA	6.26
Germany	11.69
030449 [TUN (fresh or chilled fillets)[1]]	**6.15**
Italy	5.57
Rest of the World	5.66
France	6.76
Germany	7.69
United Kingdom	7.80
Switzerland	14.19
Average	**4.38**

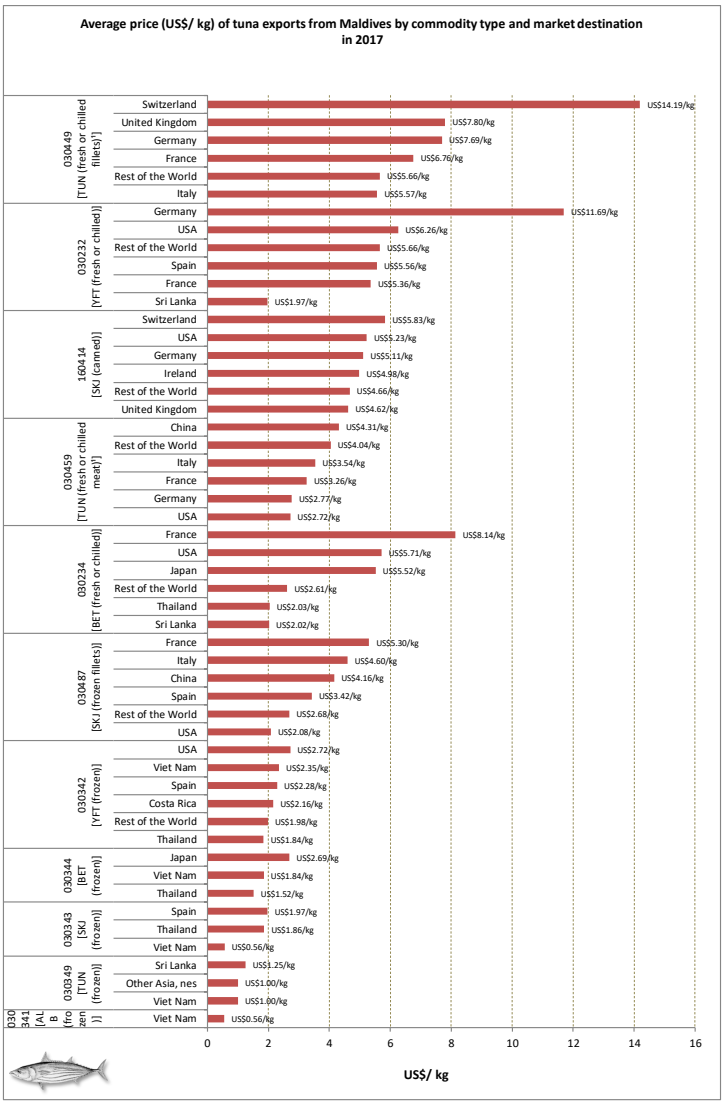


Figure 6-61: Average price of tuna exports (USD / kg) for the Maldives in 2017 by product and market destination. Source UN ComTrade (2019)

6.4.5.4 Exports tariff for main tuna products exported by the Maldives

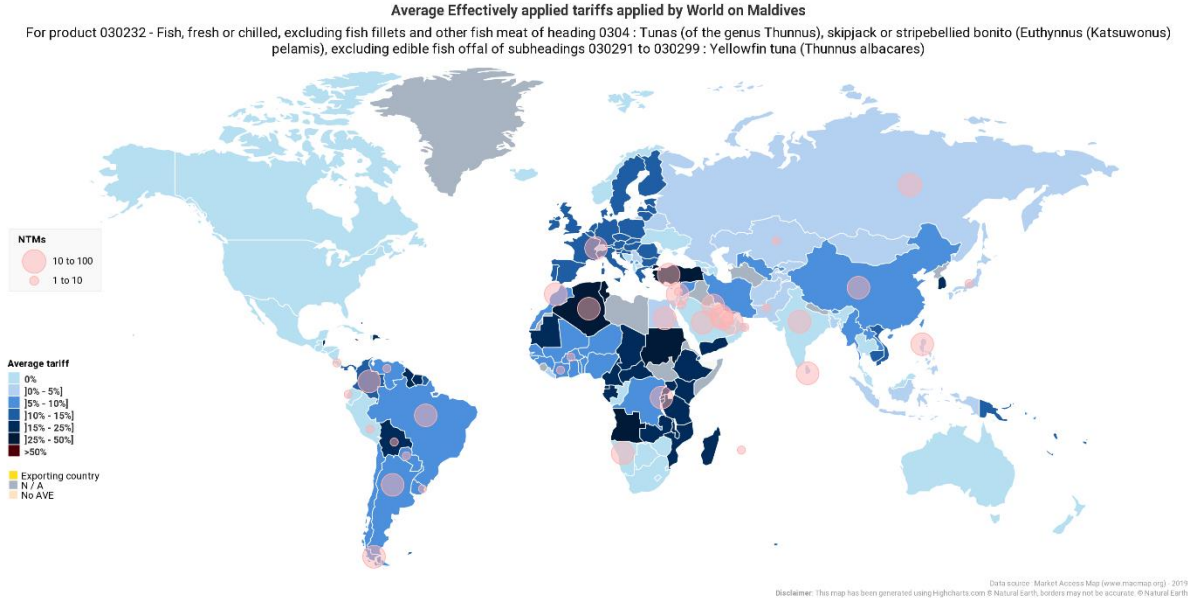


Figure 6-62: Tuna exports tariffs and NTMs faced by the Maldives on the International markets for commodity: 30232 - Yellowfin tuna (fresh or chilled). Source: ITC (2019)

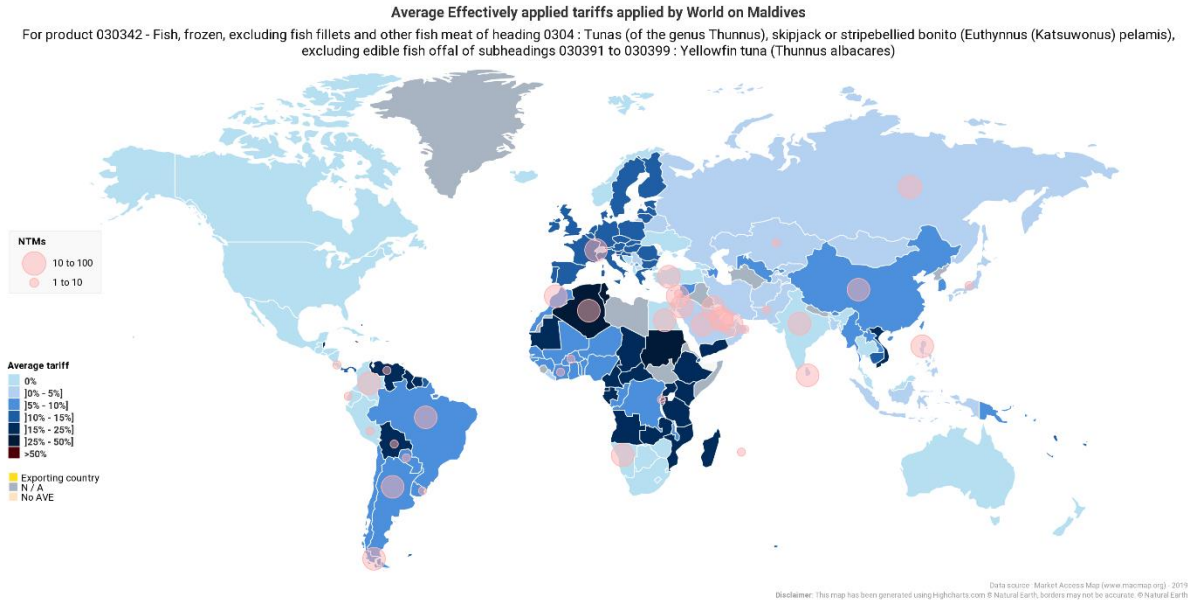


Figure 6-63: Tuna exports tariffs and NTMs faced by the Maldives on the International markets for commodity: 30342 - Yellowfin tuna (frozen). Source: ITC (2019)

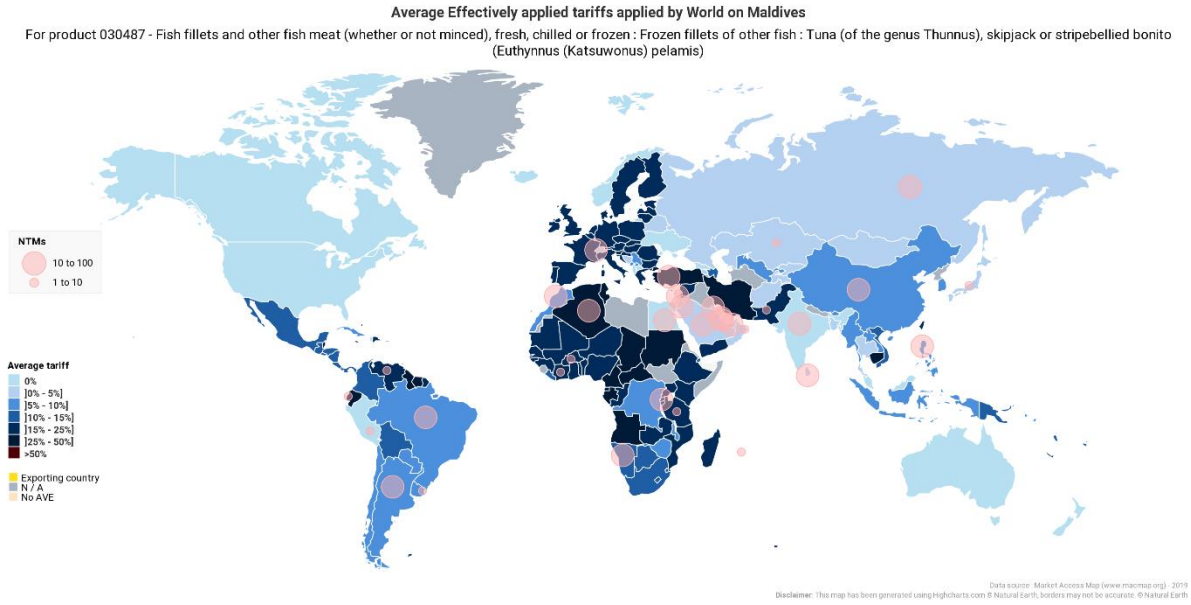


Figure 6-64: Tuna exports tariffs and NTMs faced by the Maldives on the International markets for commodity: 30487 - Skipjack tuna (frozen fillets). Source: ITC (2019)

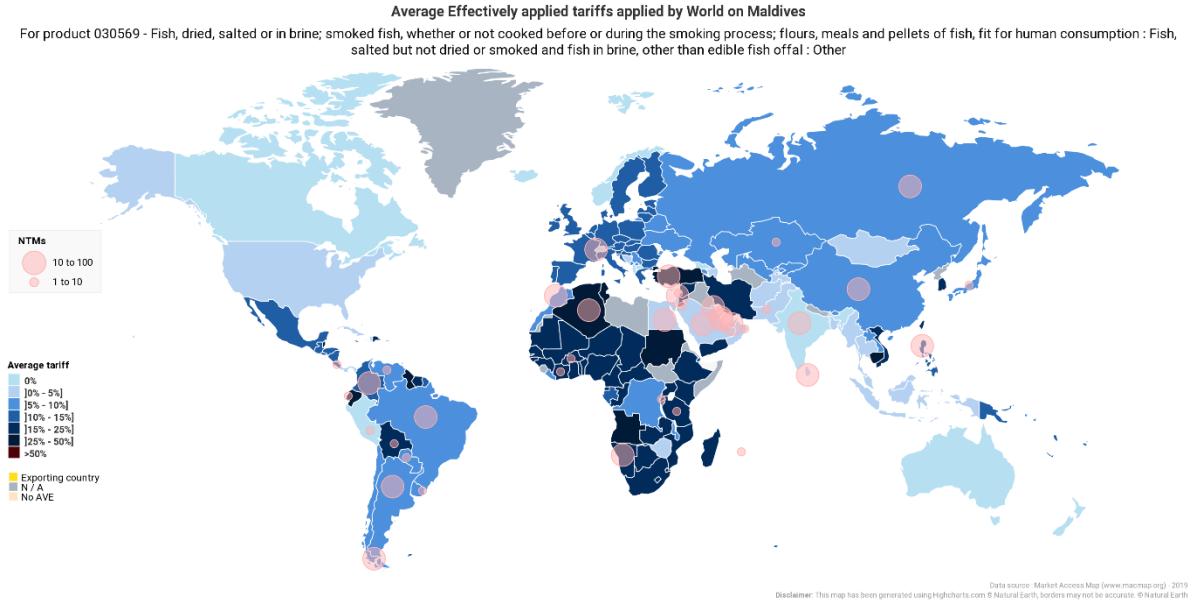


Figure 6-65: Tuna exports tariffs and NTMs faced by the Maldives on the International markets for commodity: 30569 - Tunas nei (salted). Source: ITC (2019)

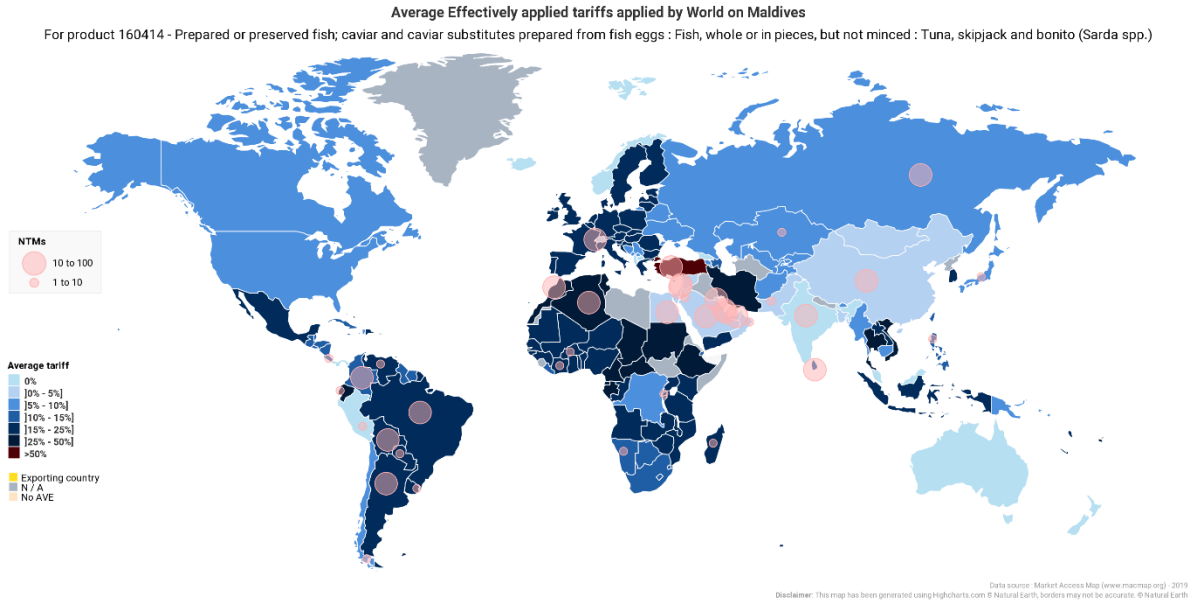


Figure 6-66: Tuna exports tariffs and NTMs faced by the Maldives on the International markets for commodity: 160414 - Skipjack tuna (canned). Source: ITC (2019)

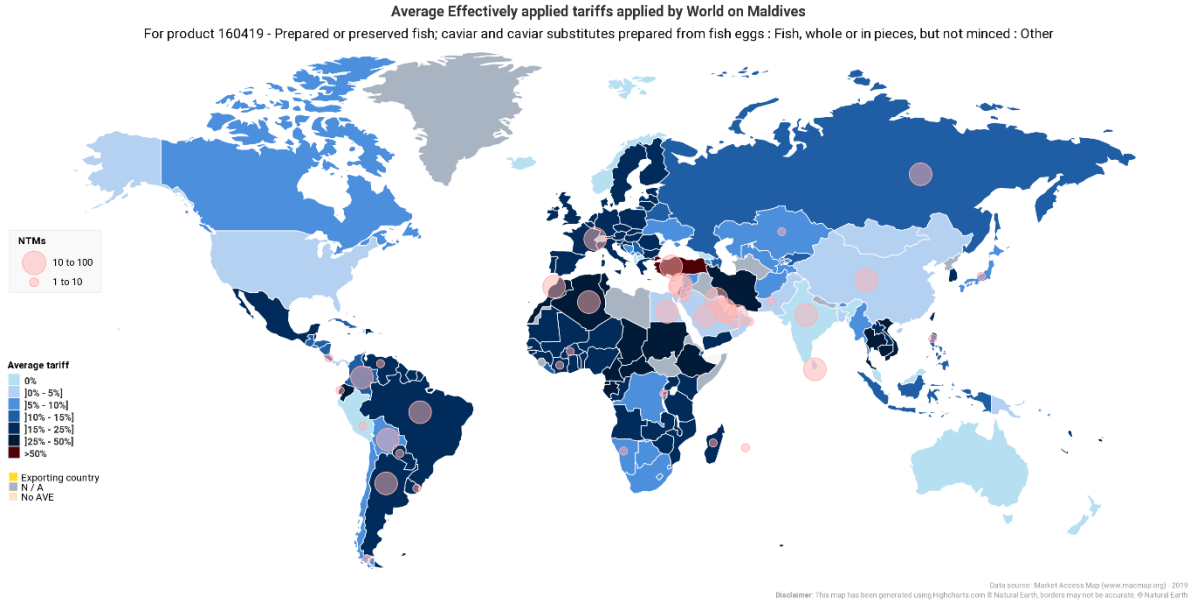


Figure 6-67: Tuna exports tariffs and NTMs faced by the Maldives on the International markets for commodity: 160419 - Tunas nei (prep minced). Source: ITC (2019)

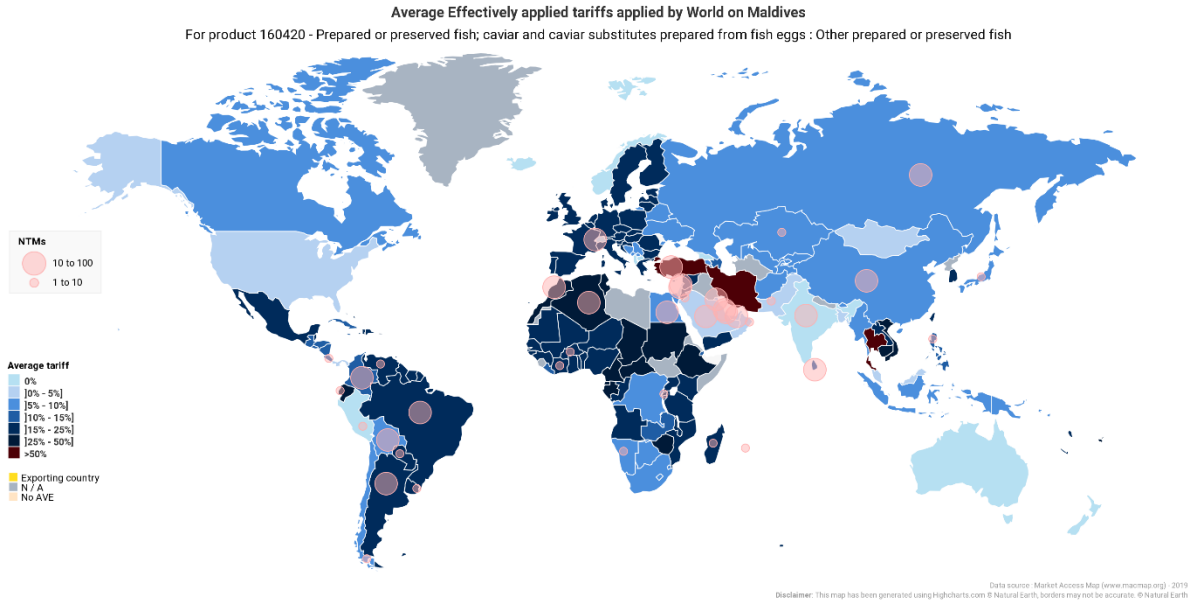


Figure 6-68: Tuna exports tariffs and NTMs faced by the Maldives on the International markets for commodity: 160420 - Tunas nei (prep not minced). Source: ITC (2019)

6.5 Mauritius

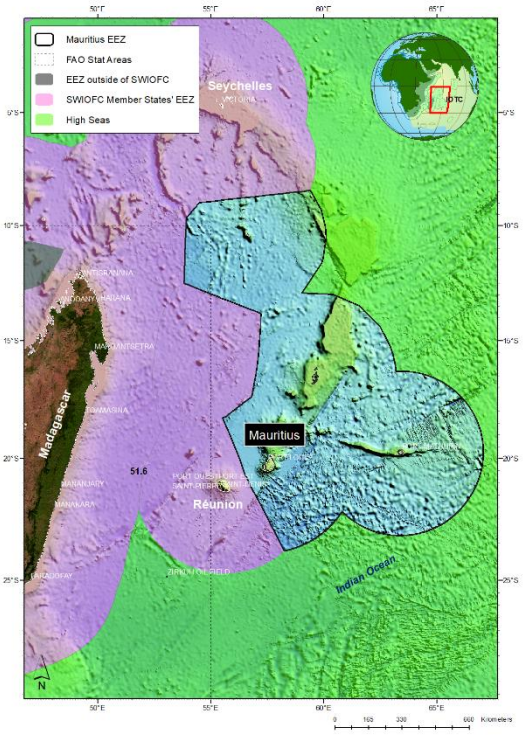


Figure 6-69: Mauritius EEZ and surrounding waters.

Mauritius has an Exclusive Economic Zone (EEZ) of 1.9 million km2 extending from the coasts of the islands of Mauritius, Rodrigues, St Brandon (Cargados Carajos Shoals), Agalega, Tromelin and Chagos Archipelago. The EEZ has a reasonable stock of various fish, including pelagic and demersal species. Fisheries resources exploited include the islandbased artisanal fisheries, the offshore demersal fishery of the banks of the Mascarene Plateau and the Chagos Archipelago, and the tuna fishery in the Western Indian Ocean. Since January 2013, Mauritius benefits from the automatic derogation with the implementation of the Interim Economic Partnership Agreement (IEPA) between the Eastern and Southern Africa (ESA) states which entered into force in 2012. Under the iEPA, Mauritius is benefitting from an automatic derogation for a quota of 3000 tonnes of preserved tuna and 750 tonnes of tuna loins.
With a view to reducing fishing effort in the overexploited lagoon, fishers are being encouraged to catch large pelagic fish around Fish Aggregating Devices (FADs) moored around the island. The FADs are placed 5 to 10 n.mi. outside the fringing reef wherein the traditional fishers have learnt their craft. The FADs are currently being maintained and renewed by the government so as to encourage lagoon fishermen to venture into the outer reef fisheries. Government is providing incentives and appropriate training to fishermen willing to operate around FADs. The tuna fishery is the major industrial fishery of Mauritius and exploits the tuna resources in the South West Indian Ocean. Land transhipment constitutes a very important related activity (FAO, 2018)

6.5.1 Fisheries Access Agreements

The current Fishery Partnership Agreement signed between the European Union and Mauritius on 21/12/2013 entered into force on 28/01/2014, for a period of 6 years, tacitly renewable for additional periods of 3 years.
The latest fisheries protocol concluded between the European Union and Mauritius covers the period 8/12/2017 – 7/12/2021 with a financial contribution of €575,000 out of which €220,000 for targeted actions for the development of the fisheries sector, and €135,000 for targeted actions for the development of the maritime policy and blue economy.
The SFPAs allows vessels from Spain, France, Portugal, and Italy to fish in the Mauritian waters and is part of the tuna network fisheries agreements in the Indian Ocean (EU, 2019).
The protocol is still in force

Table 6-7: Main features of the Tuna FPA between the EU and Mauritius

Duration of the Agreement:	6 years renewable for additional periods of 3 years (entry into force on 28/01/2014)
Duration of the Protocol:	4 years (08/12/2017-07/12/2021 - provisional application as of 08/12/2017)
Initialisation:	21/12/2013
Nature of the FPA:	Tuna Fishery Agreement
Financial contribution:	€575,000 out of which €220,000 for targeted actions for the development of the fisheries sector and €135,000 for targeted actions for the development of the maritime policy and ocean economy
Fee for ship owners:	€65 per tonne caught for 2 years, then €70
Advances:	- Tuna Seiners: €8,500/year
	- Surface longliners: €4,125 for vessels of more than 100 GT; €2,050 for vessels of equal to/less than 100 GT)
Reference tonnage:	4,000 t/year

EU Fleet	**Spain**	**France**	**Italy**	**Portugal**	**Total**
Tuna seiners	22	16	2	-	40 vessels
Surface longliners	12	29	-	4	45 vessels

Outside of the SFPA, there are no known fisheries access agreements with any other third party.

6.5.2 Tuna Production

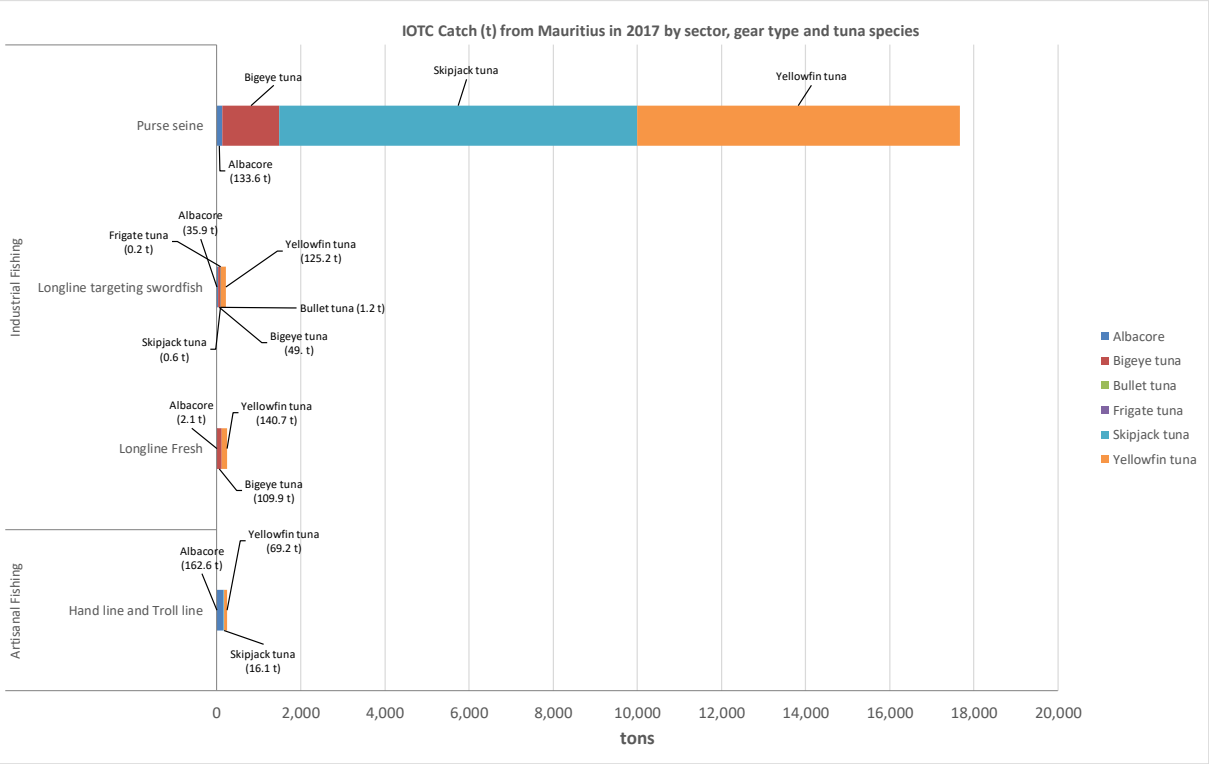


Figure 6-70: Tuna Catch in the IOTC area by Mauritius in 2017 by species and fishing method. Source (IOTC, 2019)

6.5.3 IUU Tuna Landings

Table 6-8: Reported and unreported tuna landings (Mt and USD) for Mauritius by sector, method and tuna species in 2014. Source (SAU, 2019)

Tuna Landings						
	Reported		Unreported			
Country/sector/method/ species	Catch (metric tonnes)	Landed value (US$)[1]	Catch (metric tonnes)	Landed value (US$)[1]	Total Catch (metric tonnes)	Total Landed value (US$)[1]
Mauritius	**1,318.5**	**3,306,310.7**	**669.7**	**1,851,307.9**	**1,988.2**	**5,157,618.6**
Artisanal	**125.9**	**436,793.4**			**125.9**	**436,793.4**
small scale encircling nets	121.0	423,915.5			121.0	423,915.5
YFT	121.0	423,915.5			121.0	423,915.5
small scale gillnets	1.6	4,292.6			1.6	4,292.6
ALB	1.6	4,292.6			1.6	4,292.6
small scale lines	3.2	8,585.3			3.2	8,585.3
ALB	3.2	8,585.3			3.2	8,585.3
Industrial	**1,192.6**	**2,869,517.3**			**1,192.6**	**2,869,517.3**
longline	1,184.3	2,841,249.3			1,184.3	2,841,249.3
ALB	373.1	986,155.3			373.1	986,155.3
BET	664.7	1,303,508.5			664.7	1,303,508.5
BOP	10.3	74,678.0			10.3	74,678.0
SKJ	0.1	296.3			0.1	296.3
TUX	0.1	135.8			0.1	135.8
YFT	136.0	476,475.5			136.0	476,475.5
purse seine	8.3	28,268.0			8.3	28,268.0
SKJ	0.5	1,089.8			0.5	1,089.8
YFT	7.8	27,178.2			7.8	27,178.2
Recreational			**669.7**	**1,851,307.9**	**669.7**	**1,851,307.9**
recreational fishing gear			669.7	1,851,307.9	669.7	1,851,307.9
ALB			575.3	1,520,625.9	575.3	1,520,625.9
YFT			94.4	330,682.0	94.4	330,682.0
Grand Total	**1,318.5**	**3,306,310.7**	**669.7**	**1,851,307.9**	**1,988.2**	**5,157,618.6**

[1] value estimated applying 2017 ex-vessel prices from Poseidon (2019)

6.5.4 Volume of Tuna processed

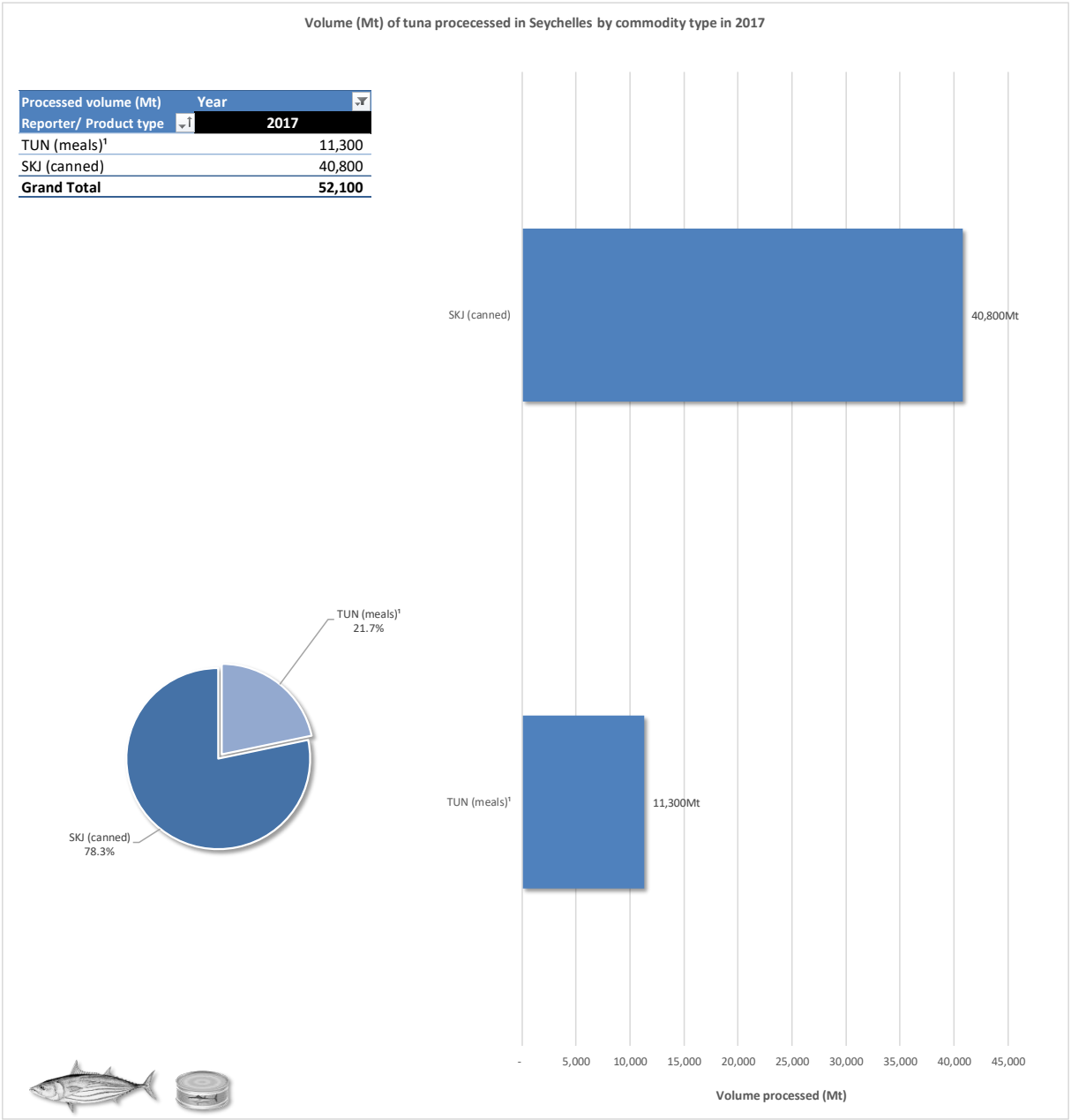


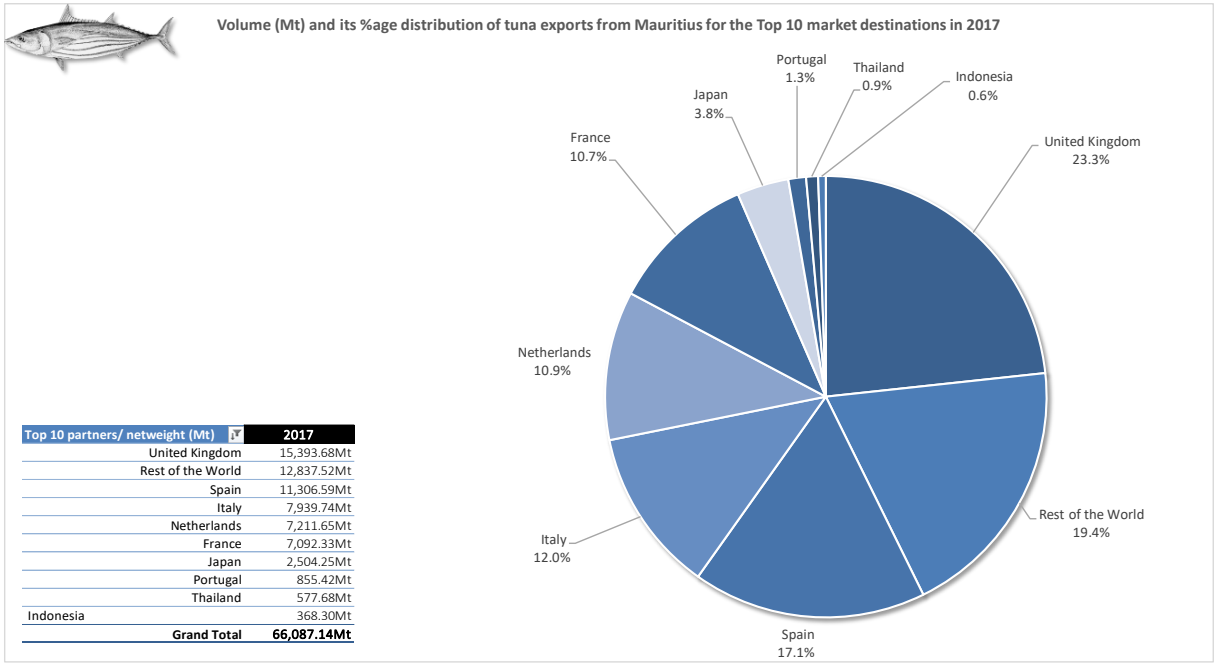
Figure 6-71: Tuna processed (metric tonnes) in Mauritius in 2017 by product type. Source FAO (2019b)

6.5.5 Tuna Export Markets

Figure 6-72: Share of tuna exports volume (% and Metric tonnes) between the top 10 market destination for Kenya and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

Figure 6-73: Geographic distribution by market destination of tuna exports volume (Mt) for Kenya and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

6.5.5.1 Tuna exports volume



Top 10 partners/ netweight (Mt)	2017
United Kingdom	15,393.68Mt
Rest of the World	12,837.52Mt
Spain	11,306.59Mt
Italy	7,939.74Mt
Netherlands	7,211.65Mt
France	7,092.33Mt
Japan	2,504.25Mt
Portugal	855.42Mt
Thailand	577.68Mt
Indonesia	368.30Mt
Grand Total	**66,087.14Mt**

Figure 6-74: Share of tuna exports volume (% and Metric tonnes) between the top 10 market destination for Mauritius and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

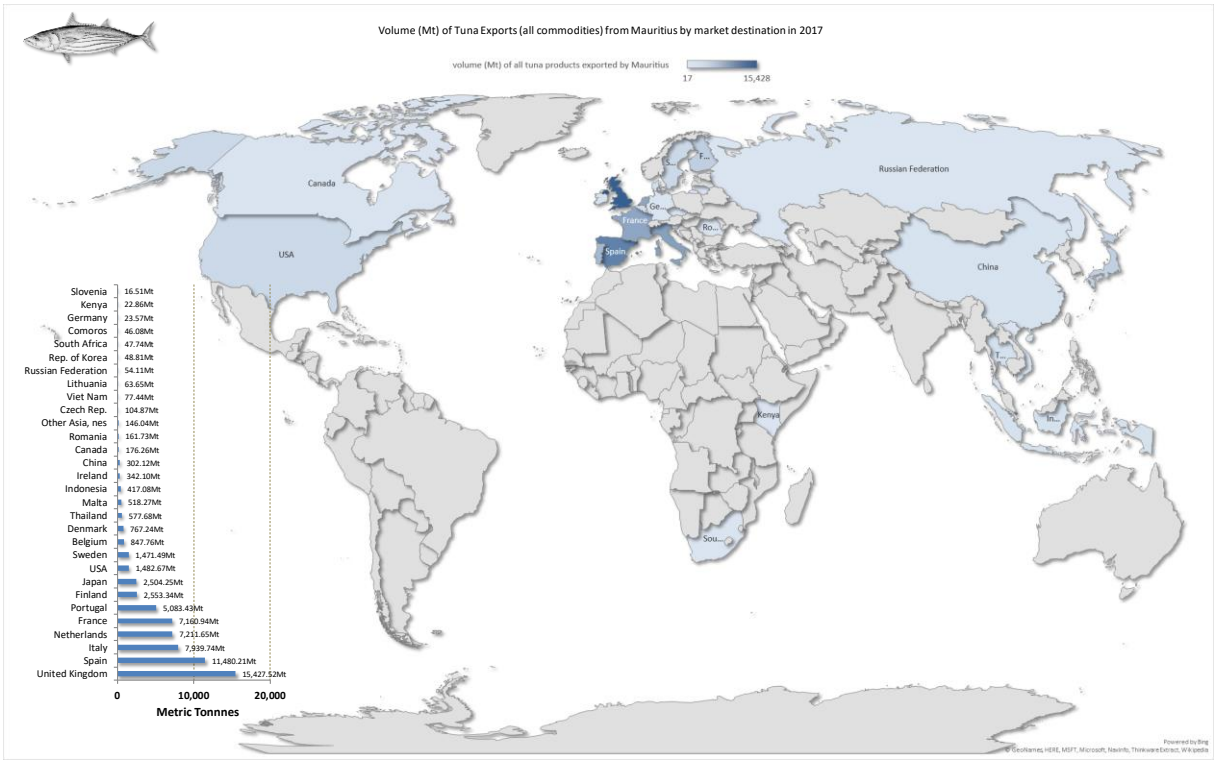


Figure 6-75: Geographic distribution by market destination of tuna exports volume (Mt) for Mauritius and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

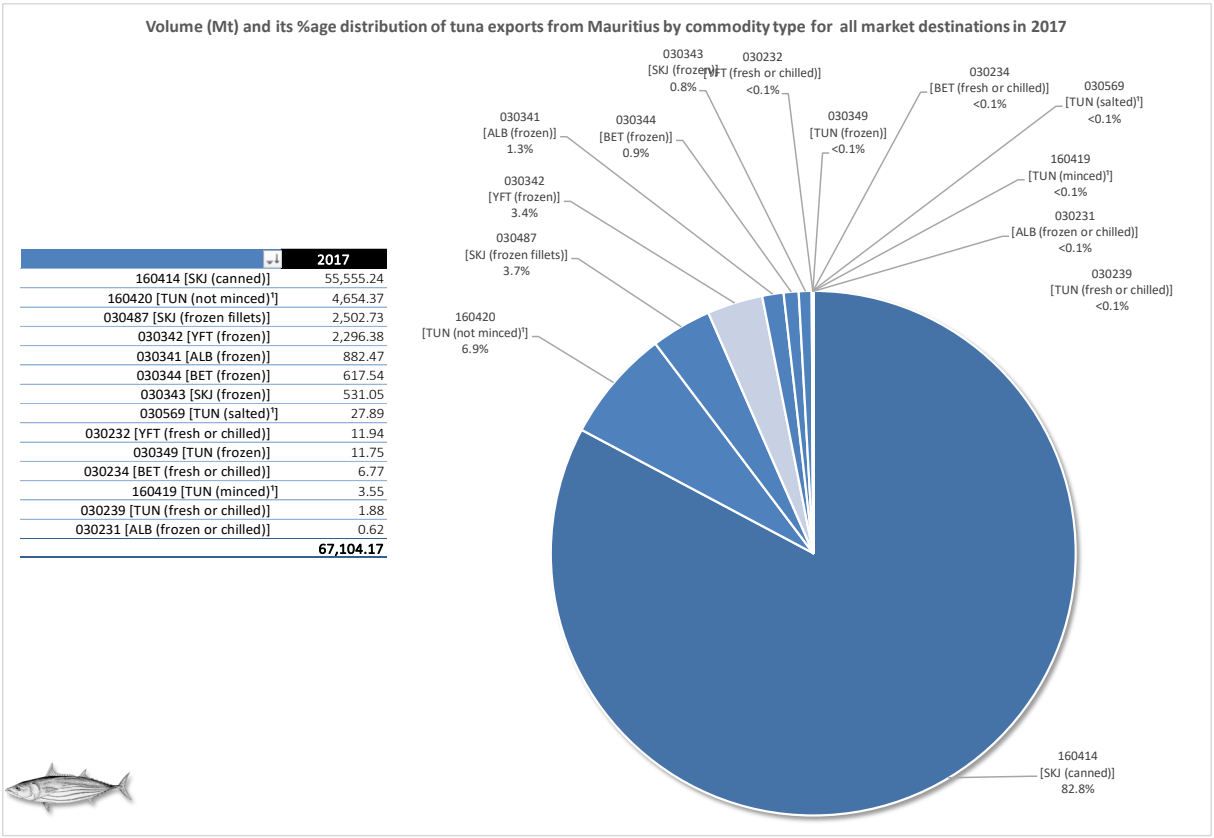


Figure 6-76: Share of tuna exports value (% and million USD) by product for Kenya in 2017. Source UN ComTrade (2019) and FAO (2019b)

Figure 6-77: Share of tuna exports volume (% and metric tonnes) by product for Mauritius in 2017. Source UN ComTrade (2019) and FAO (2019b)

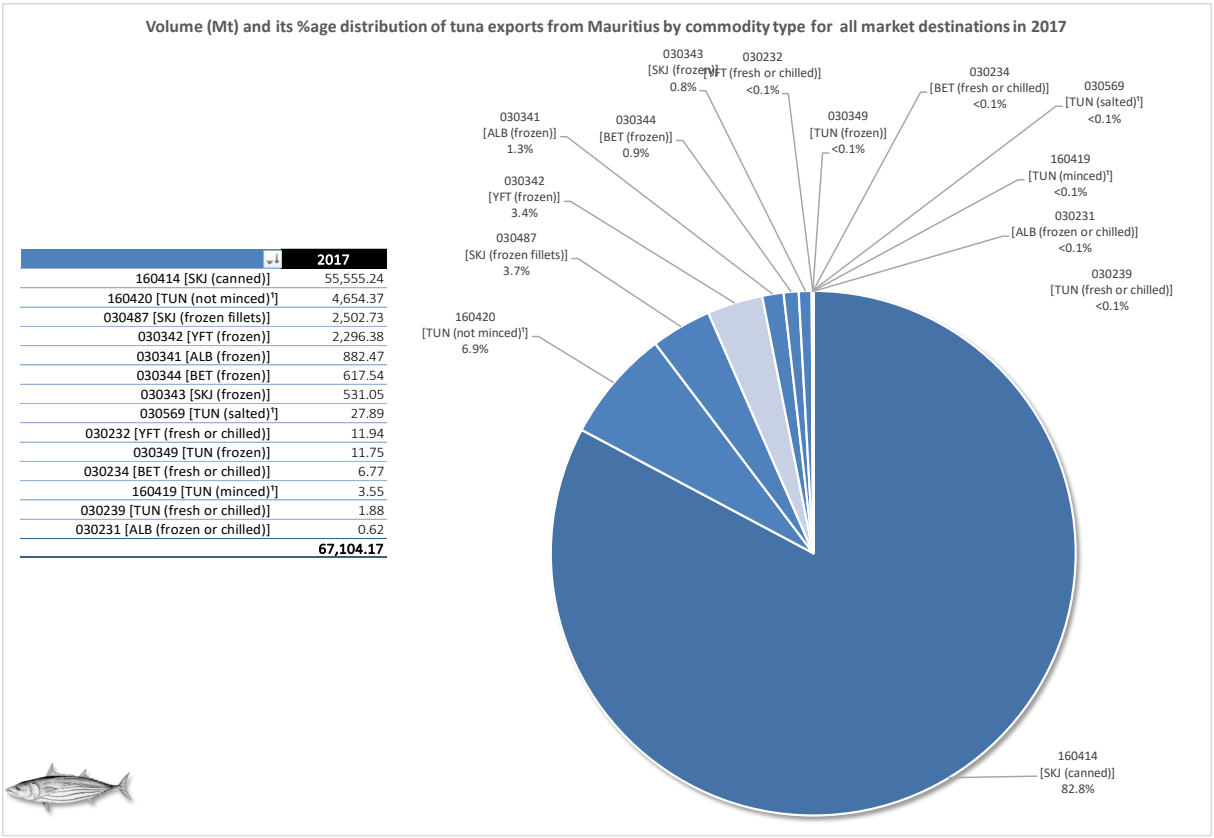


Figure 6-78: Share of tuna exports volume (% and metric tonnes) by product for Mauritius in 2017. Source UN ComTrade (2019) and FAO (2019b)

Volume (Mt) of tuna exports from Mauritius by commodity type and market destination in 2017

Netweight (Mt) Product/ Trading partner	Year 2017
030231 [ALB (frozen or chilled)]	**0.62**
France	0.62
030239 [TUN (fresh or chilled)]	**1.88**
France	1.88
160419 [TUN (minced)[1]]	**3.55**
Madagascar	0.18
Australia	0.48
Angola	0.52
Ghana	0.62
Nigeria	1.75
030234 [BET (fresh or chilled)]	**6.77**
France	0.56
USA	1.79
Japan	4.42
030349 [TUN (frozen)]	**11.75**
USA	3.69
Indonesia	8.06
030232 [YFT (fresh or chilled)]	**11.94**
France	1.22
USA	10.72
030569 [TUN (salted)[1]]	**27.89**
Australia	1.55
United Kingdom	8.24
France	18.11
030343 [SKJ (frozen)]	**531.05**
Japan	94.80
Spain	107.69
Thailand	328.56
030344 [BET (frozen)]	**617.54**
Rest of the World	6.75
USA	23.86
Thailand	66.04
China	73.29
Spain	154.17
Japan	293.43
030341 [ALB (frozen)]	**882.47**
China	29.59
Thailand	72.94
Other Asia, nes	123.75
Japan	295.95
Indonesia	360.24
030342 [YFT (frozen)]	**2,296.38**
Viet Nam	77.44
Thailand	110.15
China	196.37
Rest of the World	217.89
Spain	579.91
Japan	1,114.64
030487 [SKJ (frozen fillets)]	**2,502.73**
Rest of the World	168.47
Canada	176.26
Italy	176.37
Spain	305.28
Japan	701.02
France	975.34
160420 [TUN (not minced)[1]]	**4,654.37**
Finland	295.20
Netherlands	303.79
France	465.70
Rest of the World	467.56
Portugal	855.42
United Kingdom	2,266.71
160414 [SKJ (canned)]	**55,555.24**
France	5,628.90
Netherlands	6,907.86
Italy	7,763.37
Spain	10,159.53
Rest of the World	11,976.86
United Kingdom	13,118.73
Grand Total	**67,104.17**

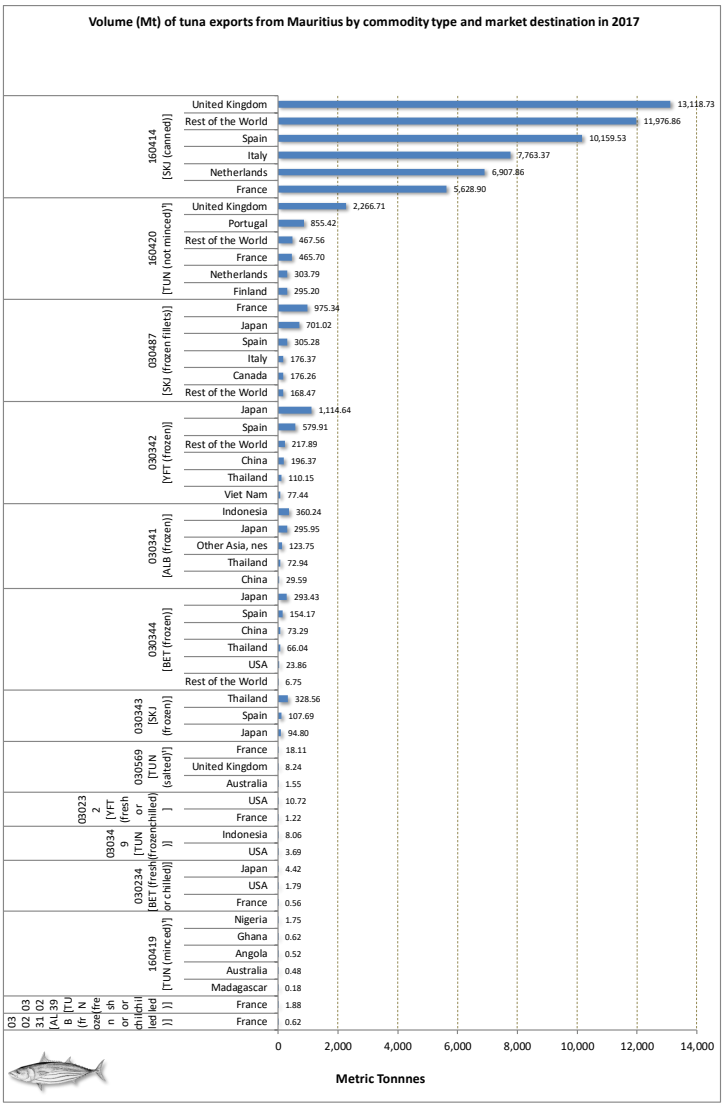


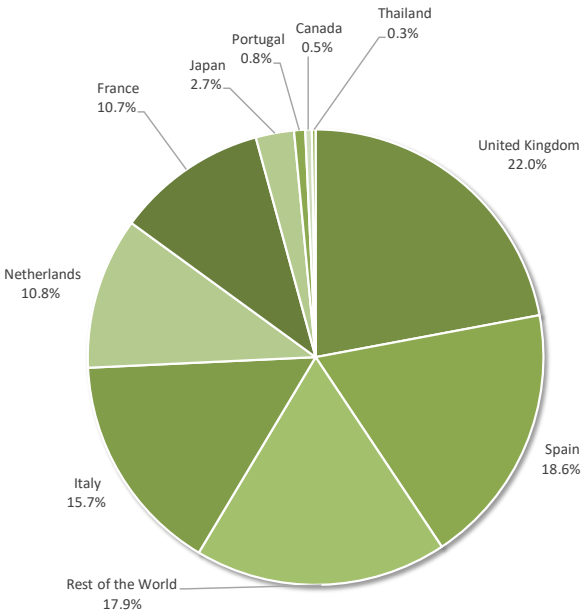
Figure 6-79: Tuna exports volume (Mt) for Mauritius in 2017 by product and market destination. Source UN ComTrade (2019)

6.5.5.2 Tuna exports value

All exports values are expressed c.i.f.



Value (million US$) and its %age distribution of tuna exports from Mauritius for the Top 10 market destinations in 2017



Top 10 partners/ Value (US$)	2017
United Kingdom	US$69.58M
Spain	US$58.72M
Rest of the World	US$56.53M
Italy	US$49.50M
Netherlands	US$33.97M
France	US$33.91M
Japan	US$8.57M
Portugal	US$2.48M
Canada	US$1.47M
Thailand	US$0.83M
Grand Total	**US$315.56M**

Figure 6-80: Share of tuna exports value (% and million USD) between the top 10 market destination Mauritius and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

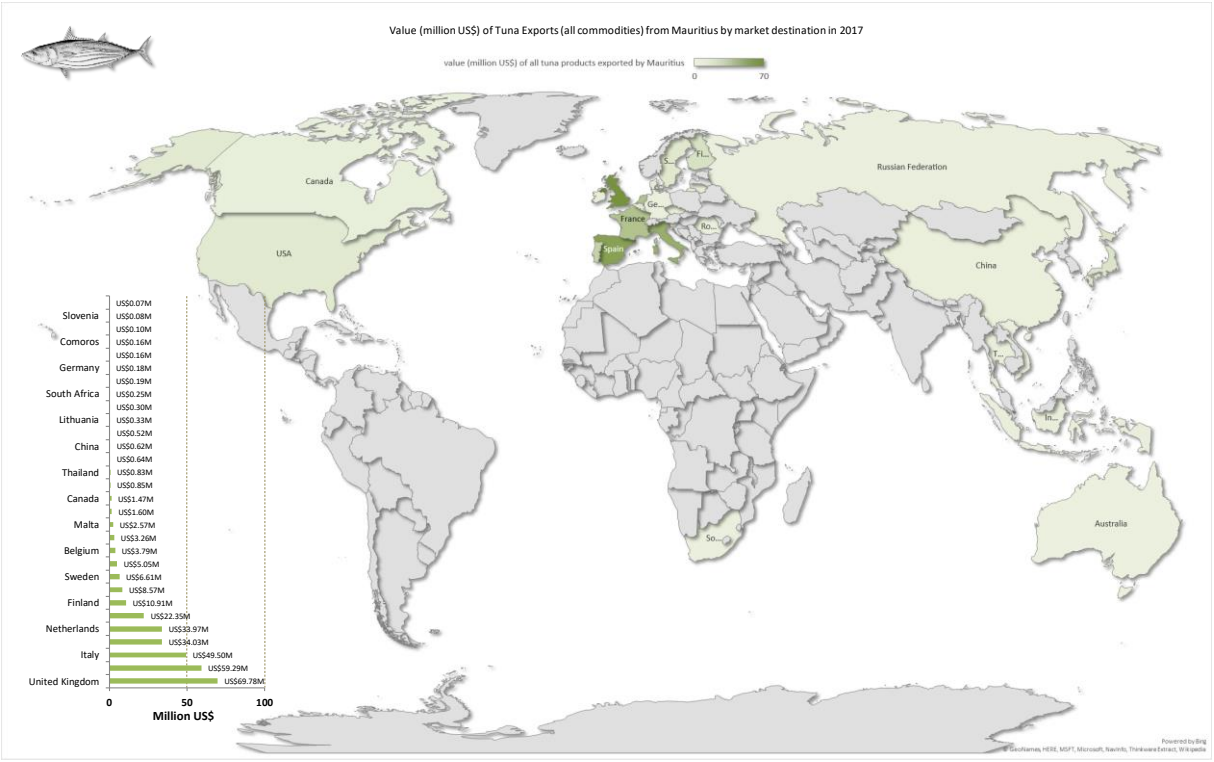
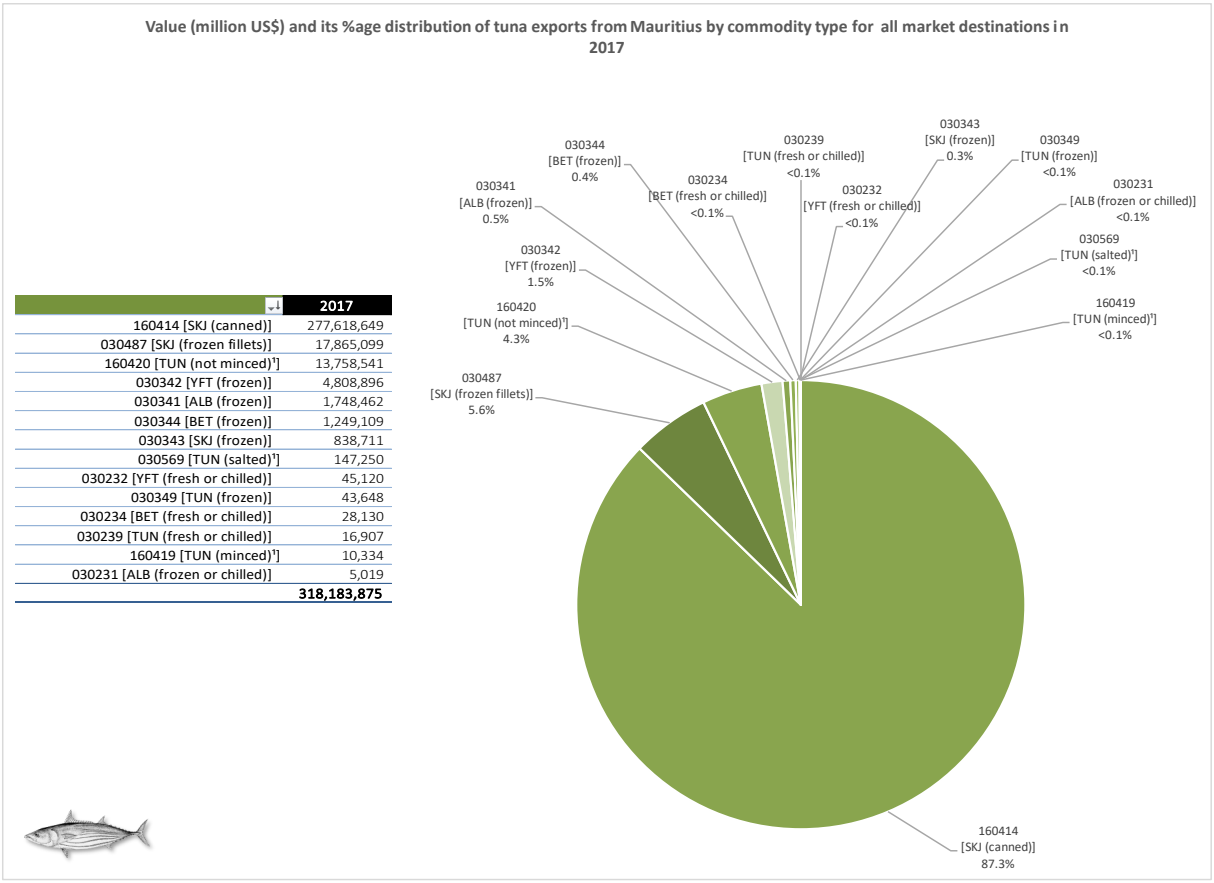


Figure 6-81: Geographic distribution by market destination of tuna exports value (million USD) for Mauritius and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)



	2017
160414 [SKJ (canned)]	277,618,649
030487 [SKJ (frozen fillets)]	17,865,099
160420 [TUN (not minced)¹]	13,758,541
030342 [YFT (frozen)]	4,808,896
030341 [ALB (frozen)]	1,748,462
030344 [BET (frozen)]	1,249,109
030343 [SKJ (frozen)]	838,711
030569 [TUN (salted)¹]	147,250
030232 [YFT (fresh or chilled)]	45,120
030349 [TUN (frozen)]	43,648
030234 [BET (fresh or chilled)]	28,130
030239 [TUN (fresh or chilled)]	16,907
160419 [TUN (minced)¹]	10,334
030231 [ALB (frozen or chilled)]	5,019
	318,183,875

Figure 6-82: Share of tuna exports value (% and million USD) by product for Mauritius in 2017. Source UN ComTrade (2019) and FAO (2019b)

Value ('000 US$) of tuna exports from Mauritius by commodity type and market destination in 2017

Value (US$)	Year
Product/ Trading partner	2017
030231 [ALB (frozen or chilled)]	**5,019**
France	5,019
160419 [TUN (minced)¹]	**10,334**
Madagascar	435
Angola	1,301
Ghana	1,483
Australia	2,205
Nigeria	4,910
030239 [TUN (fresh or chilled)]	**16,907**
France	16,907
030234 [BET (fresh or chilled)]	**28,130**
France	2,282
USA	7,467
Japan	18,381
030349 [TUN (frozen)]	**43,648**
USA	14,152
Indonesia	29,496
030232 [YFT (fresh or chilled)]	**45,120**
France	4,775
USA	40,345
030569 [TUN (salted)¹]	**147,250**
Australia	10,586
United Kingdom	48,682
France	87,982
030343 [SKJ (frozen)]	**838,711**
Japan	210,095
Spain	236,573
Thailand	392,043
030344 [BET (frozen)]	**1,249,109**
Rest of the World	14,749
USA	63,376
Thailand	87,210
China	144,796
Spain	347,689
Japan	591,289
030341 [ALB (frozen)]	**1,748,462**
China	58,610
Thailand	145,916
Other Asia, nes	250,992
Japan	591,676
Indonesia	701,268
030342 [YFT (frozen)]	**4,808,896**
Viet Nam	160,928
Thailand	201,832
China	400,764
Rest of the World	463,194
Spain	1,321,416
Japan	2,260,762
160420 [TUN (not minced)¹]	**13,758,541**
Finland	729,106
Netherlands	749,304
Rest of the World	1,368,449
France	1,522,920
Portugal	2,483,801
United Kingdom	6,904,961
030487 [SKJ (frozen fillets)]	**17,865,099**
Rest of the World	1,092,128
Italy	1,178,051
Canada	1,470,732
Spain	2,312,563
Japan	4,896,229
France	6,915,396
160414 [SKJ (canned)]	**277,618,649**
France	25,355,971
Netherlands	33,225,695
Italy	48,326,205
Rest of the World	53,590,897
Spain	54,497,891
United Kingdom	62,621,990
Grand Total	**318,183,875**

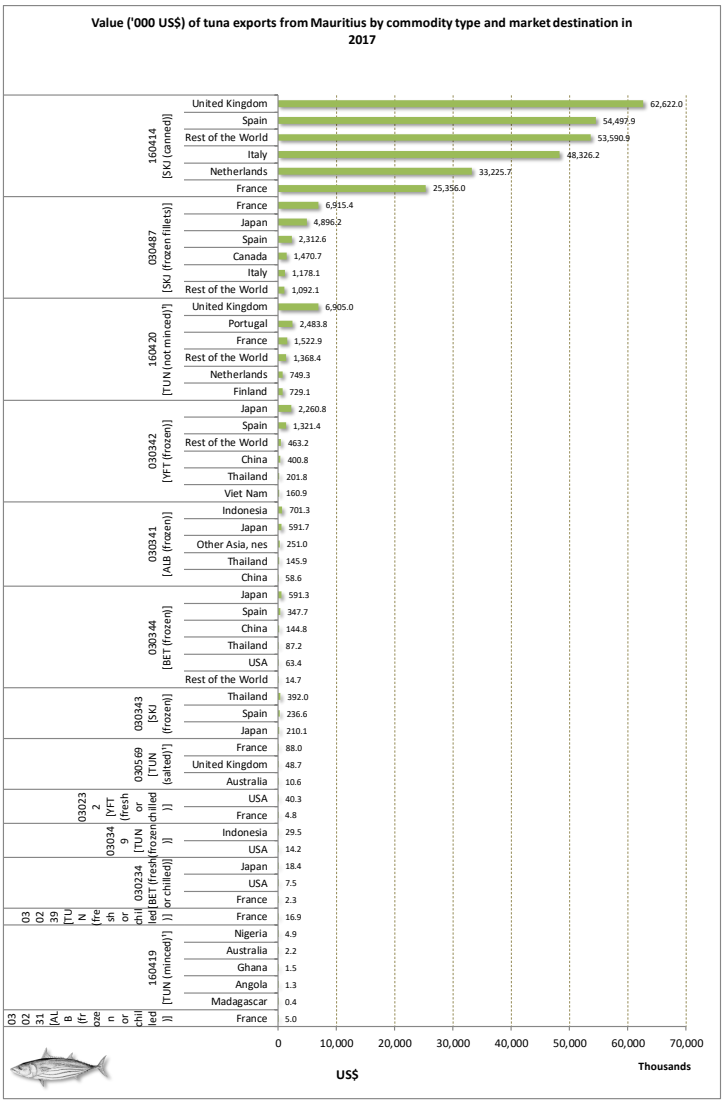


Figure 6-83: Tuna exports value (USD) for Mauritius in 2017 by product and market destination. Source UN ComTrade (2019)

6.5.5.3 Average prices of tuna exports

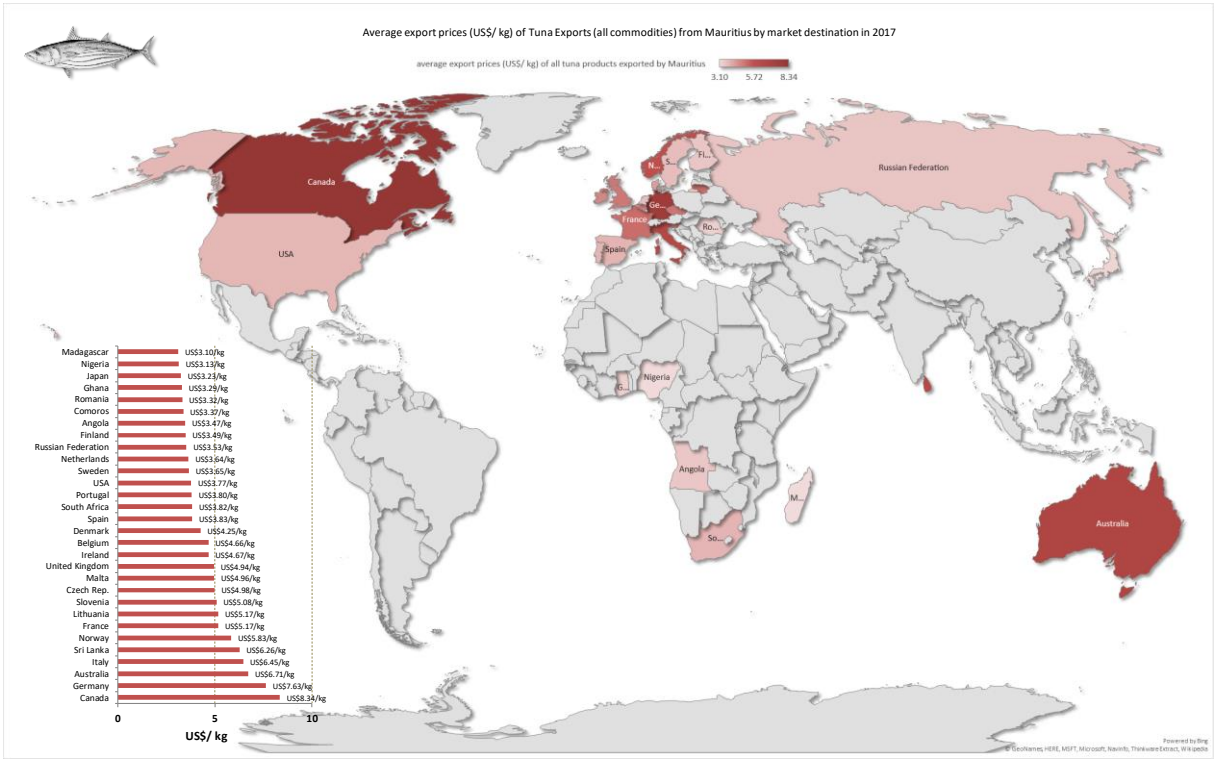


Figure 6-84: Geographic distribution by market destination of the average price of tuna exports for Mauritius and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

Average price (US$/ kg) of tuna exports from Mauritius by commodity type and market destination in 2017	
Average of Average price	Year
Product/ Trading partner	2017
030343 [SKJ (frozen)]	**1.87**
Thailand	1.19
Spain	2.20
Japan	2.22
030341 [ALB (frozen)]	**1.99**
Indonesia	1.95
China	1.98
Japan	2.00
Thailand	2.00
Other Asia, nes	2.03
030344 [BET (frozen)]	**2.14**
Thailand	1.32
China	1.98
Japan	2.02
Spain	2.26
Rest of the World	2.38
USA	2.66
030342 [YFT (frozen)]	**2.23**
Thailand	1.83
Japan	2.03
China	2.04
Viet Nam	2.08
Spain	2.28
Rest of the World	2.35
160420 [TUN (not minced)¹]	**2.81**
Netherlands	2.47
Finland	2.47
Rest of the World	2.80
Portugal	2.90
United Kingdom	3.05
France	3.27
160419 [TUN (minced)¹]	**2.95**
Ghana	2.40
Madagascar	2.44
Angola	2.48
Nigeria	2.81
Australia	4.59
030349 [TUN (frozen)]	**3.75**
Indonesia	3.66
USA	3.84
030232 [YFT (fresh or chilled)]	**3.85**
USA	3.76
France	3.93
030234 [BET (fresh or chilled)]	**4.13**
France	4.05
Japan	4.16
USA	4.18
160414 [SKJ (canned)]	**4.53**
Rest of the World	4.38
France	4.50
United Kingdom	4.77
Netherlands	4.81
Spain	5.36
Italy	6.22
030569 [TUN (salted)¹]	**5.87**
France	4.86
United Kingdom	5.91
Australia	6.85
030487 [SKJ (frozen fillets)]	**6.90**
Rest of the World	6.66
Italy	6.68
Japan	6.98
France	7.09
Spain	7.58
Canada	8.34
030231 [ALB (frozen or chilled)]	**8.04**
France	8.04
030239 [TUN (fresh or chilled)]	**9.01**
France	9.01
Average	**4.00**

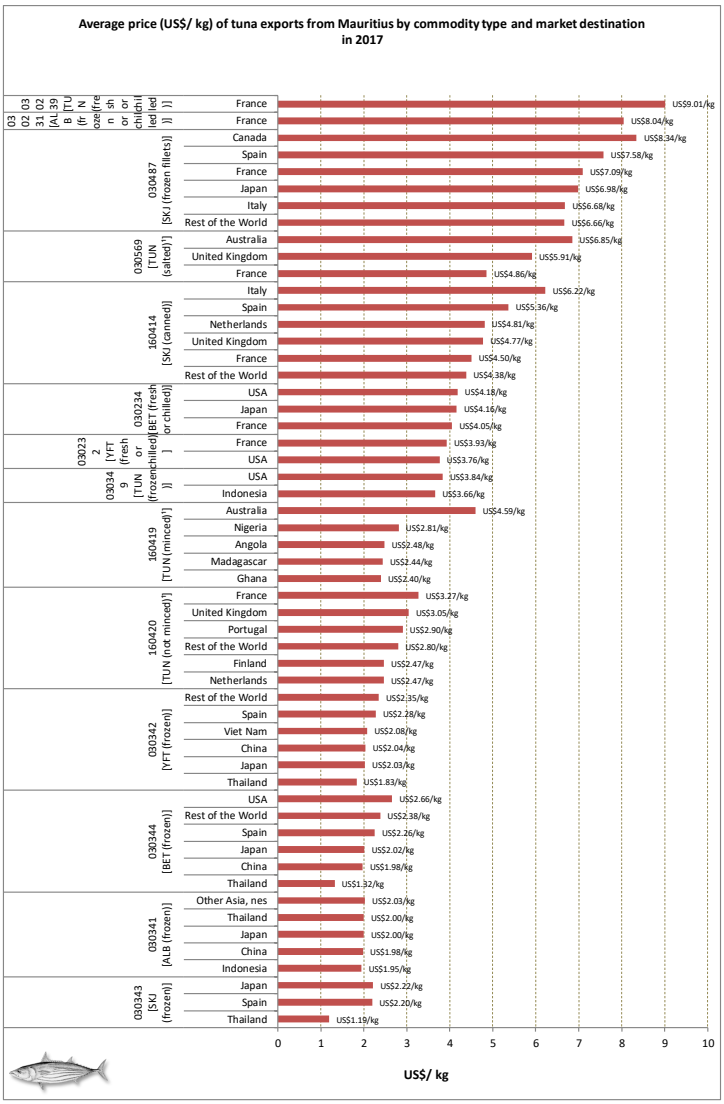


Figure 6-85: Average price of tuna exports (USD / kg) for Mauritius in 2017 by product and market destination. Source UN ComTrade (2019)

6.5.5.4 Exports tariff for main tuna products exported by Mauritius

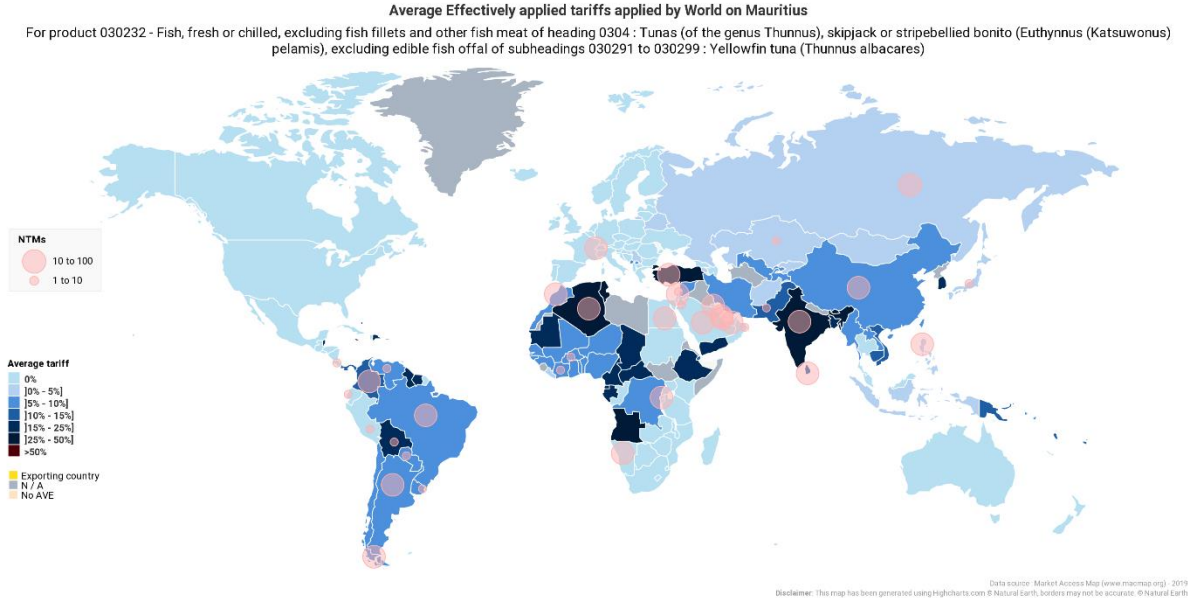


Figure 6-86: Tuna exports tariffs and NTMs faced by Mauritius on the International markets for commodity: 30232 - Yellowfin tuna (fresh or chilled). Source: ITC (2019)

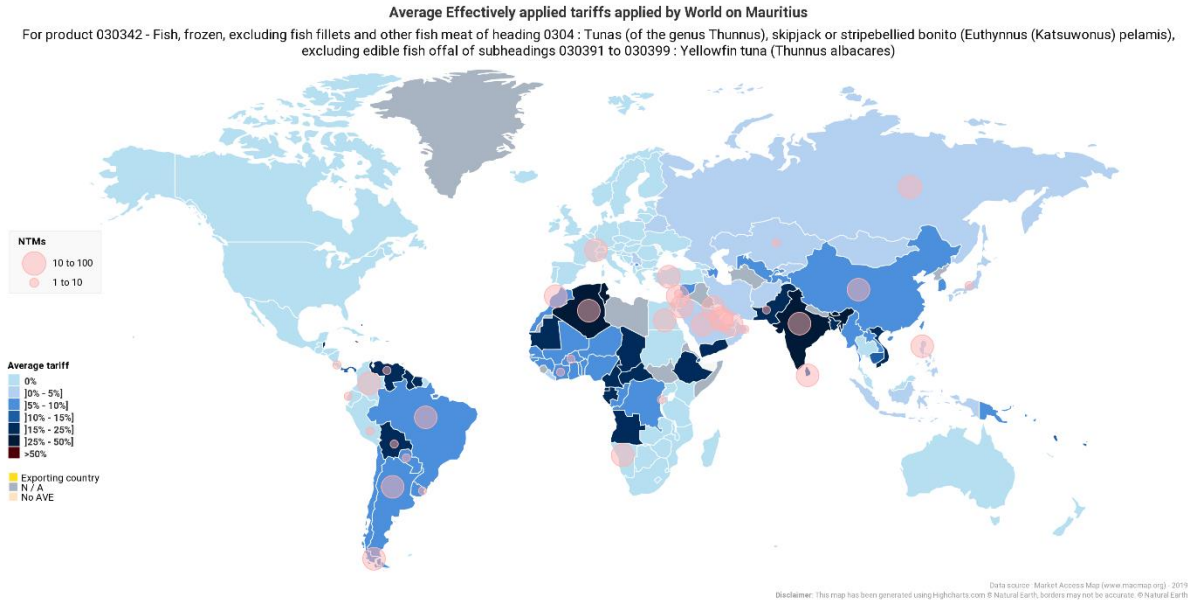


Figure 6-87: Tuna exports tariffs and NTMs faced by Mauritius on the International markets for commodity: 30342 - Yellowfin tuna (frozen). Source: ITC (2019)

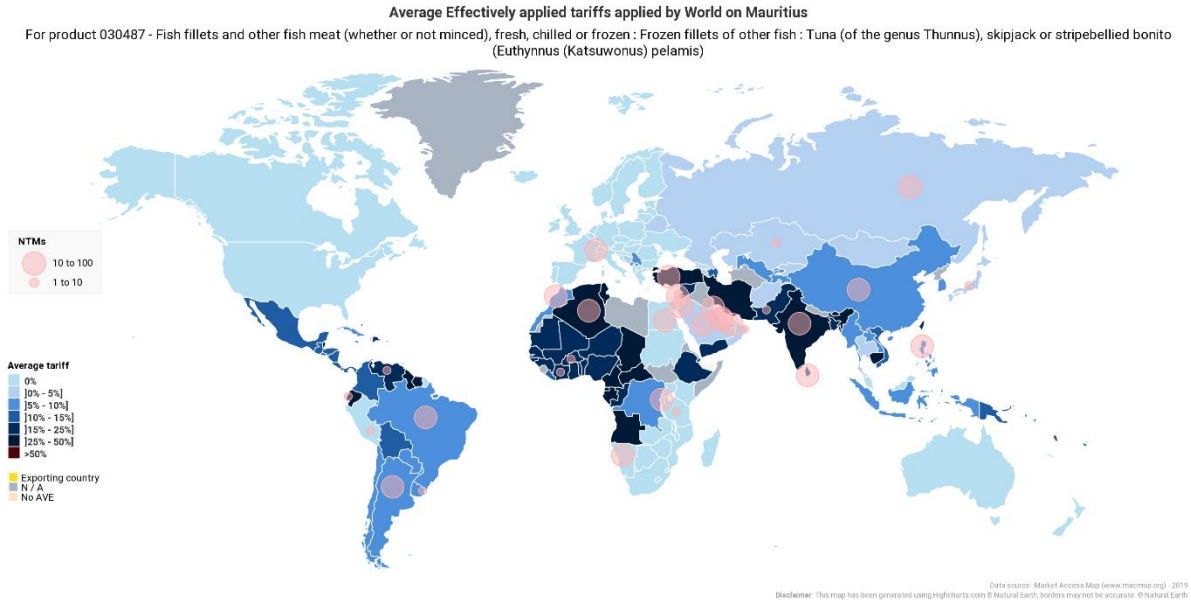


Figure 6-88: Tuna exports tariffs and NTMs faced by Mauritius on the International markets for commodity: 30487 - Skipjack tuna (frozen fillets). Source: ITC (2019)

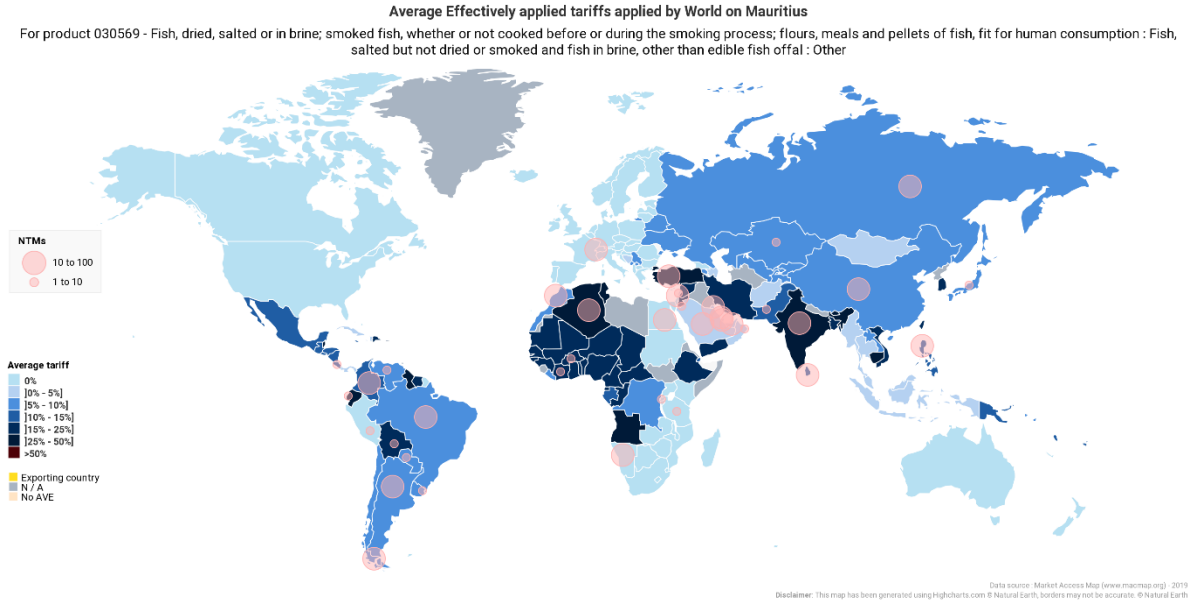


Figure 6-89: Tuna exports tariffs and NTMs faced by Mauritius on the International markets for commodity: 30569 - Tunas nei (salted). Source: ITC (2019)

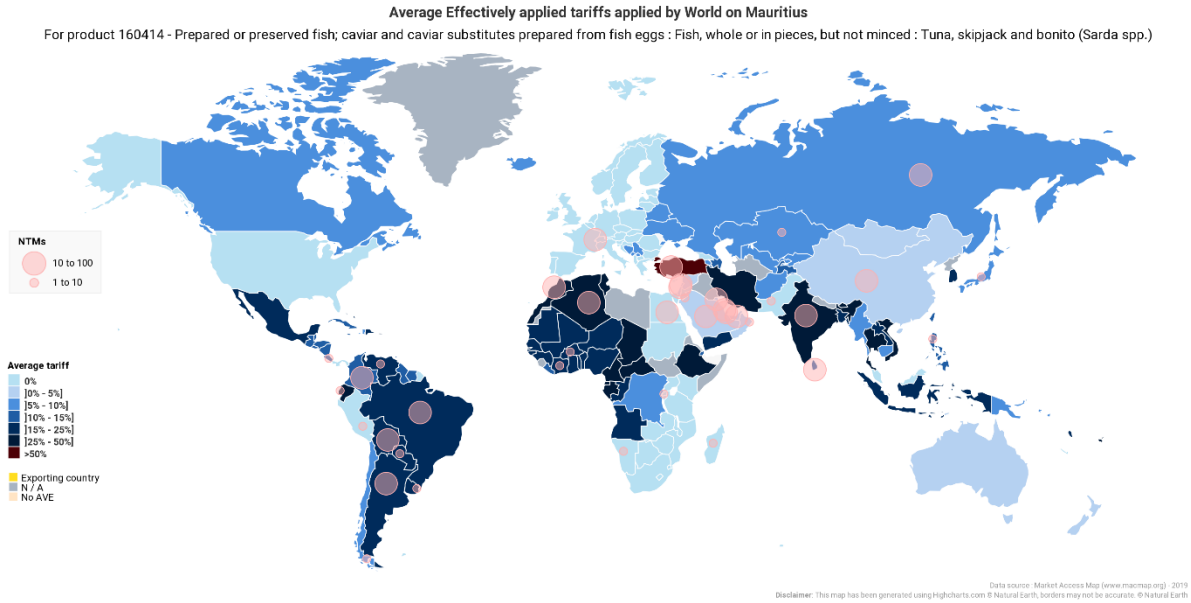


Figure 6-90: Tuna exports tariffs and NTMs faced by Mauritius on the International markets for commodity: 160414 - Skipjack tuna (canned). Source: ITC (2019)

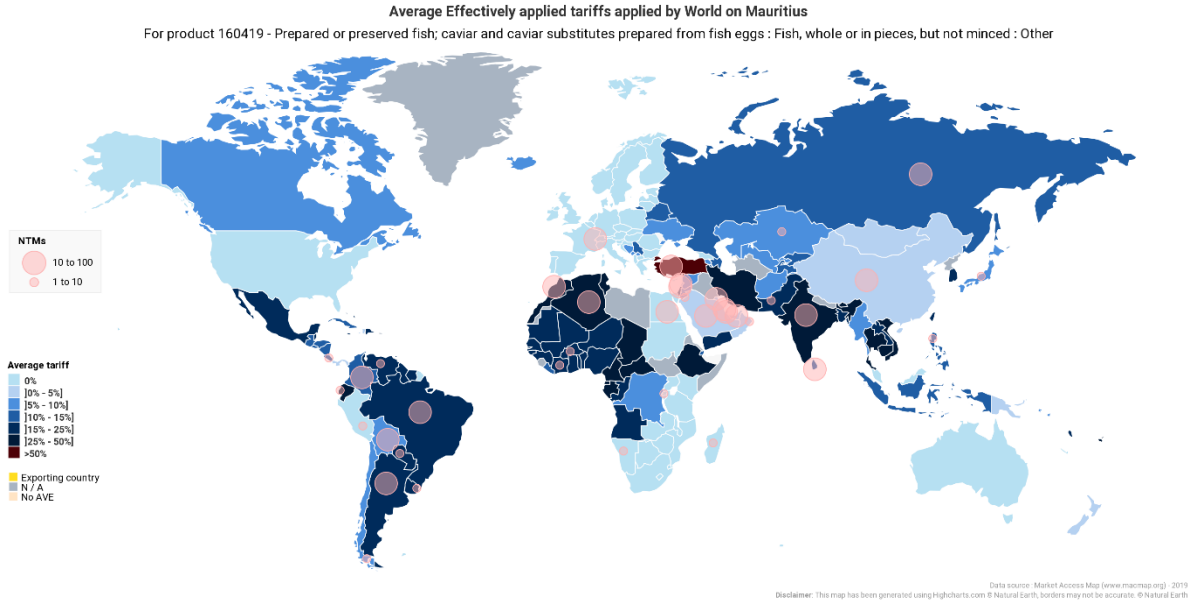


Figure 6-91: Tuna exports tariffs and NTMs faced by Mauritius on the International markets for commodity: 160419 - Tunas nei (prep minced). Source: ITC (2019)

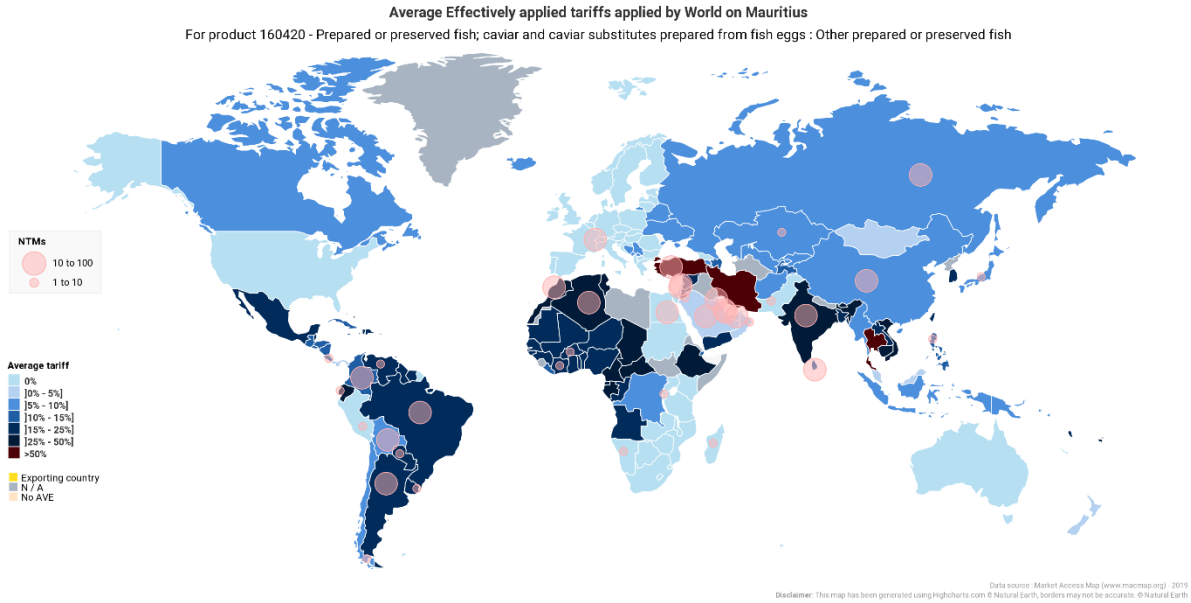


Figure 6-92: Tuna exports tariffs and NTMs faced by Mauritius on the International markets for commodity: 160420 - Tunas nei (prep not minced). Source: ITC (2019)

6.6 Mozambique

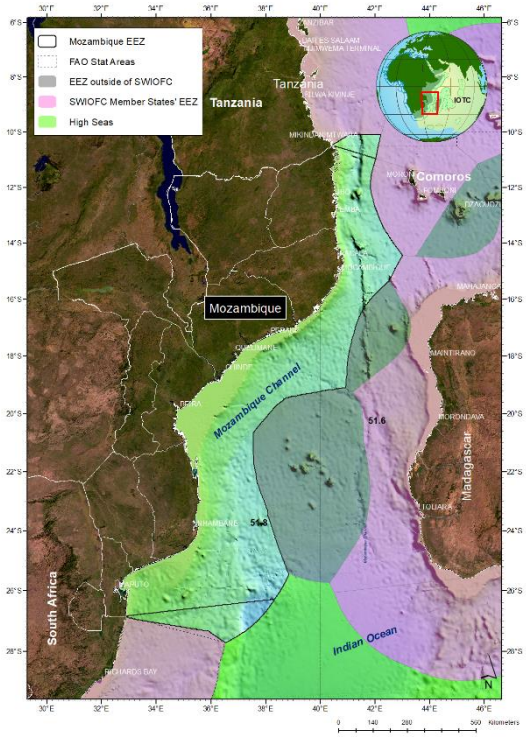


Figure 6-93: Mozambique EEZ and surrounding waters.

Mozambique is endowed with fairly rich fisheries resources. The marine waters cover an area of about 100 000 km^2 with an exclusive economic zone of 200 nautical miles while inland waters cover an area of about 13 000 km^2. The marine fisheries resources are mostly located in the two major shelves, the Sofala Bank in the center and the Delagoa bight in the south. The main fishing areas are located at the Sofala Bank, Inhambane, Vilankulos, Chiluane and Beira.
The most important marine finfish species are demersal and pelagic species mainly grouper, snapper, emperor and sea bream also high migratory tuna species of yellow fin, big eye and albacore, swordfish and shark. (FAO, 2018)

6.6.1 Fisheries Access Agreements

The last Protocol to the fisheries partnership agreement concluded between the EU and Mozambique covered the period 1/2/2012 – 31/01/2015 with a financial contribution of €980,000 out of which €460,000 is dedicated to the support of the fisheries policy of Mozambique.
This fisheries agreement allows EU vessels mainly from France, Spain, Portugal, Italy and UK to fish in the Mozambican waters and is part of the tuna network fisheries agreements in the Indian Ocean (EU, 2019).
The Protocol expired on 31/01/2015

Table 6-9: Main features of the Tuna FPA between the EU and Mozambique

Duration of the Agreement :	5 years renewable (1/1/2007 – 31/12/2011)
Duration of the Protocol:	3 years (1/2/2012 – 31/01/2015).
Initialisation:	02/06/2011
Nature of the FPA :	Tuna Fishery Agreement
Financial contribution:	€980,000 out of which €460,000 has been earmarked for the support of the Mozambican sectoral fisheries policy in order to promote sustainability in its waters.
Fee for ship owners:	€35 per tonne caught.
Advances:	- Tuna seiners: €5,100 per year (ref catches: 146 t)
	- Surface long liners < 250 GT: €4,100 per year (ref catches: 118 t)
	- Surface longliners > 250 GT: €2,500 per year (ref catches: 72 t)
Reference tonnage:	8,000 t/year

Outside of the expired SFPA, there is no known fisheries partnership agreement with any other third party.

6.6.2 Tuna Production

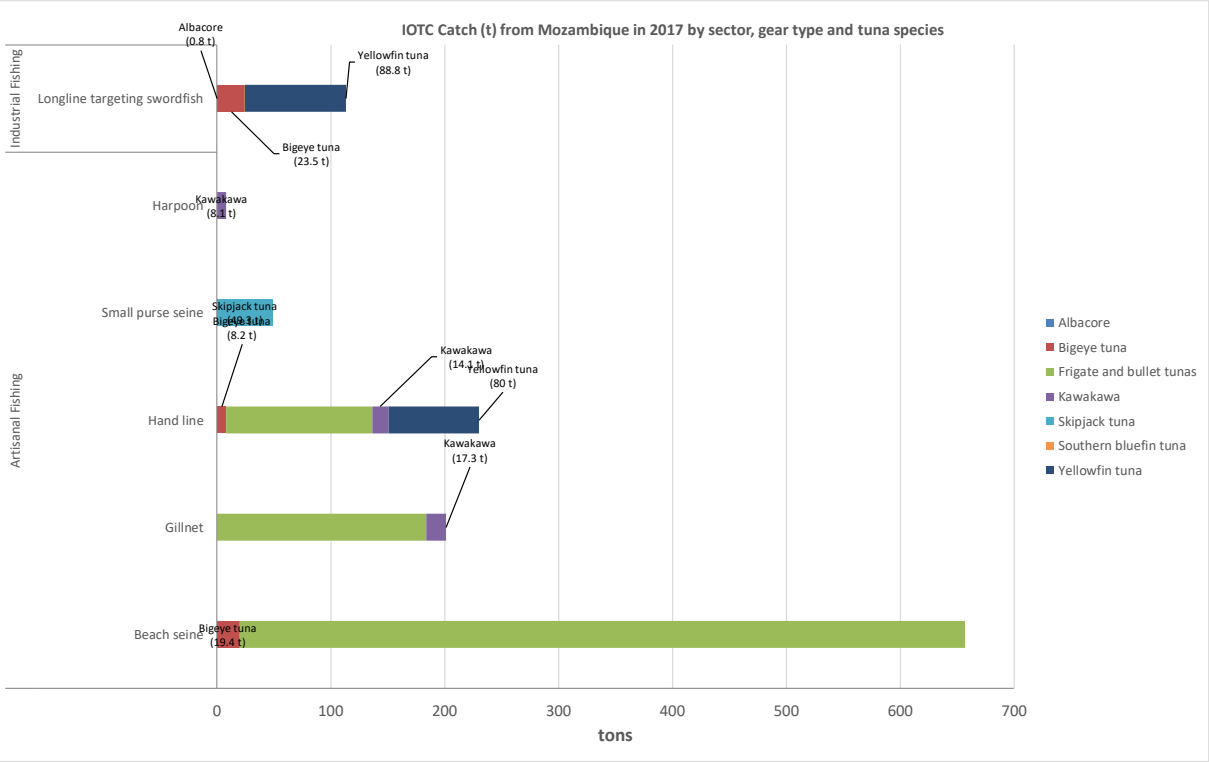


Figure 6-94: Tuna Catch in the IOTC area by Mozambique in 2017 by species and fishing method. Source (IOTC, 2019)

6.6.3 IUU Tuna Landings

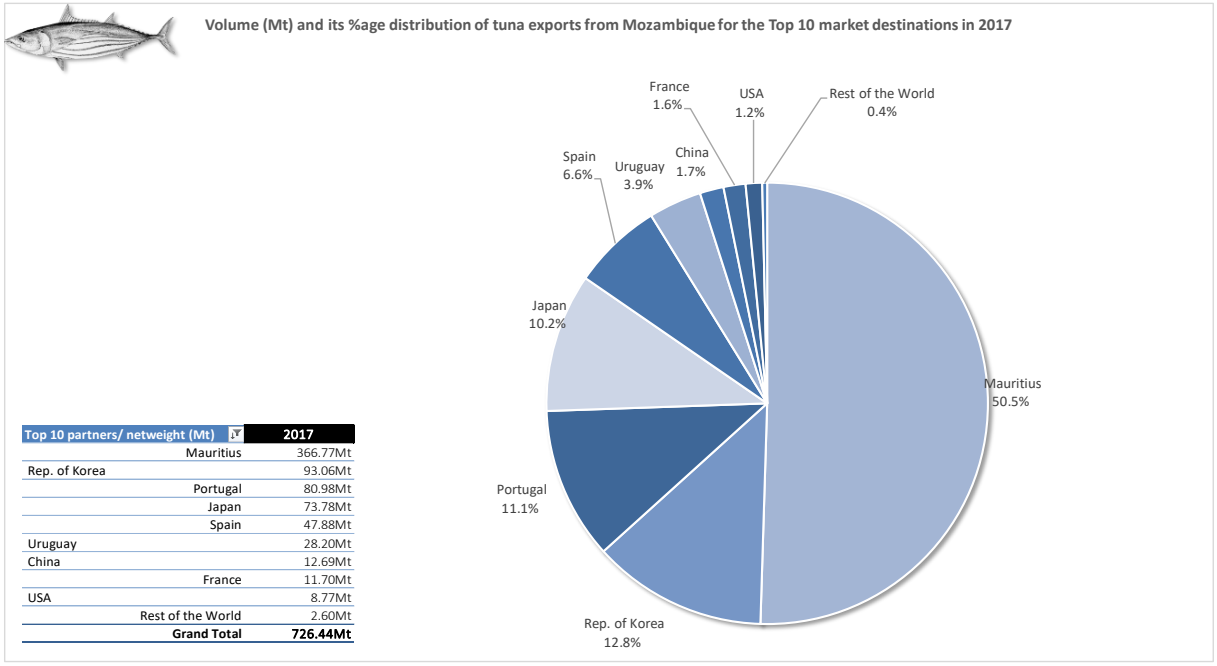
Table 6-10: Reported and unreported tuna landings (Mt and USD) for Mozambique by sector, method and tuna species in 2014. Source (SAU, 2019)

Tuna Landings				
Country/sector/method/ species	Reported		Total Catch (metric tonnes)	Total Landed value (US$)[1]
	Catch (metric tonnes)	Landed value (US$)[1]		
Mozambique	**512.4**	**983,887.8**	**512.4**	**983,887.8**
Industrial	**512.4**	**983,887.8**	**512.4**	**983,887.8**
longline	68.4	198,007.8	68.4	198,007.8
ALB	9.8	26,026.8	9.8	26,026.8
BET	36.4	71,428.6	36.4	71,428.6
BOP	0.0	8.4	0.0	8.4
SBF	2.8	33,091.4	2.8	33,091.4
SKJ	0.2	332.3	0.2	332.3
YFT	19.2	67,120.3	19.2	67,120.3
other industrial	444.0	785,880.0	444.0	785,880.0
FRZ	444.0	785,880.0	444.0	785,880.0
Grand Total	**512.4**	**983,887.8**	**512.4**	**983,887.8**

[1] value estimated applying 2017 ex-vessel prices from Poseidon (2019)

6.6.4 Tuna Export Markets

6.6.4.1 Tuna exports volume



Top 10 partners/ netweight (Mt)	2017
Mauritius	366.77Mt
Rep. of Korea	93.06Mt
Portugal	80.98Mt
Japan	73.78Mt
Spain	47.88Mt
Uruguay	28.20Mt
China	12.69Mt
France	11.70Mt
USA	8.77Mt
Rest of the World	2.60Mt
Grand Total	**726.44Mt**

Figure 6-95: Share of tuna exports volume (% and Metric tonnes) between the top 10 market destination for Mozambique and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

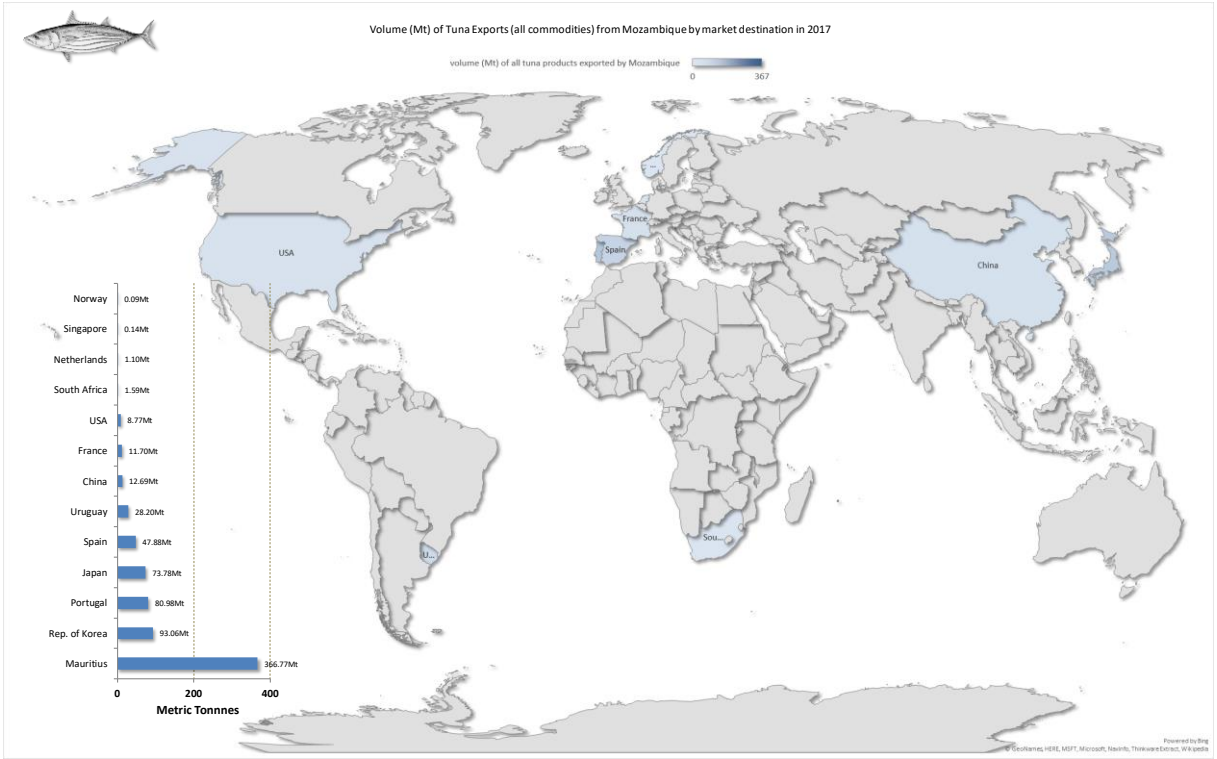
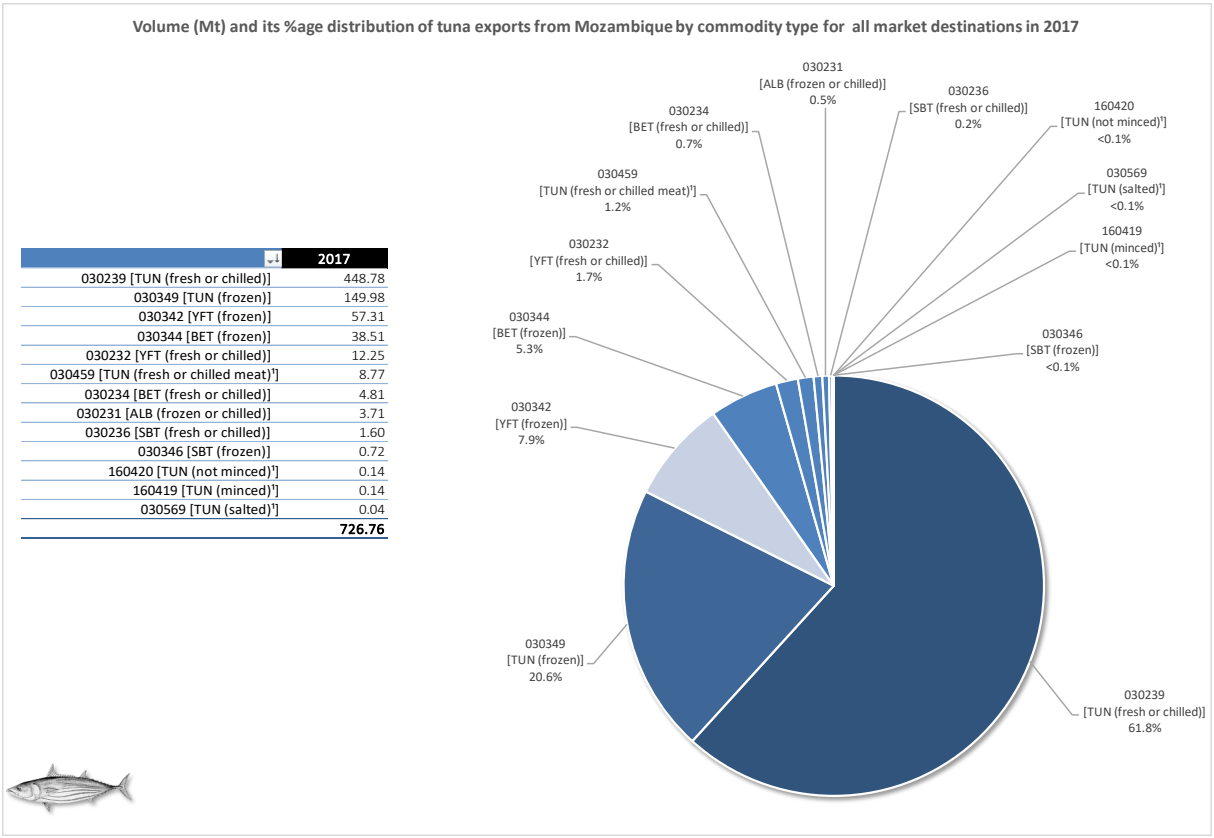


Figure 6-96: Geographic distribution by market destination of tuna exports volume (Mt) for Mozambique and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)



	2017
030239 [TUN (fresh or chilled)]	448.78
030349 [TUN (frozen)]	149.98
030342 [YFT (frozen)]	57.31
030344 [BET (frozen)]	38.51
030232 [YFT (fresh or chilled)]	12.25
030459 [TUN (fresh or chilled meat)¹]	8.77
030234 [BET (fresh or chilled)]	4.81
030231 [ALB (frozen or chilled)]	3.71
030236 [SBT (fresh or chilled)]	1.60
030346 [SBT (frozen)]	0.72
160420 [TUN (not minced)¹]	0.14
160419 [TUN (minced)¹]	0.14
030569 [TUN (salted)¹]	0.04
	726.76

Figure 6-97: Share of tuna exports volume (% and metric tonnes) by product for Mozambique in 2017. Source UN ComTrade (2019) and FAO (2019b)

Volume (Mt) of tuna exports from Mozambique by commodity type and market destination in 2017

Netweight (Mt) Product/ Trading partner	Year 2017
030569 [TUN (salted)[1]]	**0.04**
South Africa	0.04
160419 [TUN (minced)[1]]	**0.14**
Singapore	0.14
160420 [TUN (not minced)[1]]	**0.14**
South Africa	0.06
Norway	0.09
030346 [SBT (frozen)]	**0.72**
France	0.72
030236 [SBT (fresh or chilled)]	**1.60**
Japan	1.60
030231 [ALB (frozen or chilled)]	**3.71**
Mauritius	3.71
030234 [BET (fresh or chilled)]	**4.81**
Mauritius	2.31
Japan	2.50
030459 [TUN (fresh or chilled meat)[1]]	**8.77**
USA	8.77
030232 [YFT (fresh or chilled)]	**12.25**
Mauritius	12.25
030344 [BET (frozen)]	**38.51**
Japan	2.00
China	3.69
Mauritius	4.69
Uruguay	8.28
Portugal	19.84
030342 [YFT (frozen)]	**57.31**
Japan	1.31
Mauritius	7.47
China	9.00
Uruguay	9.72
Portugal	29.81
030349 [TUN (frozen)]	**149.98**
Japan	3.64
Uruguay	10.20
Portugal	31.32
Spain	45.43
Mauritius	59.38
030239 [TUN (fresh or chilled)]	**448.78**
Spain	2.45
Rest of the World	2.60
France	10.98
Japan	62.74
Rep. of Korea	93.06
Mauritius	276.96
Grand Total	**726.76**

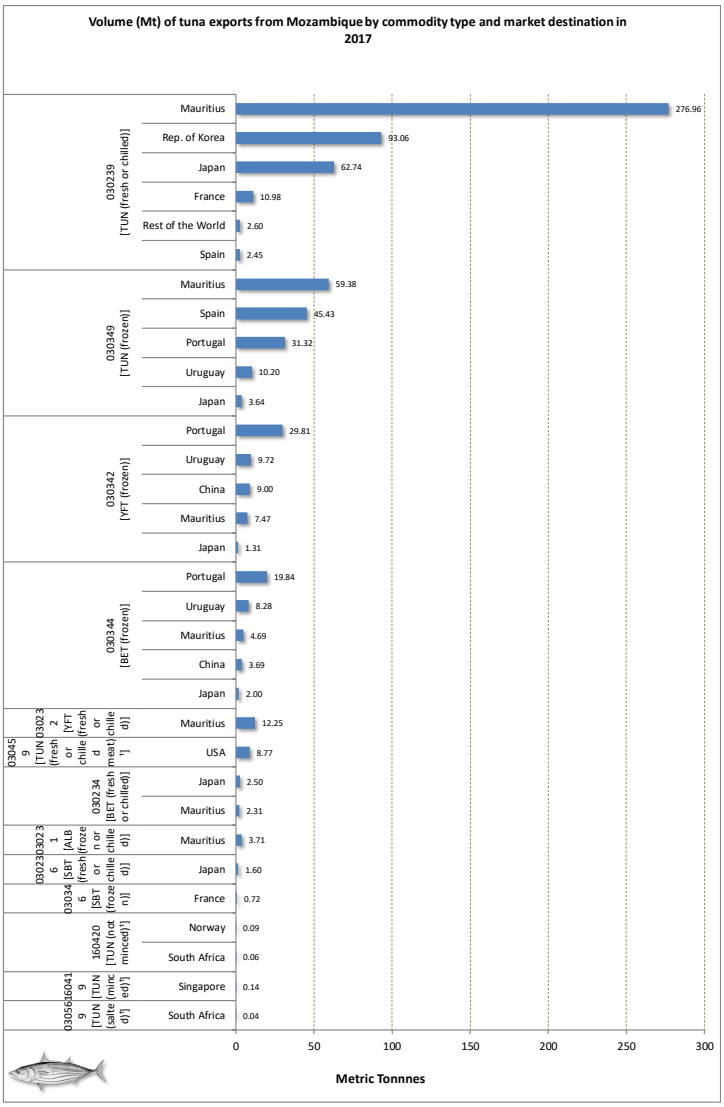
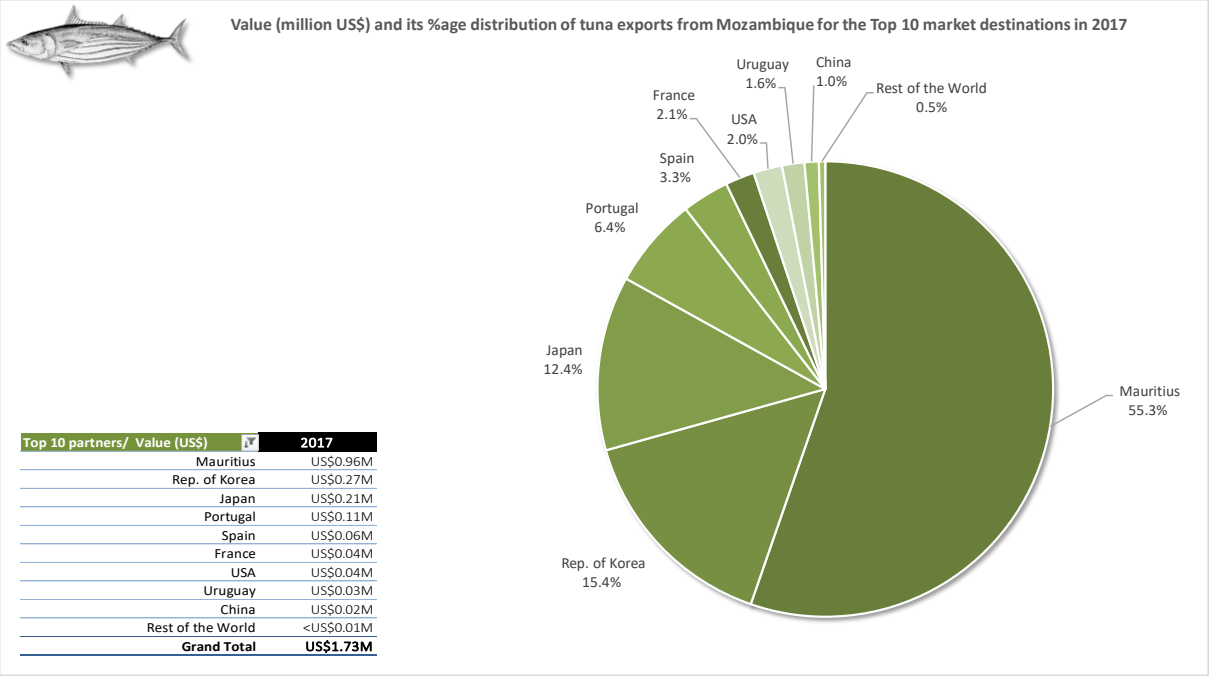


Figure 6-98: Tuna exports volume (Mt) for Mozambique in 2017 by product and market destination. Source UN ComTrade (2019)

6.6.4.2 Tuna exports value.

All exports values are expressed c.i.f.



Top 10 partners/ Value (US$)	2017
Mauritius	US$0.96M
Rep. of Korea	US$0.27M
Japan	US$0.21M
Portugal	US$0.11M
Spain	US$0.06M
France	US$0.04M
USA	US$0.04M
Uruguay	US$0.03M
China	US$0.02M
Rest of the World	<US$0.01M
Grand Total	**US$1.73M**

Figure 6-99: Share of tuna exports value (% and million USD) between the top 10 market destination for Mozambique and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

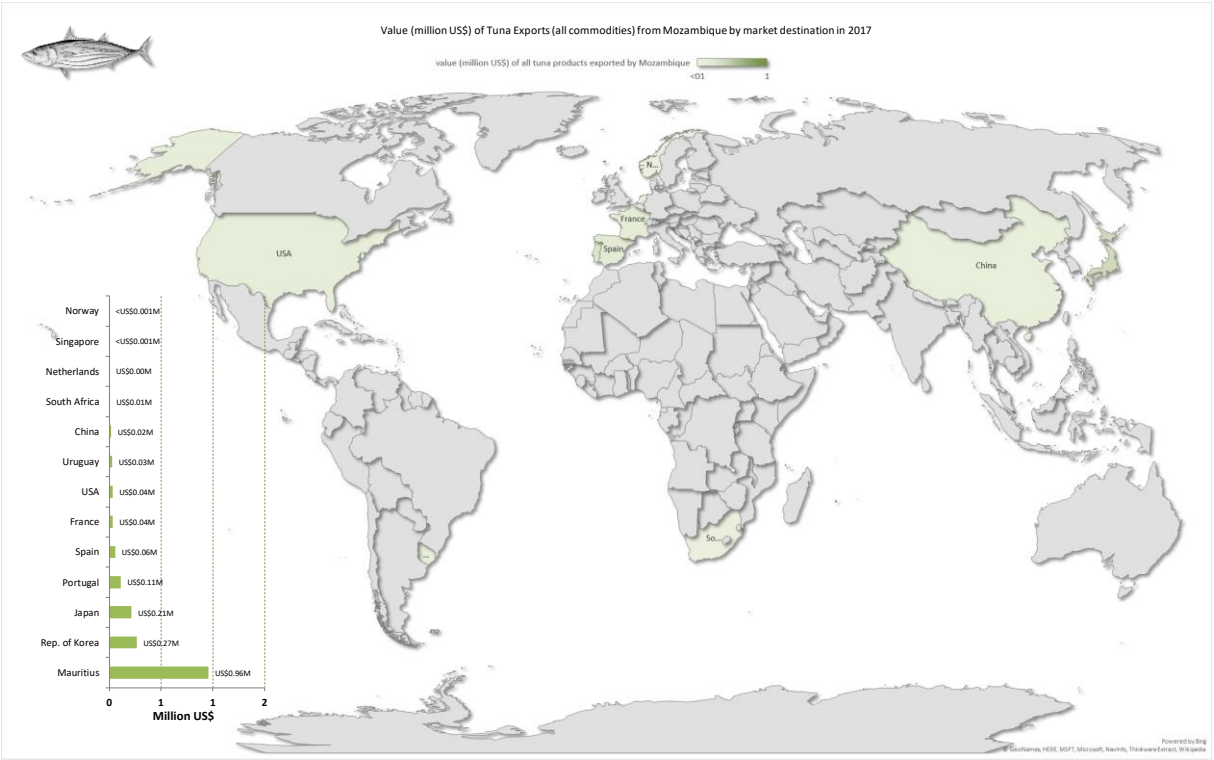
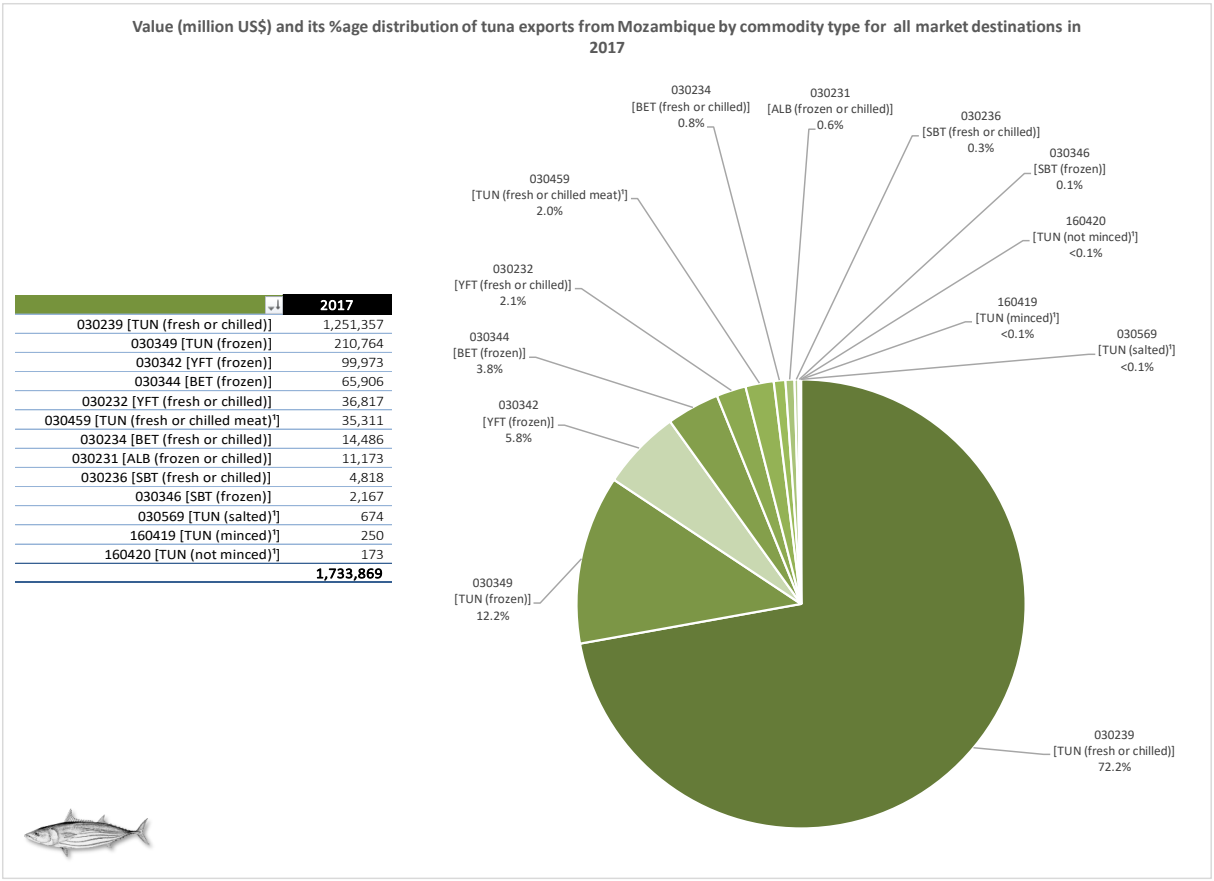


Figure 6-100: Geographic distribution by market destination of tuna exports value (million USD) for Mozambique and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)



	2017
030239 [TUN (fresh or chilled)]	1,251,357
030349 [TUN (frozen)]	210,764
030342 [YFT (frozen)]	99,973
030344 [BET (frozen)]	65,906
030232 [YFT (fresh or chilled)]	36,817
030459 [TUN (fresh or chilled meat)¹]	35,311
030234 [BET (fresh or chilled)]	14,486
030231 [ALB (frozen or chilled)]	11,173
030236 [SBT (fresh or chilled)]	4,818
030346 [SBT (frozen)]	2,167
030569 [TUN (salted)¹]	674
160419 [TUN (minced)¹]	250
160420 [TUN (not minced)¹]	173
	1,733,869

Figure 6-101: Share of tuna exports value (% and million USD) by product for Mozambique in 2017. Source UN ComTrade (2019) and FAO (2019b)

Value ('000 US$) of tuna exports from Mozambique by commodity type and market destination in 2017

Value (US$)	Year
Product/ Trading partner	2017
160420 [TUN (not minced)¹]	**173**
Norway	15
South Africa	158
160419 [TUN (minced)¹]	**250**
Singapore	250
030569 [TUN (salted)¹]	**674**
South Africa	674
030346 [SBT (frozen)]	**2,167**
France	2,167
030236 [SBT (fresh or chilled)]	**4,818**
Japan	4,818
030231 [ALB (frozen or chilled)]	**11,173**
Mauritius	11,173
030234 [BET (fresh or chilled)]	**14,486**
Mauritius	6,957
Japan	7,529
030459 [TUN (fresh or chilled meat)¹]	**35,311**
USA	35,311
030232 [YFT (fresh or chilled)]	**36,817**
Mauritius	36,817
030344 [BET (frozen)]	**65,906**
China	4,779
Japan	6,043
Uruguay	10,828
Mauritius	14,170
Portugal	30,086
030342 [YFT (frozen)]	**99,973**
Japan	6,027
Uruguay	12,700
China	12,704
Mauritius	22,360
Portugal	46,182
030349 [TUN (frozen)]	**210,764**
Uruguay	4,000
Japan	11,877
Portugal	35,422
Spain	50,829
Mauritius	108,636
030239 [TUN (fresh or chilled)]	**1,251,357**
Spain	7,116
Rest of the World	7,853
France	33,600
Japan	178,490
Rep. of Korea	266,071
Mauritius	758,227
Grand Total	**1,733,869**

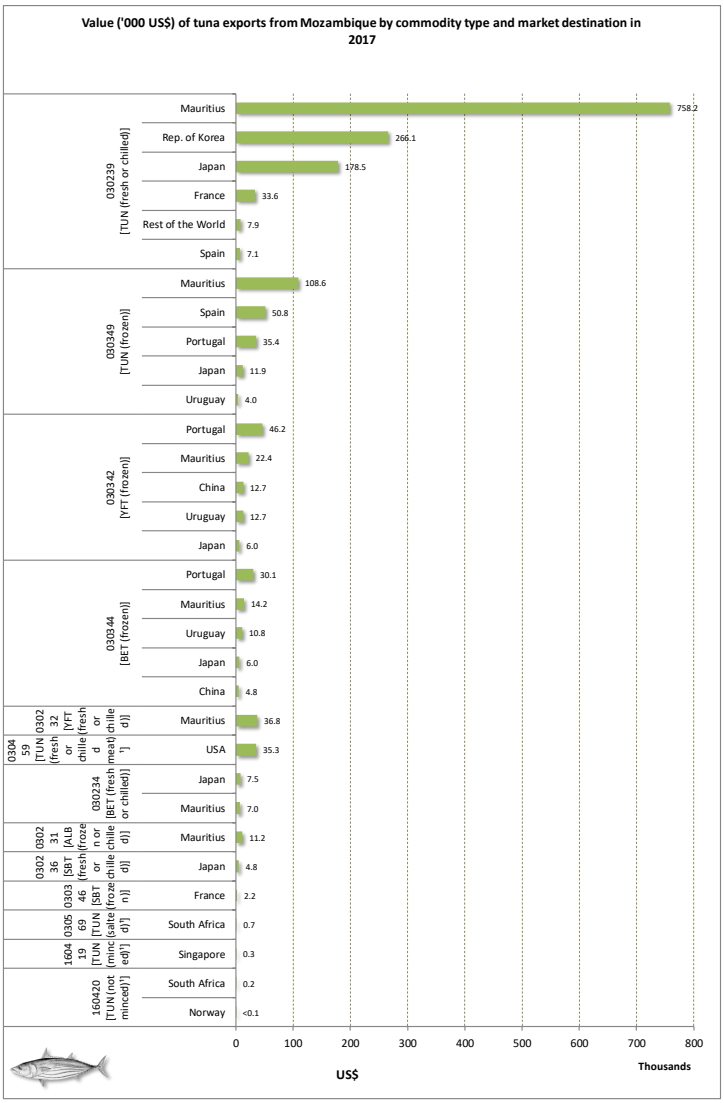


Figure 6-102: Tuna exports value (USD) for Mozambique in 2017 by product and market destination. Source UN ComTrade (2019)

6.6.4.3 Average prices of tuna exports

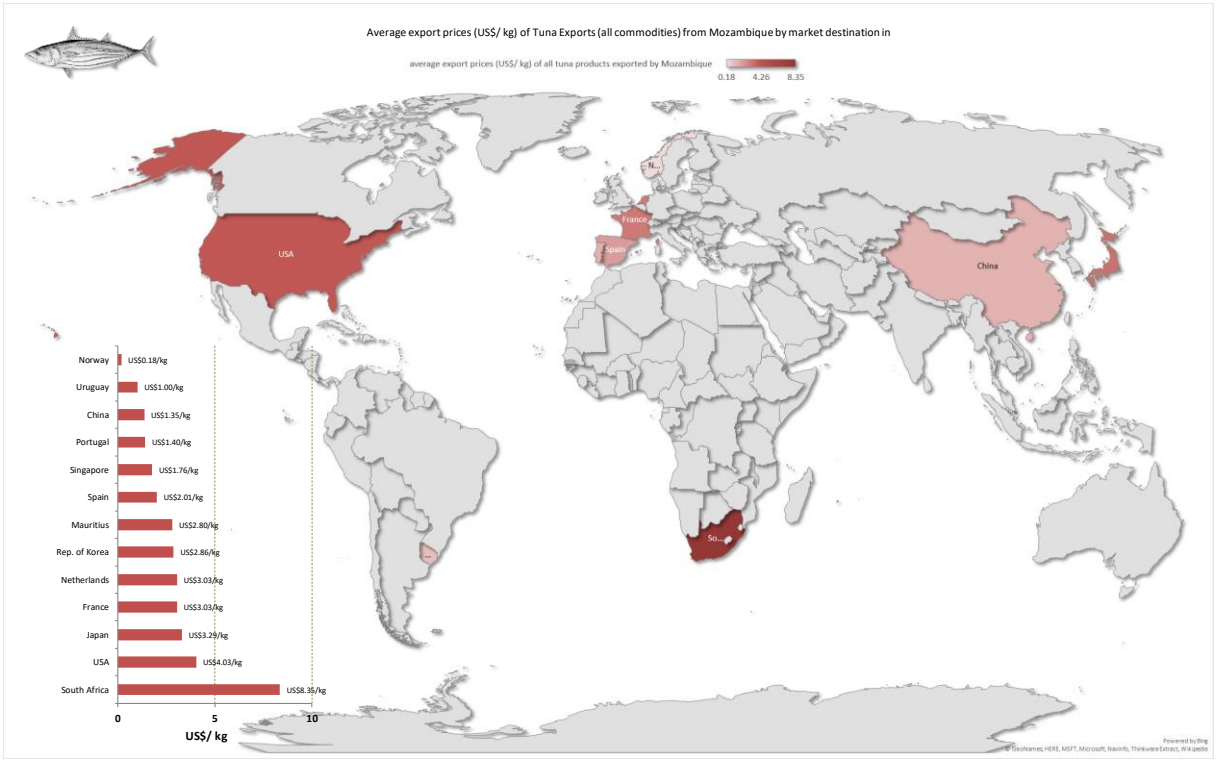


Figure 6-103: Geographic distribution by market destination of the average price of tuna exports for Mozambique and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

Average price (US$/ kg) of tuna exports from Mozambique by commodity type and market destination in 2017

Average of Average price	Year
Product/ Trading partner	2017
160420 [TUN (not minced)[1]]	**1.47**
Norway	0.18
South Africa	2.77
030349 [TUN (frozen)]	**1.55**
Uruguay	0.39
Spain	1.12
Portugal	1.13
Mauritius	1.83
Japan	3.26
160419 [TUN (minced)[1]]	**1.76**
Singapore	1.76
030344 [BET (frozen)]	**2.03**
China	1.30
Uruguay	1.31
Portugal	1.52
Mauritius	3.02
Japan	3.02
030342 [YFT (frozen)]	**2.37**
Uruguay	1.31
China	1.41
Portugal	1.55
Mauritius	2.99
Japan	4.60
030239 [TUN (fresh or chilled)]	**2.92**
Mauritius	2.74
Japan	2.85
Rep. of Korea	2.86
Spain	2.90
Rest of the World	3.02
France	3.06
030232 [YFT (fresh or chilled)]	**3.01**
Mauritius	3.01
030346 [SBT (frozen)]	**3.01**
France	3.01
030236 [SBT (fresh or chilled)]	**3.01**
Japan	3.01
030231 [ALB (frozen or chilled)]	**3.01**
Mauritius	3.01
030234 [BET (fresh or chilled)]	**3.01**
Japan	3.01
Mauritius	3.01
030459 [TUN (fresh or chilled meat)[1]]	**4.03**
USA	4.03
030569 [TUN (salted)[1]]	**19.26**
South Africa	19.26
Average	**2.92**

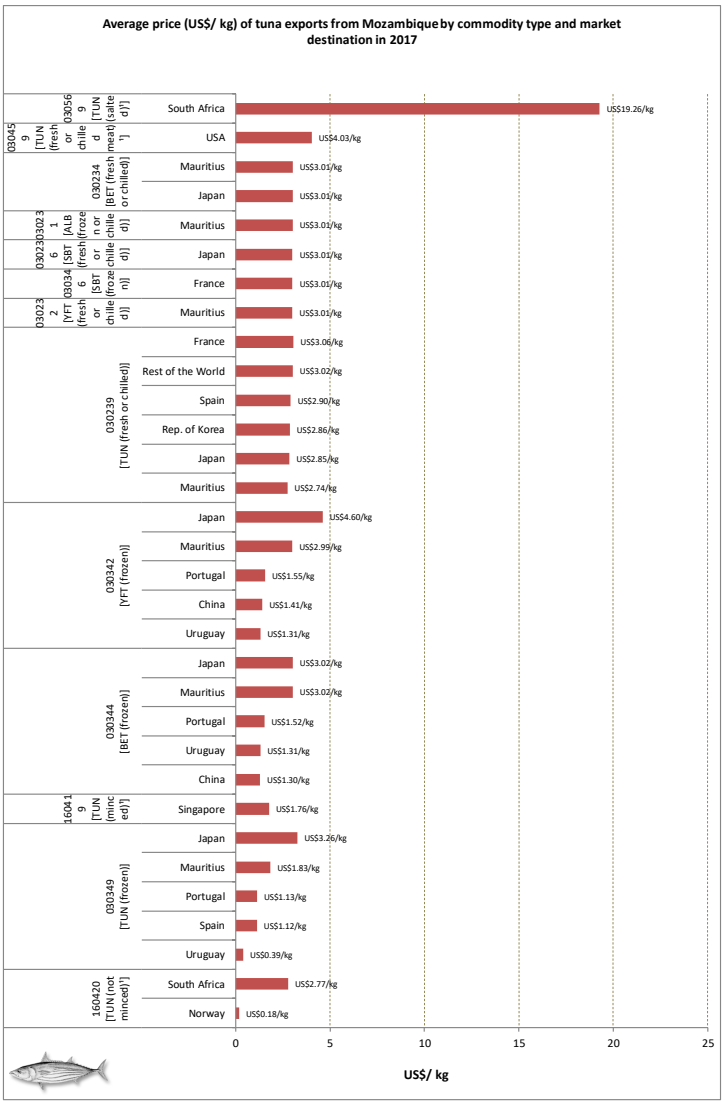


Figure 6-104: Average price of tuna exports (USD / kg) for Mozambique in 2017 by product and market destination. Source UN ComTrade (2019)

6.6.4.4 Exports tariff for main tuna products exported by Mozambique

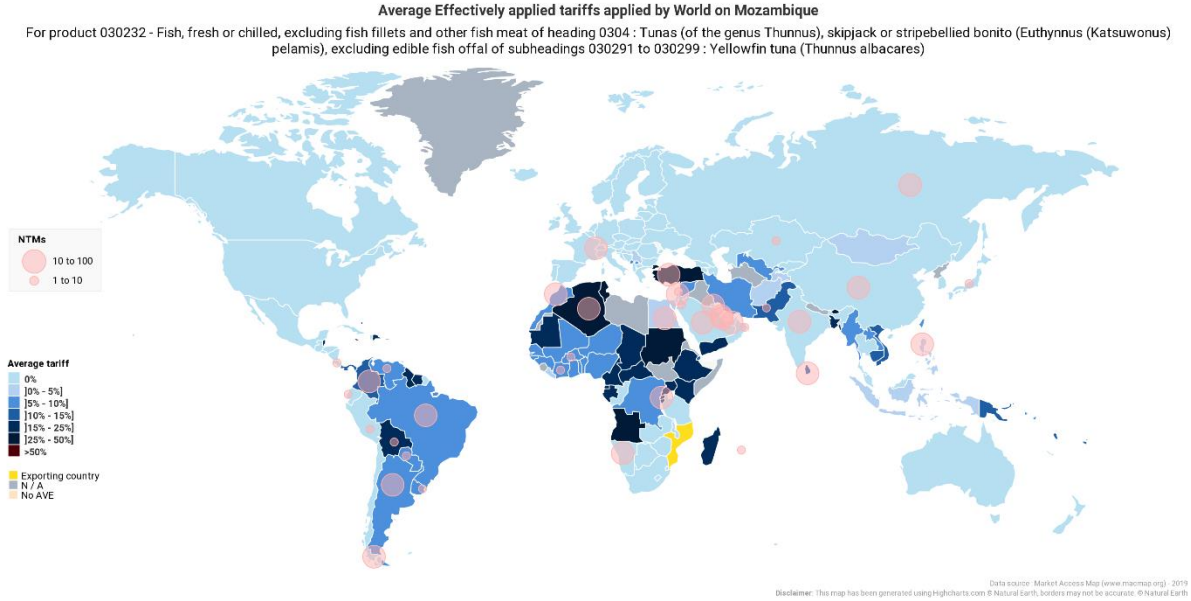


Figure 6-105: Tuna exports tariffs and NTMs faced by Mozambique on the International markets for commodity: 30232 - Yellowfin tuna (fresh or chilled). Source: ITC (2019)

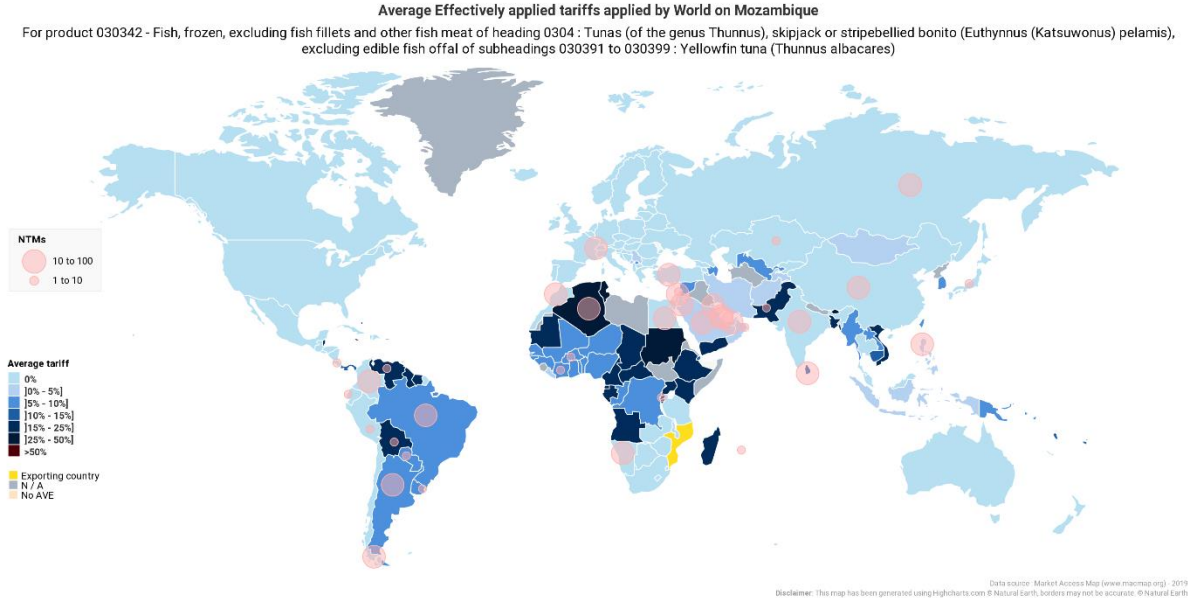


Figure 6-106: Tuna exports tariffs and NTMs faced by Mozambique on the International markets for commodity: 30342 - Yellowfin tuna (frozen). Source: ITC (2019)

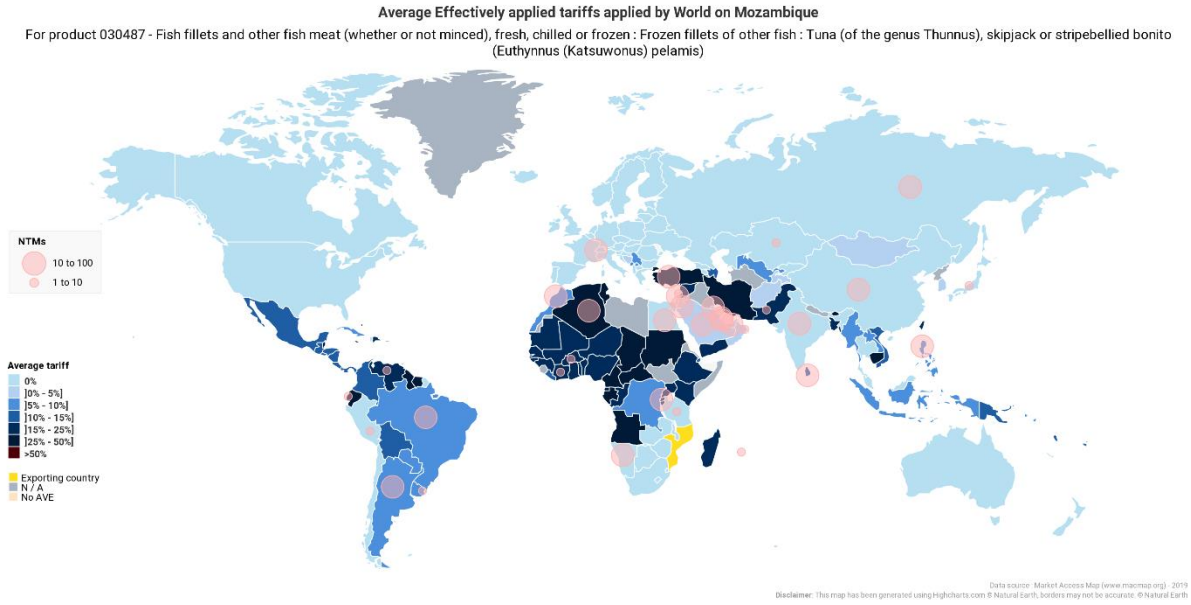


Figure 6-107: Tuna exports tariffs and NTMs faced by Mozambique on the International markets for commodity: 30487 - Skipjack tuna (frozen fillets). Source: ITC (2019)

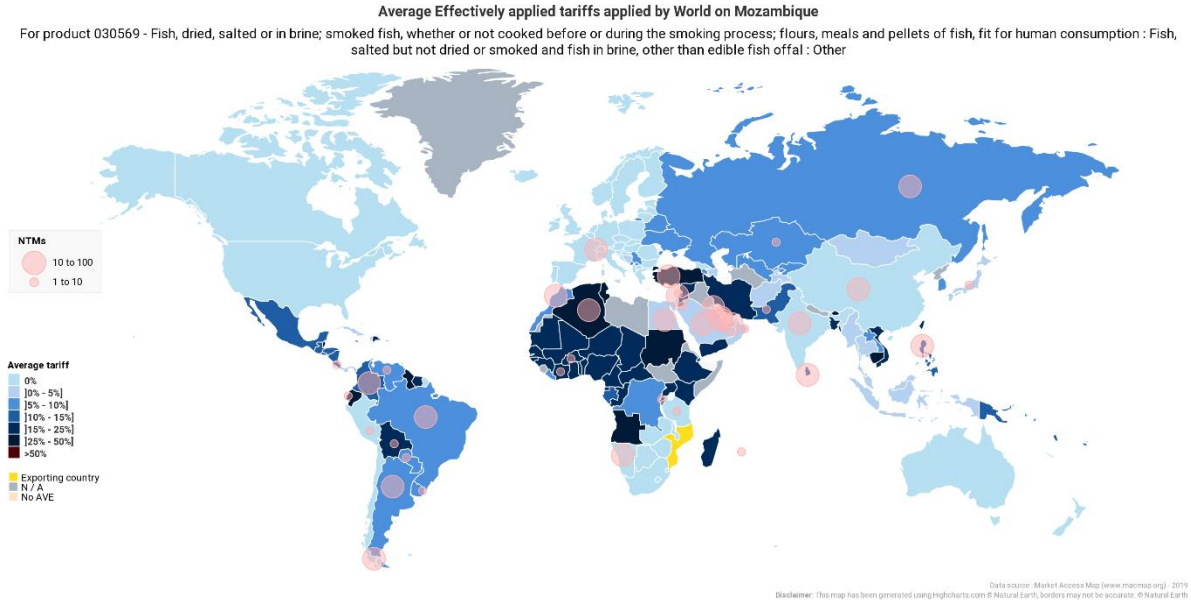


Figure 6-108: Tuna exports tariffs and NTMs faced by Mozambique on the International markets for commodity: 30569 - Tunas nei (salted). Source: ITC (2019)

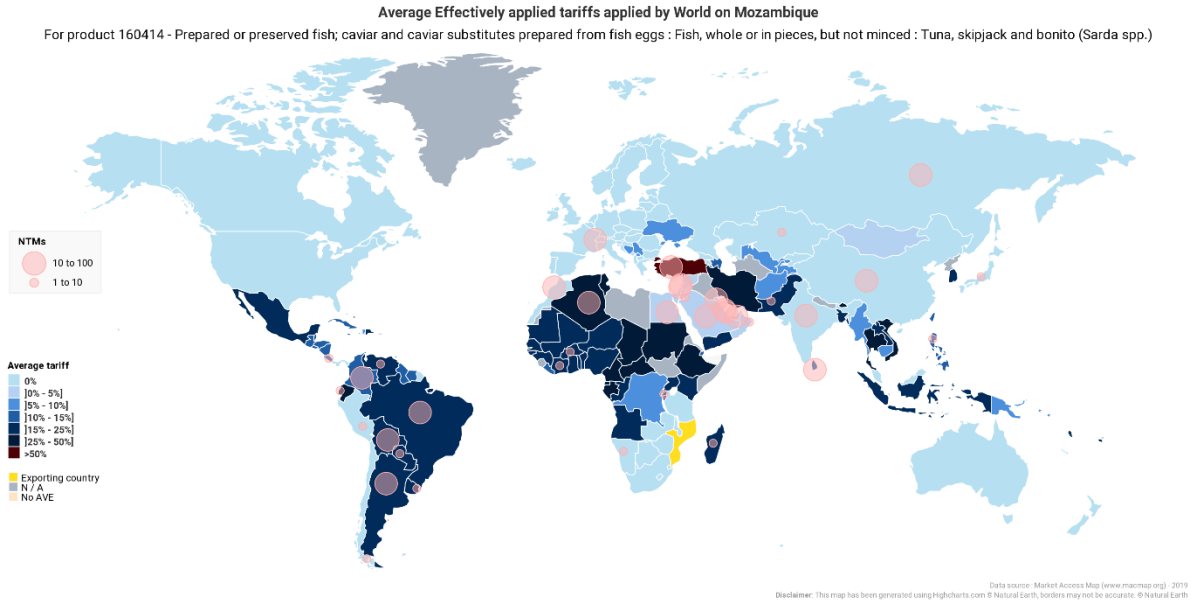


Figure 6-109: Tuna exports tariffs and NTMs faced by Mozambique on the International markets for commodity: 160414 - Skipjack tuna (canned). Source: ITC (2019)

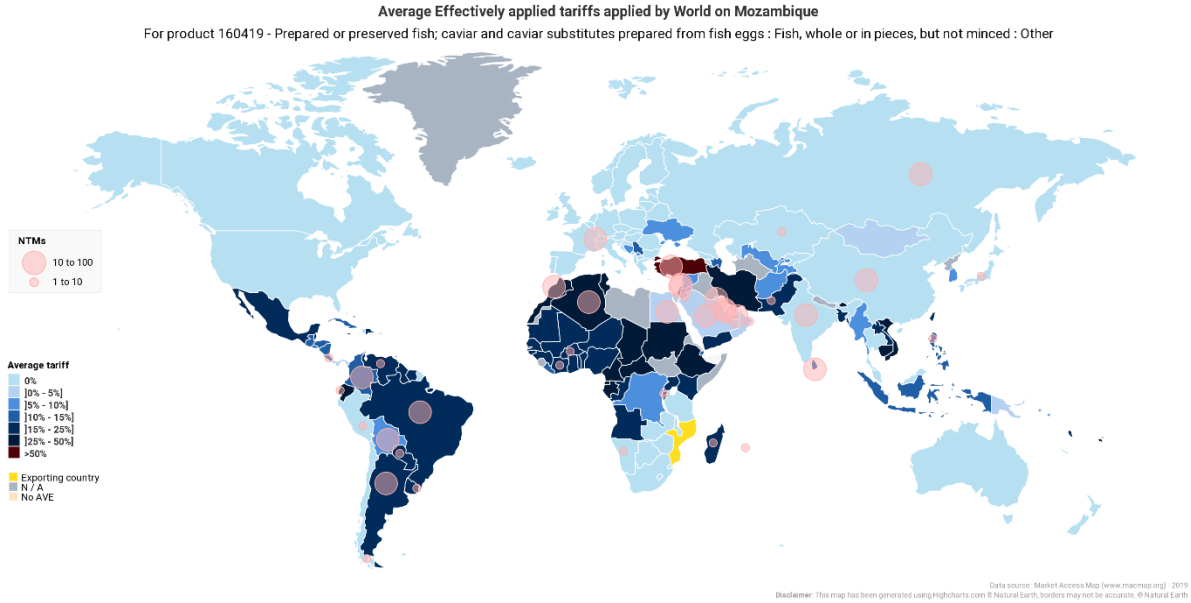


Figure 6-110: Tuna exports tariffs and NTMs faced by Mozambique on the International markets for commodity: 160419 - Tunas nei (prep minced). Source: ITC (2019)

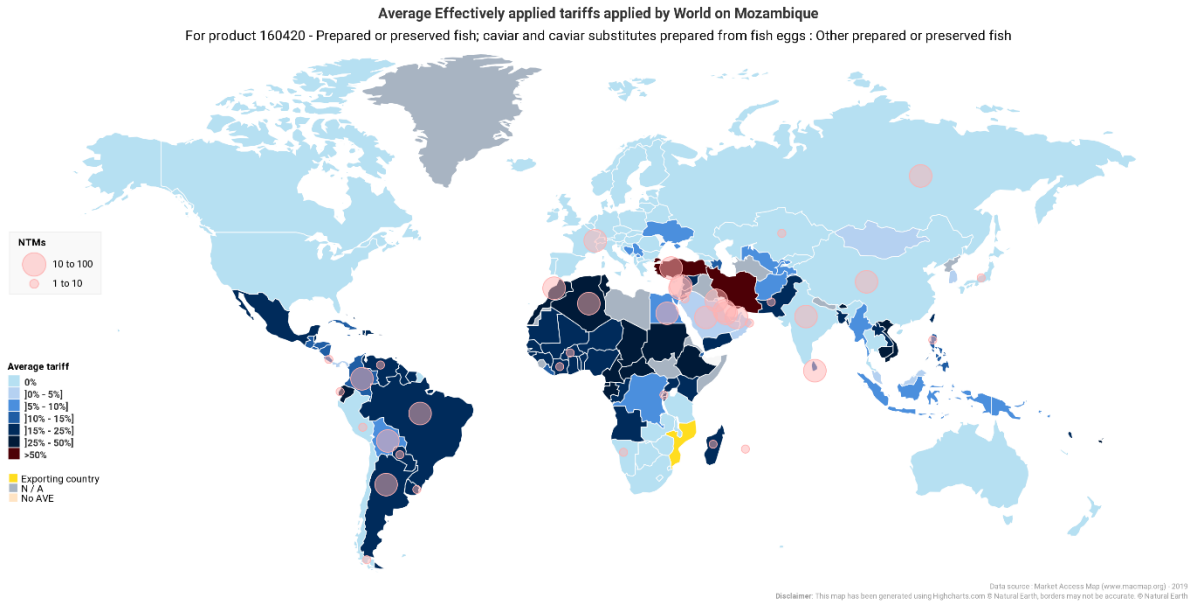


Figure 6-111: Tuna exports tariffs and NTMs faced by Mozambique on the International markets for commodity: 160420 - Tunas nei (prep not minced). Source: ITC (2019)

6.7 Réunion

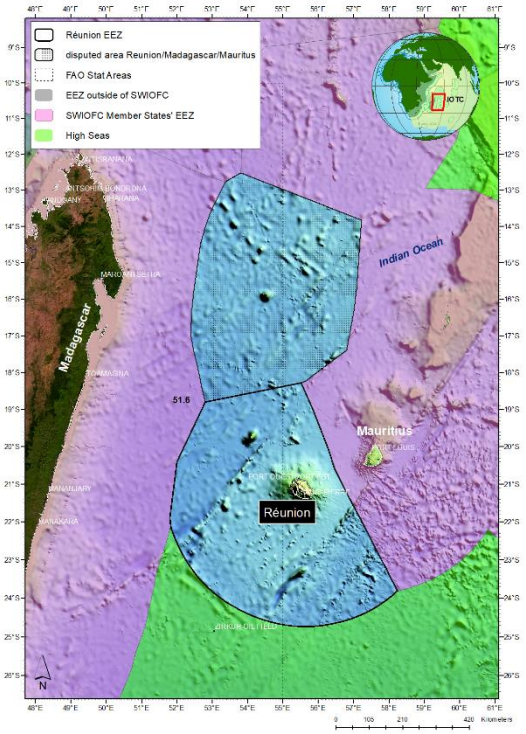


Figure 6-112: Réunion EEZ and surrounding waters

The island is 63 km (39 mi) long; 45 km (28 mi) wide; and covers 2,512 km2 (970 sq mi). Reunion Island is among the French overseas territories and is located off the eastern coast of Madagascar in the Indian Ocean and about 200 km from Mauritius. As an EU outermost region Reunion Island is an integral part of the European Union and subject to EU law. Exports from Reunion have the same access to the EU market as do exports from any other EU Member State. Financial support given to the industry is the same as that for all French fisheries. The France/Réunion fishing fleet targets mainly swordfish and tuna.

6.7.1 Fisheries Access Agreements

Because Réunion is part of France, French Seiners are de facto allowed to fish for tuna in the Réunion's EEZ and have to follow CFP regulations.

6.7.2 Tuna Production

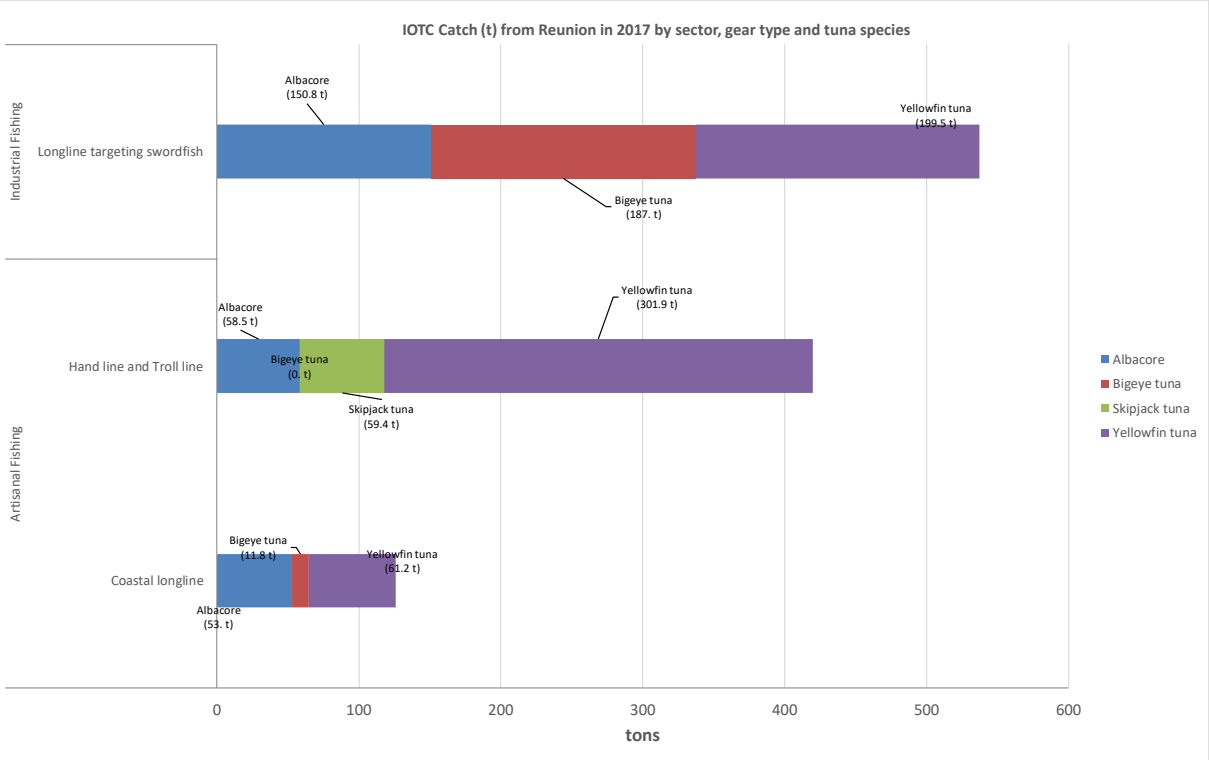


Figure 6-113: Tuna Catch in the IOTC area by la Réunion in 2017 by species and fishing method. Source (IOTC, 2019)

6.7.3 IUU Tuna Landings

Table 6-11: Reported and unreported tuna landings (Mt and USD) for la Réunion by sector, method and tuna species in 2014. Source (SAU, 2019)

Tuna Landings						
	Reported		Unreported		Total Catch (metric tonnes)	Total Landed value (US$)[1]
Country/sector/method/ species	Catch (metric tonnes)	Landed value (US$)[1]	Catch (metric tonnes)	Landed value (US$)[1]		
La Réunion (France)	**532.2**	**1,685,485.9**	**587.5**	**1,926,887.6**	**1,119.6**	**3,612,373.5**
Artisanal	**367.2**	**1,204,304.8**	**403.9**	**1,324,735.2**	**771.0**	**2,529,040.0**
small scale encircling nets	292.0	1,015,957.4	321.2	1,117,553.1	613.2	2,133,510.5
BET	1.3	2,471.1	1.4	2,718.2	2.6	5,189.3
DOT	1.2	2,147.7	1.3	2,362.5	2.5	4,510.2
SKJ	2.0	4,166.4	2.2	4,583.1	4.2	8,749.5
YFT	287.5	1,007,172.1	316.3	1,107,889.3	603.8	2,115,061.5
small scale gillnets	24.3	61,169.0	26.7	67,285.9	51.1	128,454.8
ALB	19.8	52,289.2	21.8	57,518.1	41.5	109,807.2
BET	1.3	2,471.1	1.4	2,718.2	2.6	5,189.3
DOT	1.3	2,242.2	1.4	2,466.5	2.7	4,708.7
SKJ	2.0	4,166.4	2.2	4,583.1	4.2	8,749.5
small scale lines	44.3	113,827.3	48.7	125,210.0	93.0	239,037.3
ALB	39.6	104,578.3	43.5	115,036.2	83.1	219,614.5
BET	1.3	2,471.1	1.4	2,718.2	2.6	5,189.3
DOT	1.5	2,611.4	1.6	2,872.5	3.1	5,484.0
SKJ	2.0	4,166.4	2.2	4,583.1	4.2	8,749.5
small scale seine nets	6.6	13,351.1	7.2	14,686.3	13.8	28,037.4
BET	2.5	4,942.2	2.8	5,436.5	5.3	10,378.7
DOT	0.0	76.0	0.0	83.6	0.1	159.6
SKJ	4.0	8,332.9	4.4	9,166.2	8.4	17,499.1
Industrial	**165.0**	**481,181.1**			**165.0**	**481,181.1**
longline	165.0	481,181.1			165.0	481,181.1
ALB	94.3	249,267.2			94.3	249,267.2
BET	14.3	27,994.4			14.3	27,994.4
BOP	1.7	12,096.7			1.7	12,096.7
YFT	54.8	191,822.8			54.8	191,822.8
Recreational			**183.6**	**602,152.4**	**183.6**	**602,152.4**
recreational fishing gear			183.6	602,152.4	183.6	602,152.4
ALB			29.7	78,433.7	29.7	78,433.7
BET			3.2	6,177.8	3.2	6,177.8
DOT			2.0	3,538.7	2.0	3,538.7
SKJ			5.0	10,416.1	5.0	10,416.1
YFT			143.8	503,586.1	143.8	503,586.1
Grand Total	**532.2**	**1,685,485.9**	**587.5**	**1,926,887.6**	**1,119.6**	**3,612,373.5**

[1] value estimated applying 2017 ex-vessel prices from Poseidon (2019)

6.7.4 Tuna Export Markets

There is no trade data available on the UN ComTrade (UN Comtrade, 2019) nor the FAO FishStat database (FAO, 2019a) for Réunion.

6.8 Seychelles

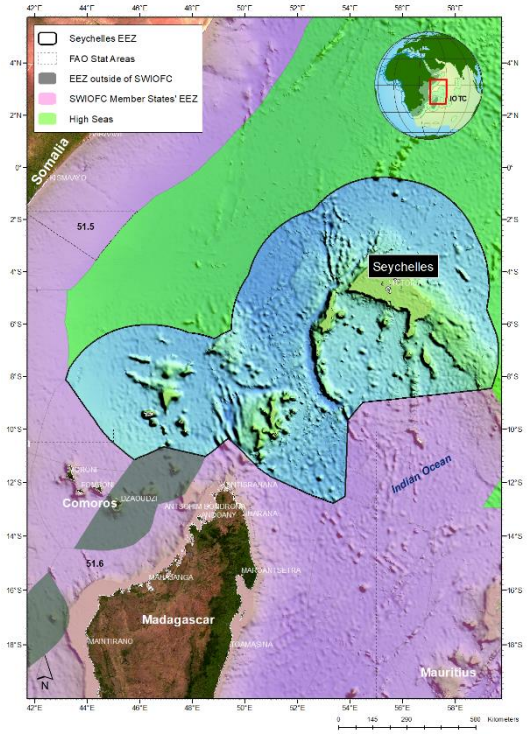


Figure 6-114: Seychelles EEZ and surrounding waters

The Seychelles fishery sector has three main components: artisanal fisheries, carried out by local fishers, with small, motorized boats targeting mainly demersal and semi-pelagic species; semi-industrial fishery, consisting of small (from 14 to 22 m LOA), locally-owned long-liners targeting pelagic species (mainly tuna and swordfish); and industrial fisheries, comprising foreign-owned purse seiners and large long-liners primarily targeting tuna species (yellowfin and skipjack). There is a fish processing industry, with two fish processing plants producing for both the local market and export, and a large canning factory processing an average of 350 tonne of tuna a day, mostly for the export market. summarizes the fleets and their annual landings. The semi-industrial fishery targets swordfish and tuna stocks found outside the Mahé plateau, but mostly within the Seychelles EEZ. The fishery started in the mid-1990s and now involves several vessels ranging in size from 14 to 22 m LOA each, with an average of 5–6 crew. Most vessels were constructed overseas, mostly in Sri Lanka, and are equipped with modern electronic equipment and monofilament longline spools.

The peak annual landing of the semi-industrial fleet was approximately 500 tonne, with swordfish being the predominant species (60% of the catch), followed by yellowfin and big-eye tuna. The catch is sold to the two local exporting companies, exporting mostly to the European Union (EU) (principally France, Italy and the United Kingdom). The industrial fishery is operated by foreign-owned, licensed vessels, including some Seychelles registered vessels, and has two main categories. The purse seine fishery (mainly French and Spanish vessels under the EU agreement) targets mostly surface-swimming tuna (skipjack and yellowfin), and the longline fishery (mainly Taiwanese and Japanese vessels) targets deep-swimming big-eye and yellowfin tuna. The catch from purse seiners has remained stable over the past decade, with around 300 000 tonne of tuna caught in waters in the South-West Indian Ocean (including 15% in the Seychelles EEZ). In the last two years, however, the catch has been exceptionally high with the dominant species being yellowfin. Approximately 85% of the tuna catch from purse seiners is transshipped in Port Victoria, with around 90 000 tonne being landed for processing by the Indian Ocean Tuna factory. (FAO, 2018)

6.8.1 Fisheries Access Agreements

the EU and the Seychelles have enjoyed a strong relationship in fisheries following the Agreement between the European Economic Community and the Republic of Seychelles on fishing off Seychelles concluded in 1987. That Agreement was reinforced through the conclusion of a Fisheries Partnership Agreement between the Parties in 2006 which is still in force and implemented through the appropriate Protocol to that Agreement (EU, 2019).

Shipowners fee, advance payment and statement of fees (EU, 2019)

1. The payments to be paid by shipowners shall be calculated on the basis of the following rate per tonne of fish caught: For the first year of application of this Agreement, €110 per tonne. For the second and third years of application of this Agreement, €115 per tonne. For the fourth and fifth years of application of this Agreement, €120 per tonne. For the sixth year of application of this Agreement, €125 per tonne.
2. The annual advance payment to be paid by the shipowners of Seychelles vessels at the time of application for a fishing authorisation to the EU authorities and to be issued by the EU shall be as follows: Tuna Purse Seine Vessels

For the first year of application of this Agreement, the advance payment shall be €11,000, which the equivalent of €110 per tonne for 100 tonnes of tuna and tuna-like species caught within Mayotte waters. For the second and third years of application of this Agreement, the advance payment shall be €11,500, which the equivalent of €115 per tonne for 100 tonnes of tuna and tuna-like species caught within Mayotte waters. For the fourth and fifth year of application of this Agreement, the advance payment shall be €12,000, which the equivalent of €120 per tonne for 100 tonnes of tuna and tuna-like species caught within Mayotte waters. For the sixth year of application of this Agreement, the advance payment shall be €12,500, which the equivalent of €125 per tonne for 100 tonnes of tuna and tuna-like species caught within Mayotte waters.

3. For catches in excess of the 100 tonnes, the yearly rate per tonne of catch provided for in point 1 shall apply.
4. The EU authorities shall draw up a statement of fees due in respect of the previous calendar year on the basis of catch declarations submitted by Seychelles vessels and other information in the possession of the EU authorities. A copy shall also be provided to the Seychelles authorities for verification.
5. The statement shall be sent to the Seychelles authorities before 31 March of the current year. The Seychelles authorities shall transmit it before 15 April to the vessel owner.
6. Where the vessel owner does not agree with the statement submitted by the EU authorities, he may consult the competent scientific institutes for verifying catch statistics in the Seychelles and subsequently discuss with the Seychelles authorities, who shall inform the Commission thereof, to establish the final statement before 31 May of the current year. In the absence of observations by the vessel owners at that date, the statement submitted by the EU authorities shall be considered as the final one. Where the final statement is less than the advance payment referred to in point 2, the balance shall not be recoverable by the vessel owners. Supply Vessels
7. An authorisation for a supply vessel will be provided through the same procedure as for fishing vessels and the advance fee for the provision of an authorisation will be €3,000. In the event of any change in the provisions, fees and conditions relating to supply vessels, the EU shall inform the Seychelles of this change before it enters into effect.

The protocol is still in force

Table 6-12: Main features of the Tuna FPA between the EU and The Seychelles

Duration of the Agreement:	6 years renewable (02/11/2013 – 01/11/2019)
Duration of the Protocol:	6 years (18/01/2014 – 17/01/2020)
Initialisation:	10/05/2003
Nature of the FPA:	Tuna Fishery Agreement
Financial contribution:	1st and 2nd Years: €5,530,000 per year, of which €2,600,000 is dedicated to the support of the fisheries sector of Seychelles.
	3rd to 6th Years: €5,000,000 per year, of which €2,500,000 is dedicated to the support of the fisheries sector of Seychelles.
Advances:	- Tuna seiners: Annually incremental from €38,500 € to €52,500 (Years 4 and 5 - €49,000). (ref catches: 700 t)
	- Surface longliners =or< 250 GRT: Annually incremental from €4,950 € to €6,750 (Years 4 and 5 - €6,300) (ref catches: 90 t)
	Surface longliners > 250 GRT: Annually incremental from €6,600 € to €9,000 € (Years 4 and 5 - €8,400) (ref catches: 120 t)
Reference tonnage:	50,000 t/year

EU Fleet	Spain	France	Italy	Portugal	Total
Tuna seiners	22	16	2	-	40 vessels
Surface longliners	2	2	-	2	6 vessels

Outside of the SFPA, the following past fisheries access agreements were identified:

- China National Fisheries Association, Fishing Agreement 2006, Source: Republic of Seychelles (2006)
- Japan Tuna Fisheries Co-operation Associations, Fishing Agreement 2003, Source: Republic of Seychelles (2003a)
- Japan Tuna Fisheries Co-operation Associations, Goods and Services Agreement, 2003, Source: Republic of Seychelles (2003b)
- Taiwan Deep Sea Boat-owners and Export Association, Fishing Agreement 2003-2005, Source: Republic of Seychelles (2003c)
- Taiwan Deep Sea Boat-owners and Export Association, Fishing Agreement 2008, Source: Republic of Seychelles (2008)
- Japan Tuna Fisheries Co-operation Associations, Fishing Agreement 2007-2009, Source: Republic of Seychelles (2007)

6.8.2 Tuna Production

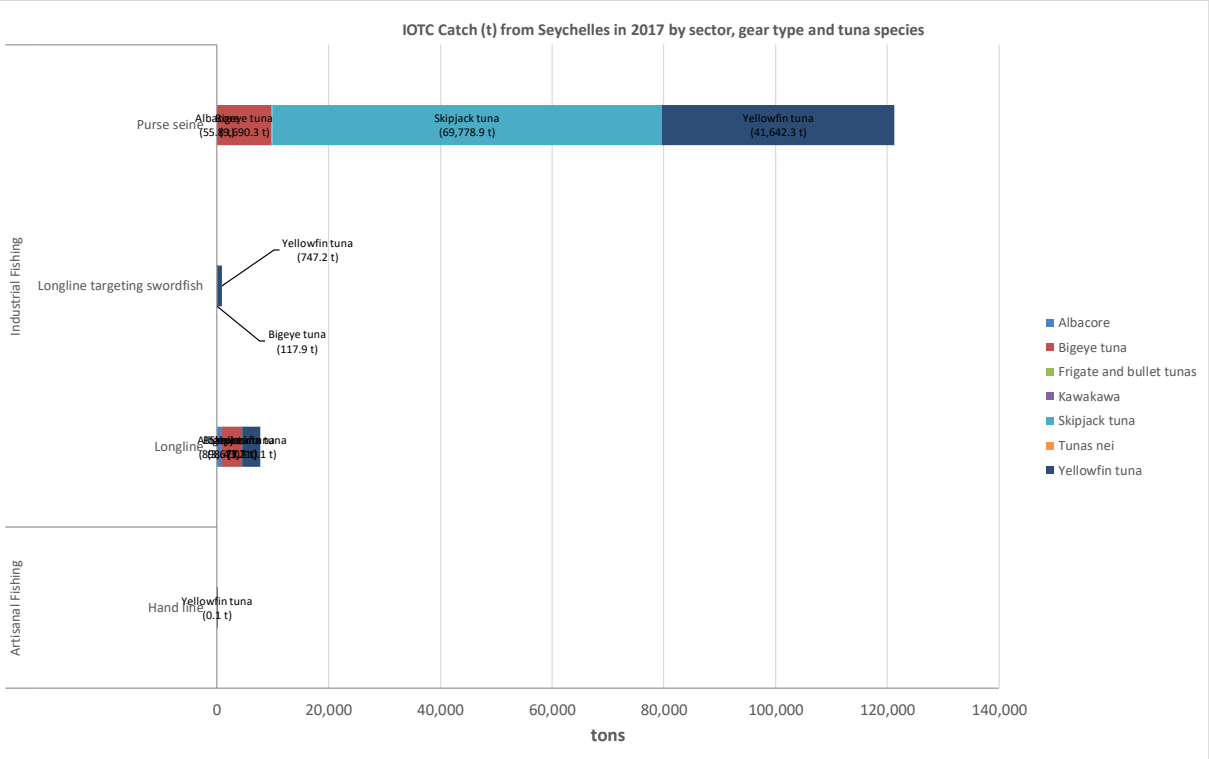


Figure 6-115: Tuna Catch in the IOTC area by Seychelles in 2017 by species and fishing method. Source (IOTC, 2019)

6.8.3 IUU Tuna Landings

Table 6-13: Reported and unreported tuna landings (Mt and USD) for Seychelles by sector, method and tuna species in 2014. Source (SAU, 2019)

Tuna Landings						
	Reported		Unreported		Total Catch (metric tonnes)	Total Landed value (US$)[1]
Country/sector/method/ species	Catch (metric tonnes)	Landed value (US$)[1]	Catch (metric tonnes)	Landed value (US$)[1]		
Seychelles	**436.0**	**968,817.8**	**10.1**	**17,977.6**	**446.1**	**986,795.4**
Artisanal	**67.4**	**119,850.6**	**7.6**	**13,483.2**	**74.9**	**133,333.8**
hand lines	67.4	119,850.6	7.6	13,483.2	74.9	133,333.8
KAW	67.0	118,590.0	7.5	13,341.4	74.5	131,931.4
YFT	0.4	1,260.6	0.0	141.8	0.4	1,402.4
Industrial	**368.7**	**848,967.3**			**368.7**	**848,967.3**
longline	252.3	556,291.0			252.3	556,291.0
ALB	18.0	47,467.4			18.0	47,467.4
BET	194.4	381,316.2			194.4	381,316.2
BOP	1.3	9,193.6			1.3	9,193.6
TUX	9.9	17,477.3			9.9	17,477.3
YFT	28.8	100,836.5			28.8	100,836.5
purse seine	116.3	292,676.2			116.3	292,676.2
BET	17.3	34,017.3			17.3	34,017.3
SKJ	62.1	129,356.3			62.1	129,356.3
YFT	36.9	129,302.6			36.9	129,302.6
Recreational			**2.5**	**4,494.4**	**2.5**	**4,494.4**
recreational fishing gear			2.5	4,494.4	2.5	4,494.4
KAW			2.5	4,447.1	2.5	4,447.1
YFT			0.0	47.3	0.0	47.3
Grand Total	**436.0**	**968,817.8**	**10.1**	**17,977.6**	**446.1**	**986,795.4**

[1] value estimated applying 2017 ex-vessel prices from Poseidon (2019)

6.8.4 Volume of Tuna processed

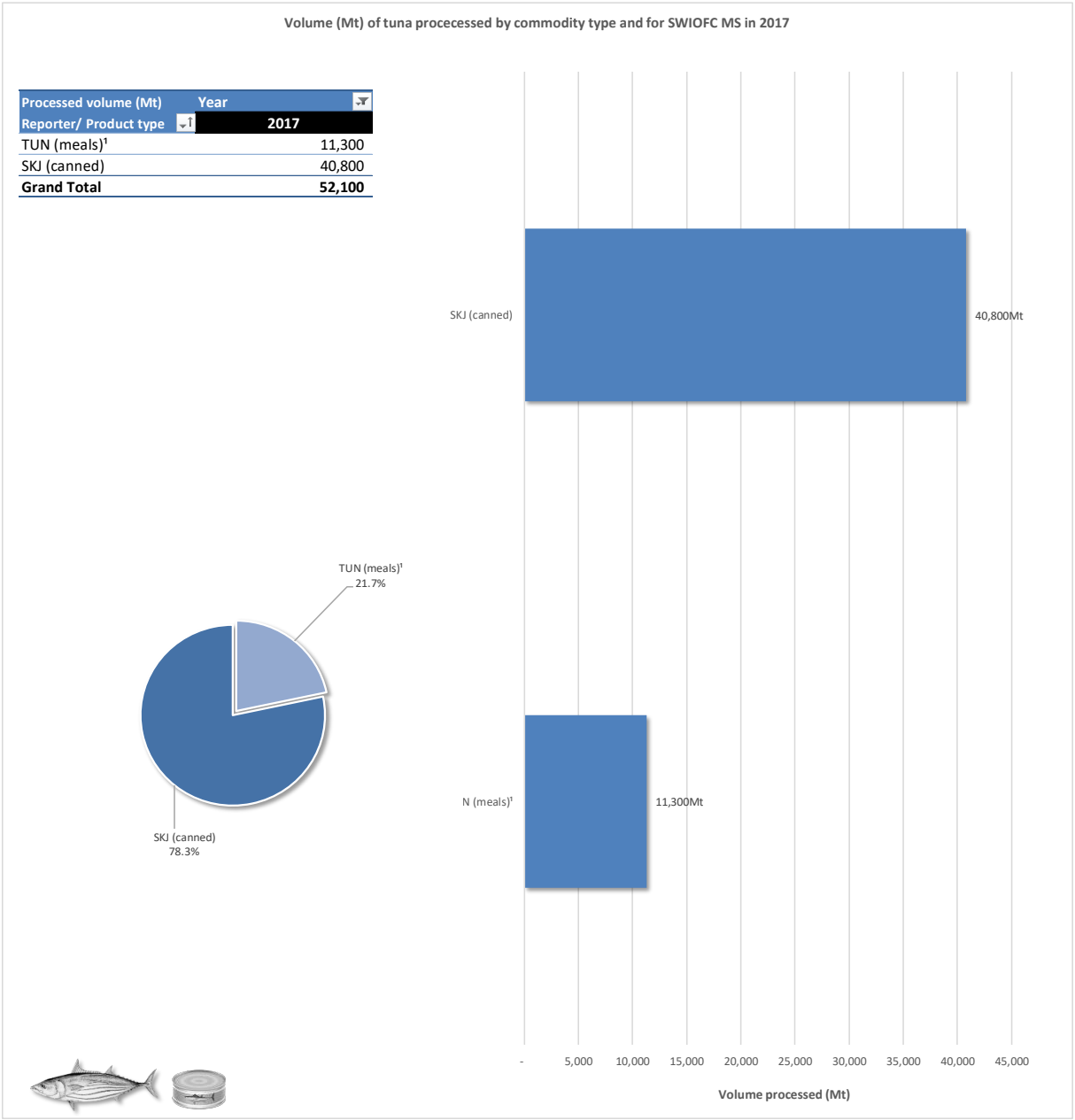
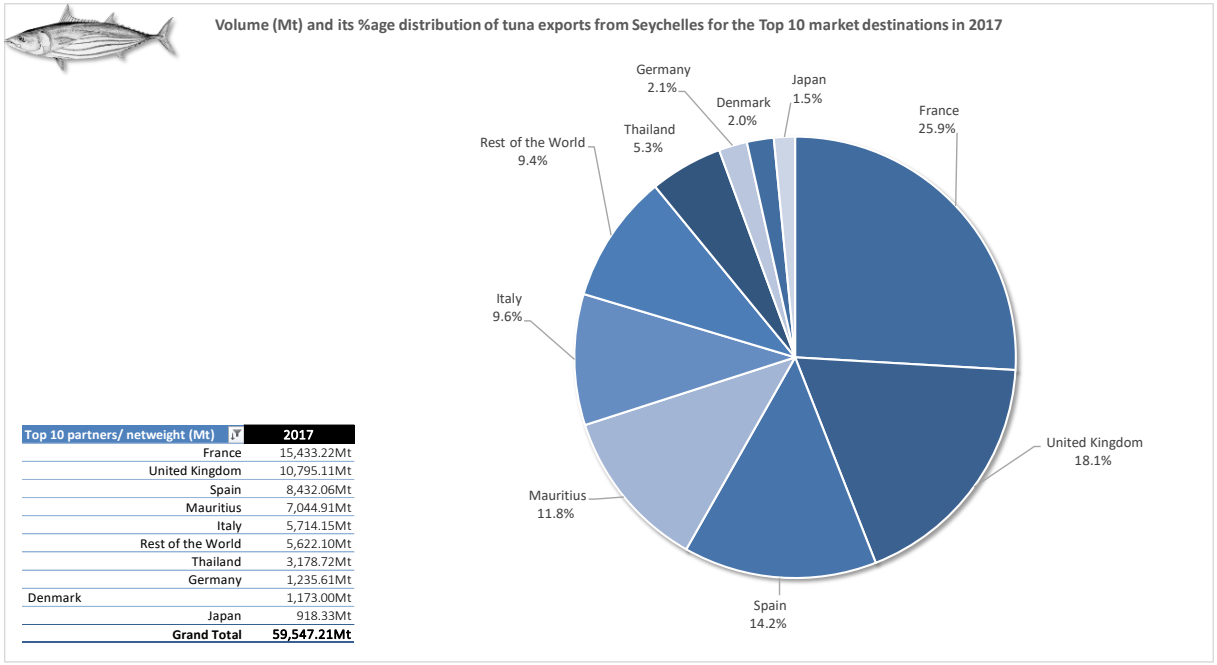


Figure 6-116: Tuna processed (metric tonnes) in Mauritius in 2017 by product type. Source FAO (2019b)

6.8.5 Tuna Export Markets

6.8.5.1 Tuna exports volume



Top 10 partners/ netweight (Mt)	2017
France	15,433.22Mt
United Kingdom	10,795.11Mt
Spain	8,432.06Mt
Mauritius	7,044.91Mt
Italy	5,714.15Mt
Rest of the World	5,622.10Mt
Thailand	3,178.72Mt
Germany	1,235.61Mt
Denmark	1,173.00Mt
Japan	918.33Mt
Grand Total	**59,547.21Mt**

Figure 6-117: Share of tuna exports volume (% and Metric tonnes) between the top 10 market destination for the Seychelles and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

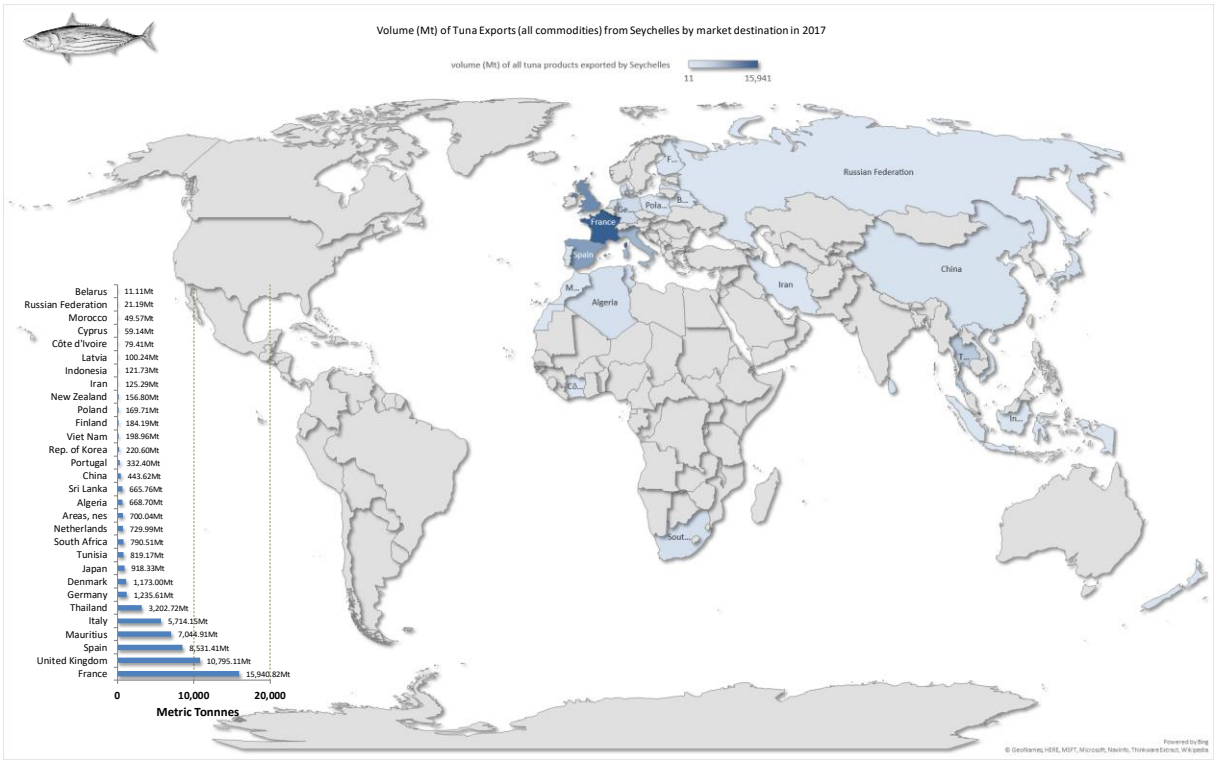


Figure 6-118: Geographic distribution by market destination of tuna exports volume (Mt) for the Seychelles and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

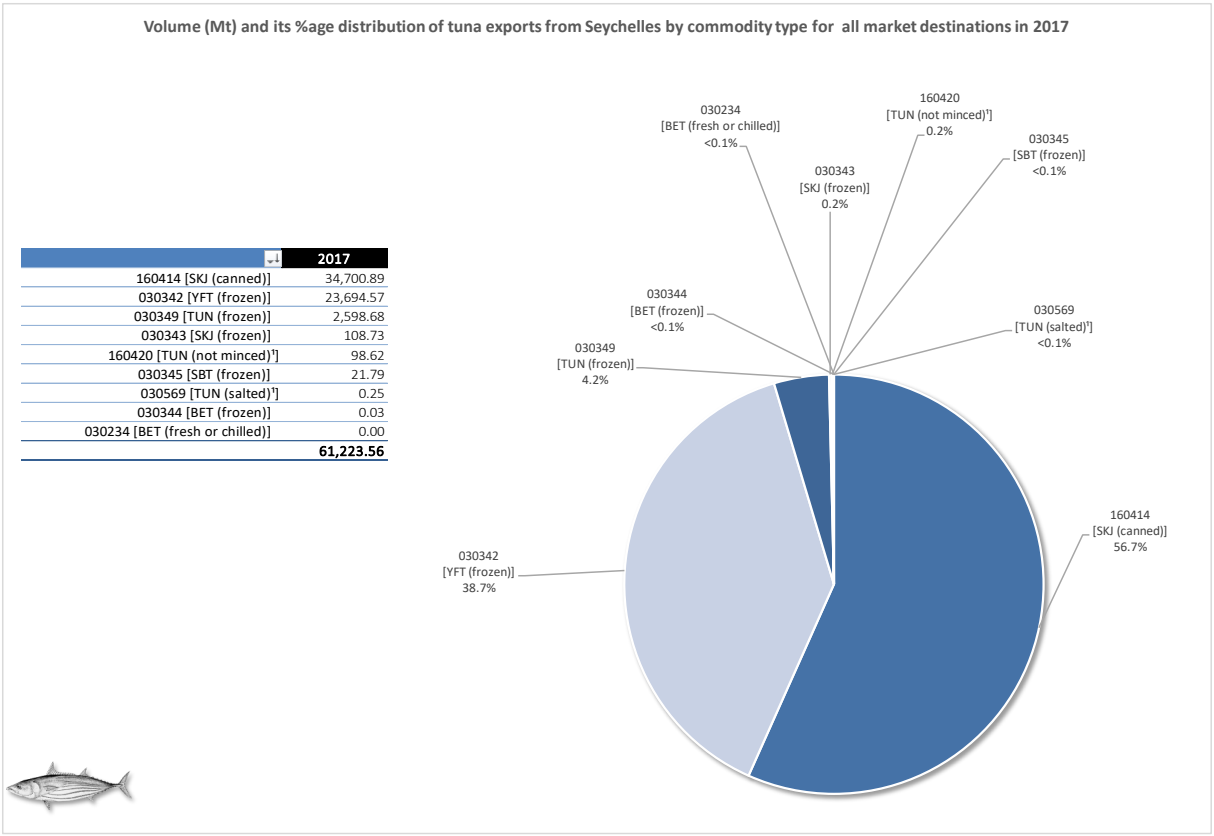


Figure 6-119: Share of tuna exports volume (% and metric tonnes) by product for the Seychelles in 2017. Source UN ComTrade (2019) and FAO (2019b)

Volume (Mt) of tuna exports from Seychelles by commodity type and market destination in 2017

Netweight (Mt) Product/ Trading partner	Year 2017
030234 [BET (fresh or chilled)]	**0.00**
Mauritius	0.00
030344 [BET (frozen)]	**0.03**
Mauritius	0.03
030569 [TUN (salted)¹]	**0.25**
China, Hong Kong SAR	0.25
030345 [SBT (frozen)]	**21.79**
Rep. of Korea	21.79
160420 [TUN (not minced)¹]	**98.62**
Thailand	14.68
Italy	83.94
030343 [SKJ (frozen)]	**108.73**
Mauritius	0.03
Sri Lanka	27.00
Areas, nes	81.70
030349 [TUN (frozen)]	**2,598.68**
Rest of the World	79.41
Mauritius	84.76
Portugal	332.40
Sri Lanka	594.88
Areas, nes	618.34
Spain	888.89
030342 [YFT (frozen)]	**23,694.57**
Japan	918.33
Italy	1,141.10
Thailand	3,164.04
Rest of the World	3,967.84
Mauritius	6,960.09
Spain	7,543.17
160414 [SKJ (canned)]	**34,700.89**
Denmark	1,173.00
Germany	1,235.61
Rest of the World	1,574.84
Italy	4,489.11
United Kingdom	10,795.11
France	15,433.22
Grand Total	**61,223.56**

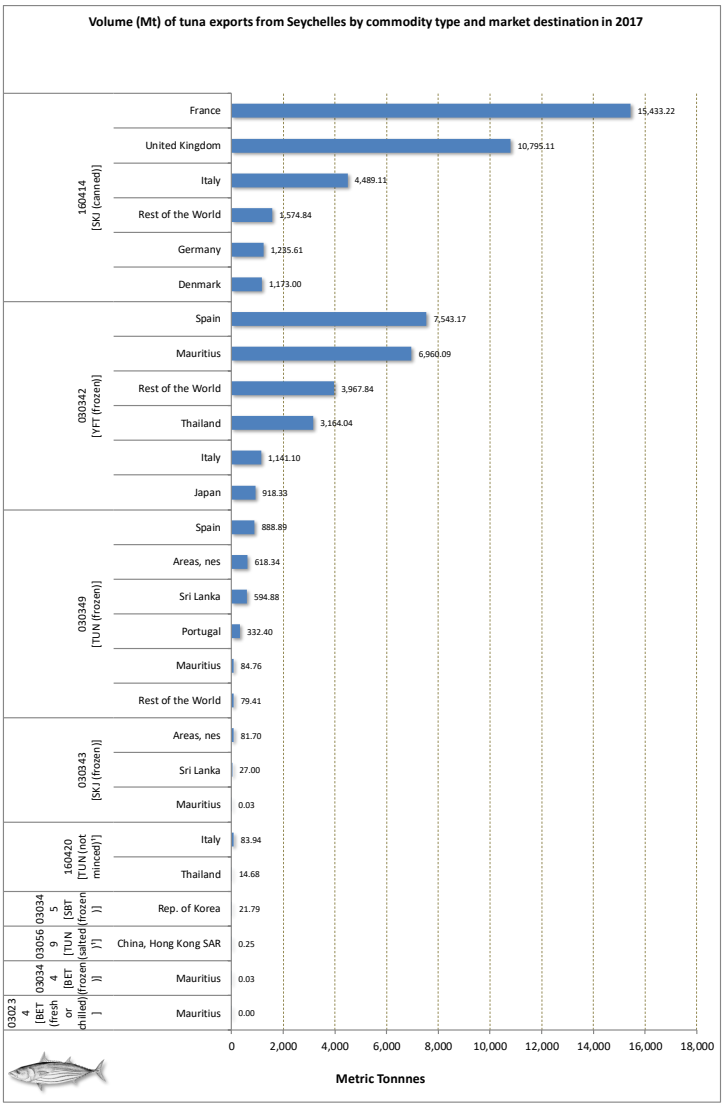
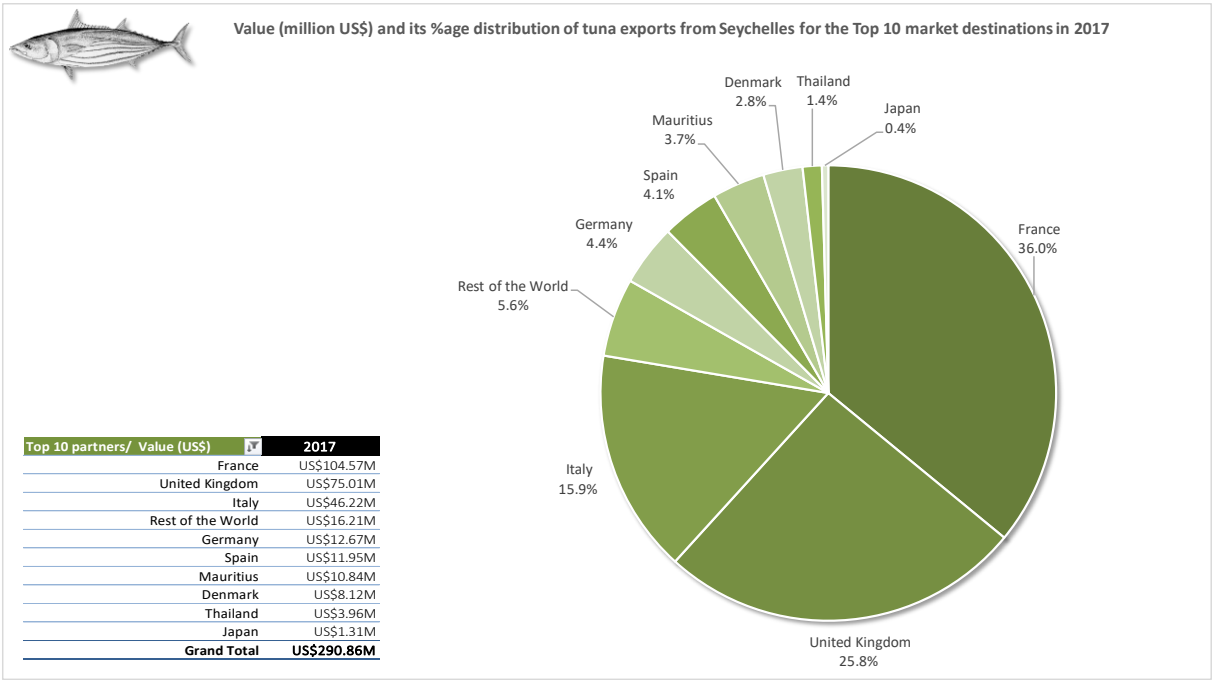


Figure 6-120: Tuna exports volume (Mt) for Seychelles in 2017 by product and market destination. Source UN ComTrade (2019)

6.8.5.2 Tuna exports value

All exports values are expressed c.i.f.



Top 10 partners/ Value (US$)	2017
France	US$104.57M
United Kingdom	US$75.01M
Italy	US$46.22M
Rest of the World	US$16.21M
Germany	US$12.67M
Spain	US$11.95M
Mauritius	US$10.84M
Denmark	US$8.12M
Thailand	US$3.96M
Japan	US$1.31M
Grand Total	**US$290.86M**

Figure 6-121: Share of tuna exports value (% and million USD) between the top 10 market destination for the Seychelles and for all products combined in 2017 (does not include Somalia and Yemen). Source UN ComTrade (2019) and FAO (2019b)

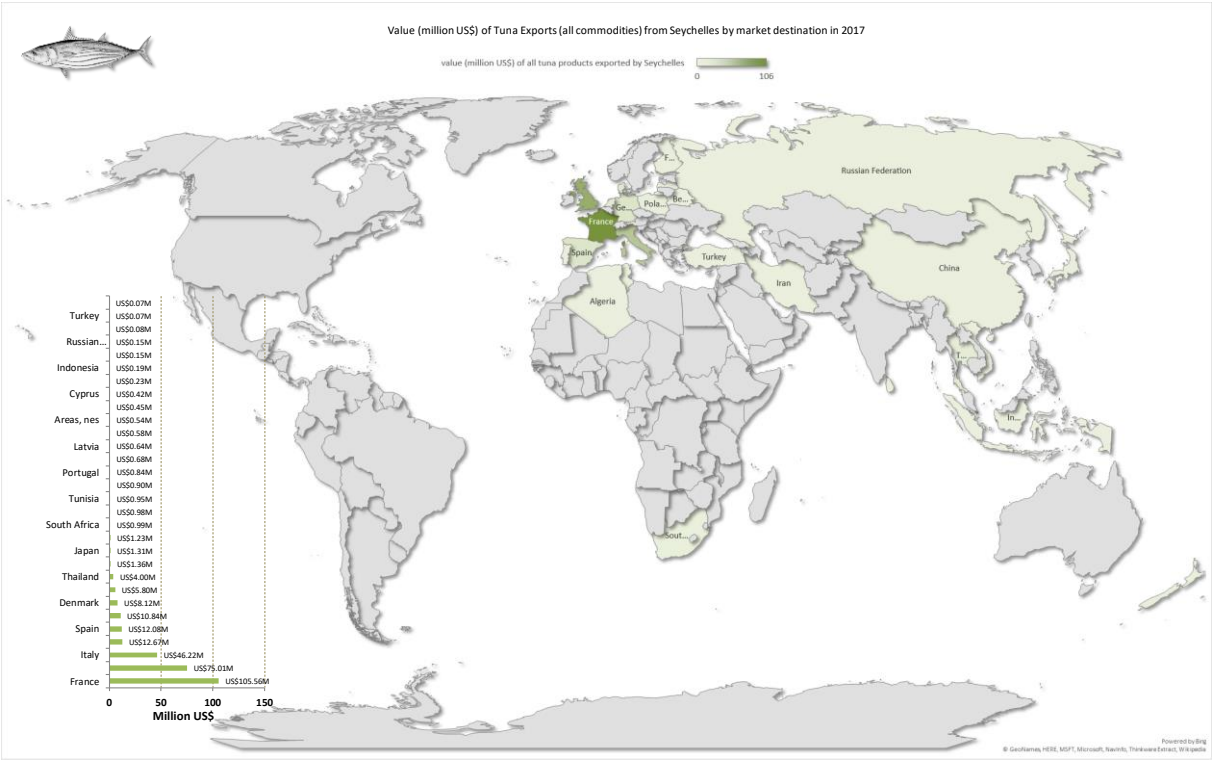
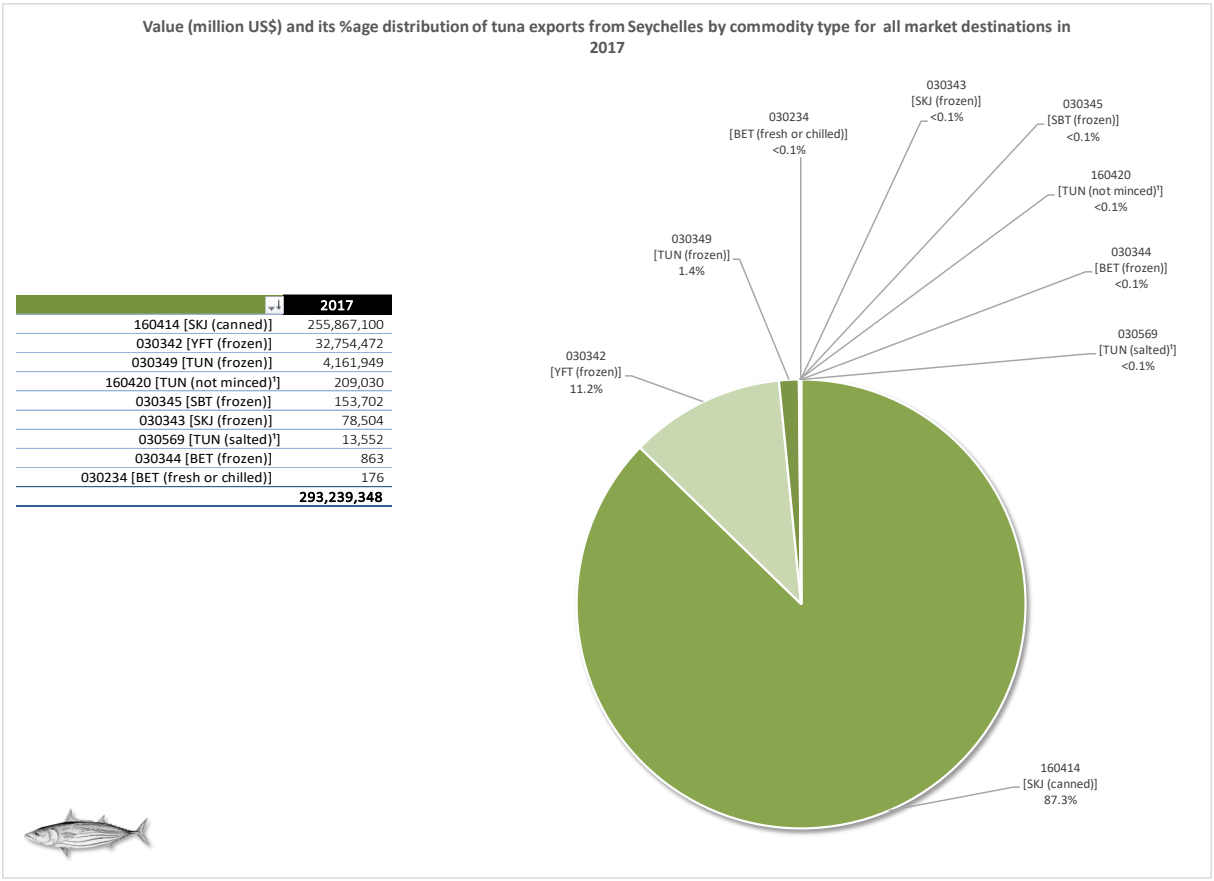


Figure 6-122: Geographic distribution by market destination of tuna exports value (million USD) for the Seychelles and products combined in 2017 (does not include Somalia and Yemen). Source UN ComTrade (2019) and FAO (2019b)



	2017
160414 [SKJ (canned)]	255,867,100
030342 [YFT (frozen)]	32,754,472
030349 [TUN (frozen)]	4,161,949
160420 [TUN (not minced)¹]	209,030
030345 [SBT (frozen)]	153,702
030343 [SKJ (frozen)]	78,504
030569 [TUN (salted)¹]	13,552
030344 [BET (frozen)]	863
030234 [BET (fresh or chilled)]	176
	293,239,348

Figure 6-123: Share of tuna exports value (% and million USD) by product for the Seychelles in 2017. Source UN ComTrade (2019) and FAO (2019b)

Value ('000 US$) of tuna exports from Seychelles by commodity type and market destination in 2017

Value (US$)	Year
Product/ Trading partner	2017
030234 [BET (fresh or chilled)]	**176**
Mauritius	176
030344 [BET (frozen)]	**863**
Mauritius	863
030569 [TUN (salted)¹]	**13,552**
China, Hong Kong SAR	13,552
030343 [SKJ (frozen)]	**78,504**
Mauritius	1,028
Sri Lanka	21,089
Areas, nes	56,387
030345 [SBT (frozen)]	**153,702**
Rep. of Korea	153,702
160420 [TUN (not minced)¹]	**209,030**
Italy	28,531
Thailand	180,499
030349 [TUN (frozen)]	**4,161,949**
Rest of the World	65,786
Mauritius	168,886
Areas, nes	482,478
Sri Lanka	811,763
Portugal	841,201
Spain	1,791,835
030342 [YFT (frozen)]	**32,754,472**
Japan	1,305,297
Italy	1,660,301
Thailand	3,775,259
Rest of the World	5,181,393
Spain	10,158,988
Mauritius	10,673,234
160414 [SKJ (canned)]	**255,867,100**
Denmark	8,120,194
Rest of the World	10,959,778
Germany	12,671,192
Italy	44,535,930
United Kingdom	75,005,015
France	104,574,991
Grand Total	**293,239,348**

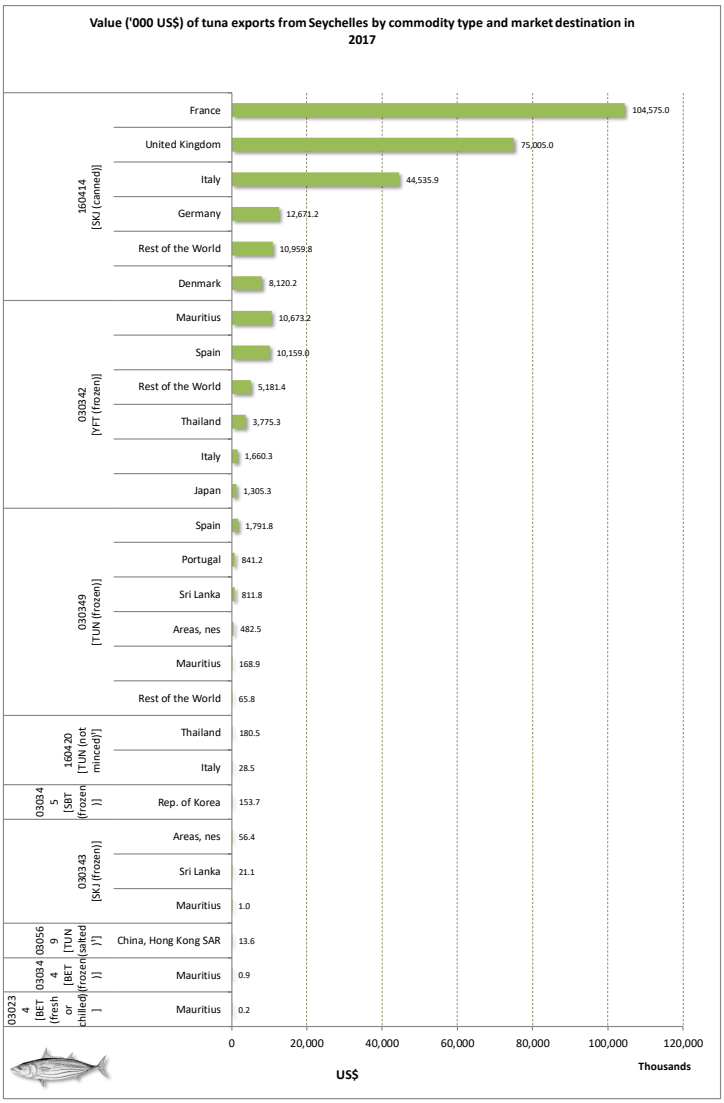


Figure 6-124: Tuna exports value (USD) for Seychelles in 2017 by product and market destination. Source UN ComTrade (2019)

6.8.5.3 Average prices of tuna exports

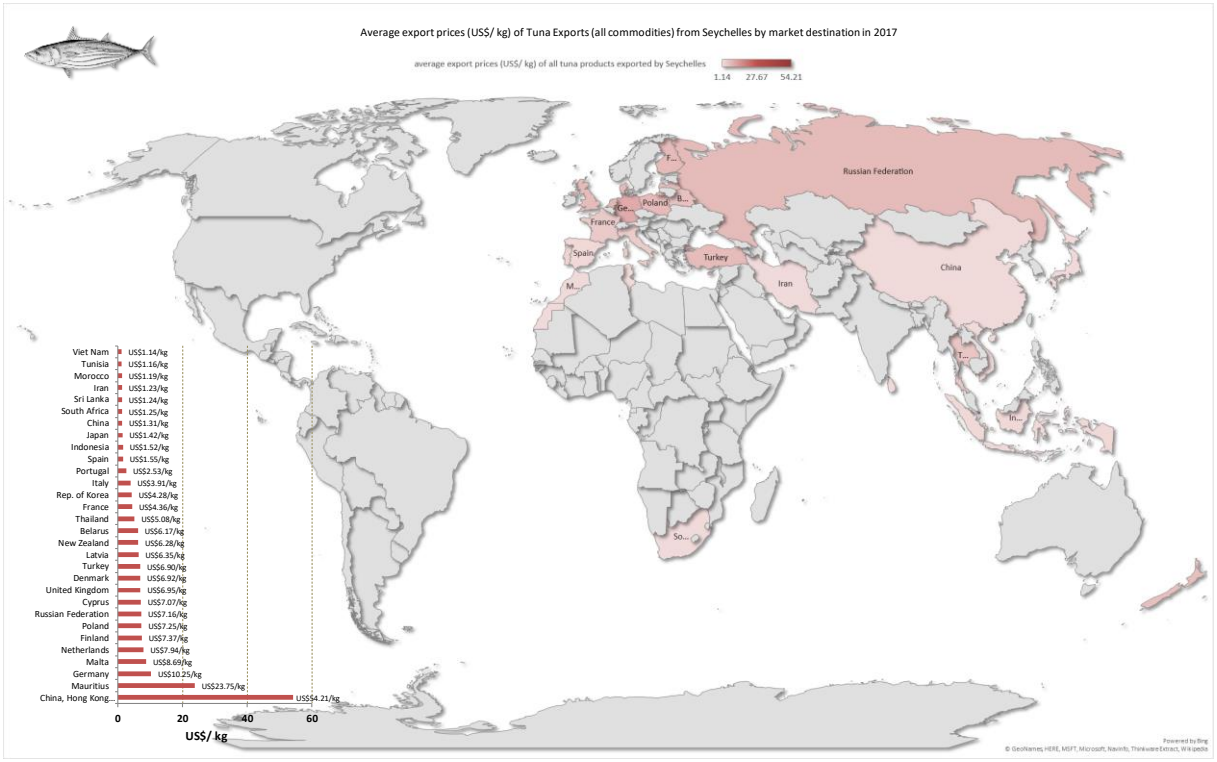


Figure 6-125: Geographic distribution by market destination of the average price of tuna exports for the Seychelles and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

Average price (US$/ kg) of tuna exports from Seychelles by commodity type and market destination in 2017	
Average of Average price	Year
Product/ Trading partner	2017
030342 [YFT (frozen)]	**1.36**
Thailand	1.19
Spain	1.35
Rest of the World	1.35
Japan	1.42
Italy	1.46
Mauritius	1.53
030349 [TUN (frozen)]	**1.59**
Areas, nes	0.78
Rest of the World	0.83
Sri Lanka	1.36
Mauritius	1.99
Spain	2.02
Portugal	2.53
160420 [TUN (not minced)¹]	**6.32**
Italy	0.34
Thailand	12.30
160414 [SKJ (canned)]	**6.77**
Rest of the World	6.18
France	6.78
Denmark	6.92
United Kingdom	6.95
Italy	9.92
Germany	10.25
030345 [SBT (frozen)]	**7.05**
Rep. of Korea	7.05
030343 [SKJ (frozen)]	**12.73**
Areas, nes	0.69
Sri Lanka	0.78
Mauritius	36.71
030344 [BET (frozen)]	**34.52**
Mauritius	34.52
030234 [BET (fresh or chilled)]	**44.00**
Mauritius	44.00
030569 [TUN (salted)¹]	**54.21**
China, Hong Kong SAR	54.21
Average	**7.02**

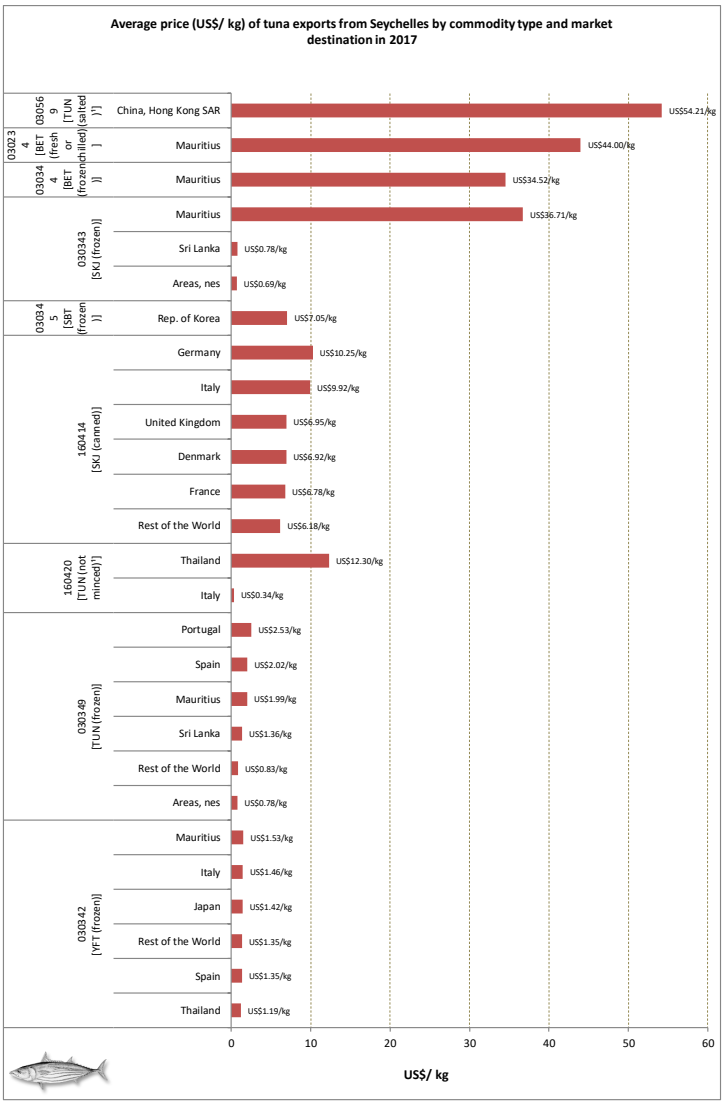


Figure 6-126: Average price of tuna exports (USD / kg) for the Seychelles in 2017 by product and market destination. Source UN ComTrade (2019)

6.8.5.4 Exports tariff for main tuna products exported by Seychelles

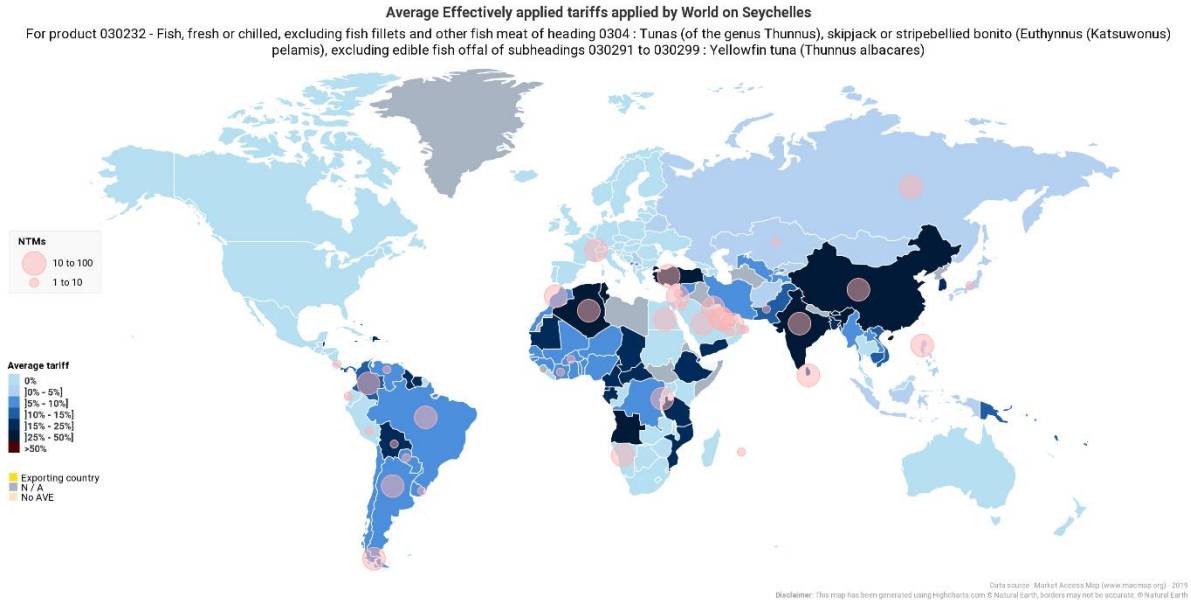


Figure 6-127: Tuna exports tariffs and NTMs faced by Seychelles on the International markets for commodity: 30232 - Yellowfin tuna (fresh or chilled). Source: ITC (2019)

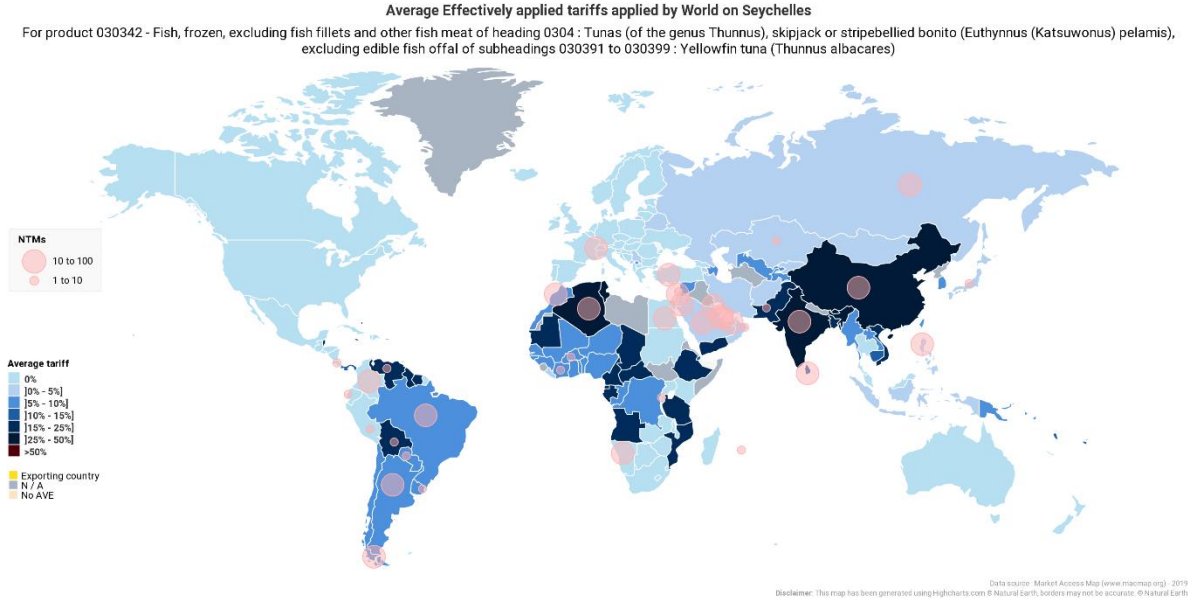


Figure 6-128: Tuna exports tariffs and NTMs faced by Seychelles on the International markets for commodity: 30342 - Yellowfin tuna (frozen). Source: ITC (2019)

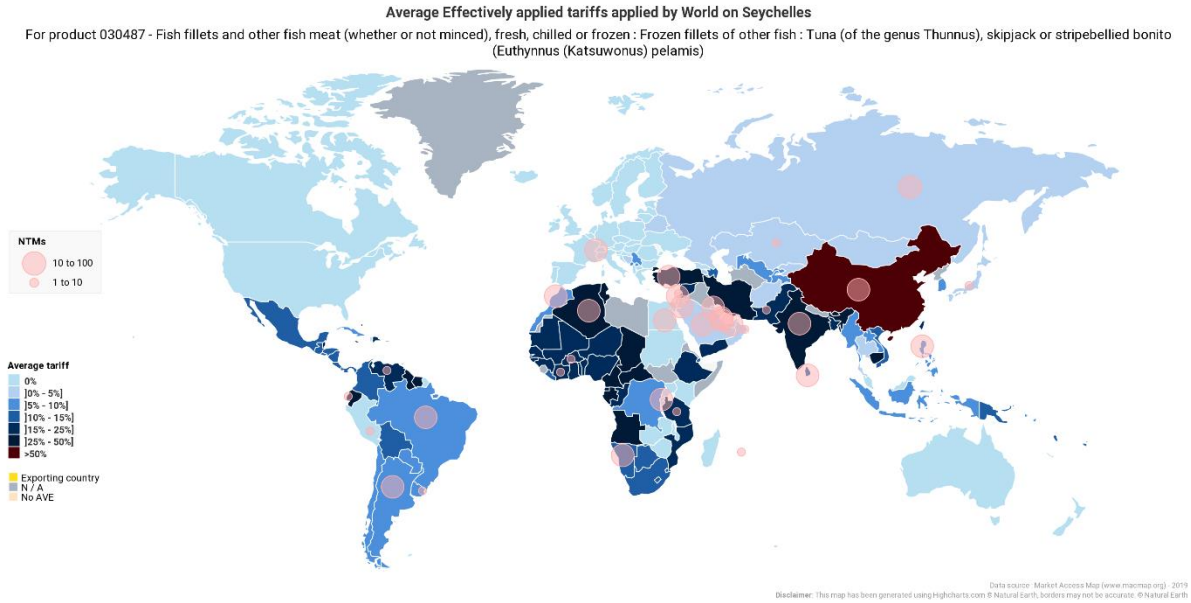


Figure 6-129: Tuna exports tariffs and NTMs faced by Seychelles on the International markets for commodity: 30487 - Skipjack tuna (frozen fillets). Source: ITC (2019)

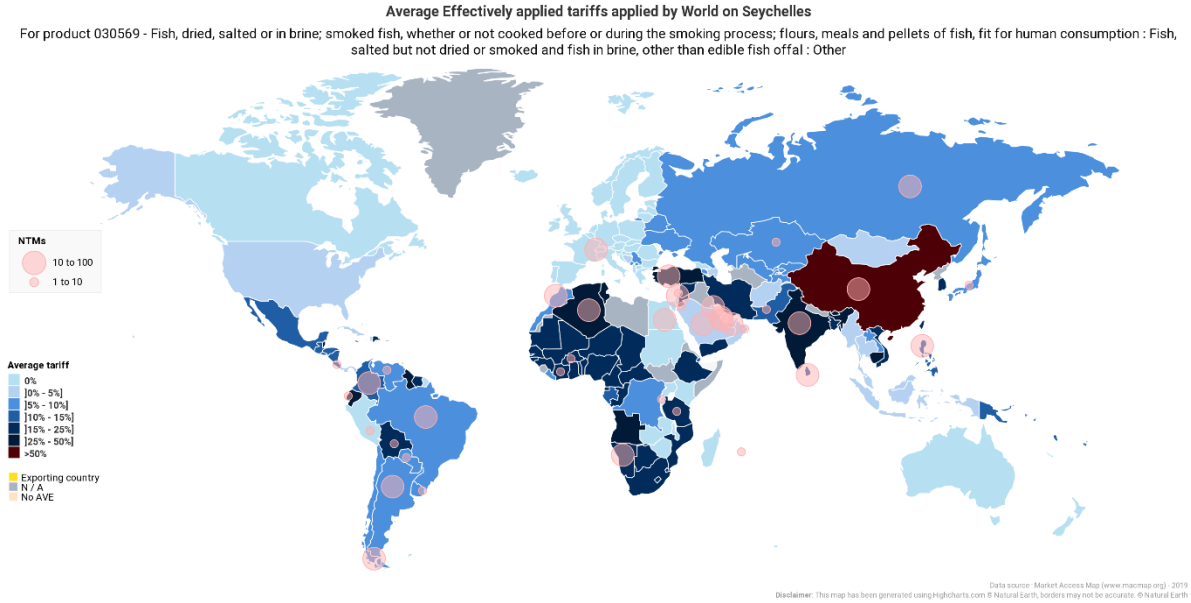


Figure 6-130: Tuna exports tariffs and NTMs faced by Seychelles on the International markets for commodity: 30569 - Tunas nei (salted). Source: ITC (2019)

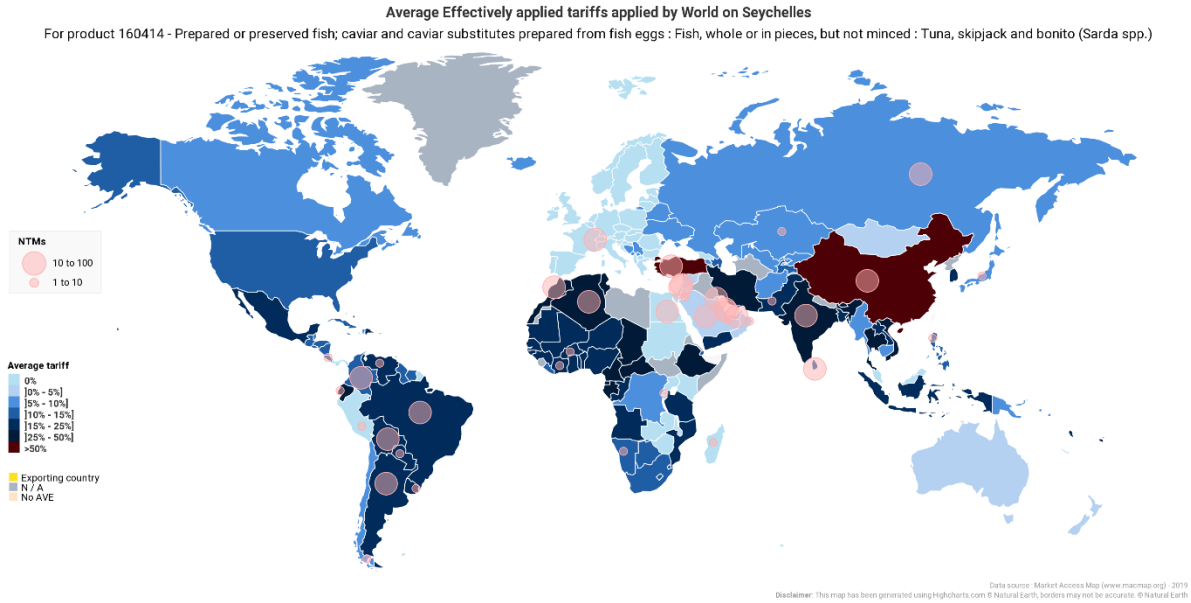


Figure 6-131: Tuna exports tariffs and NTMs faced by Seychelles on the International markets for commodity: 160414 - Skipjack tuna (canned). Source: ITC (2019)

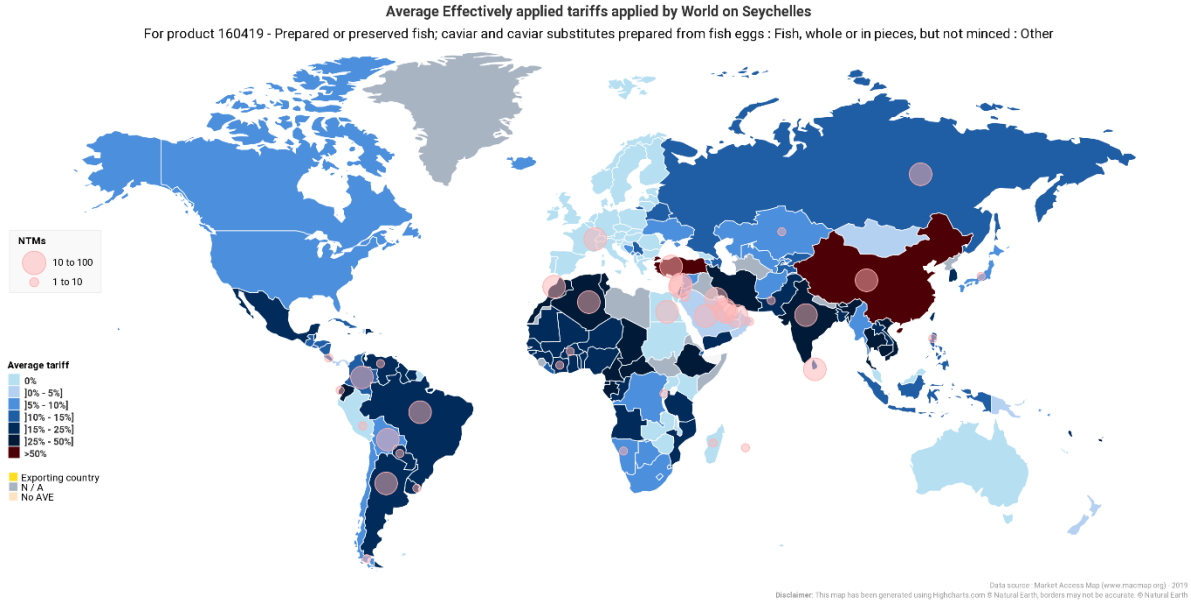


Figure 6-132: Tuna exports tariffs and NTMs faced by Seychelles on the International markets for commodity: 160419 - Tunas nei (prep minced). Source: ITC (2019)

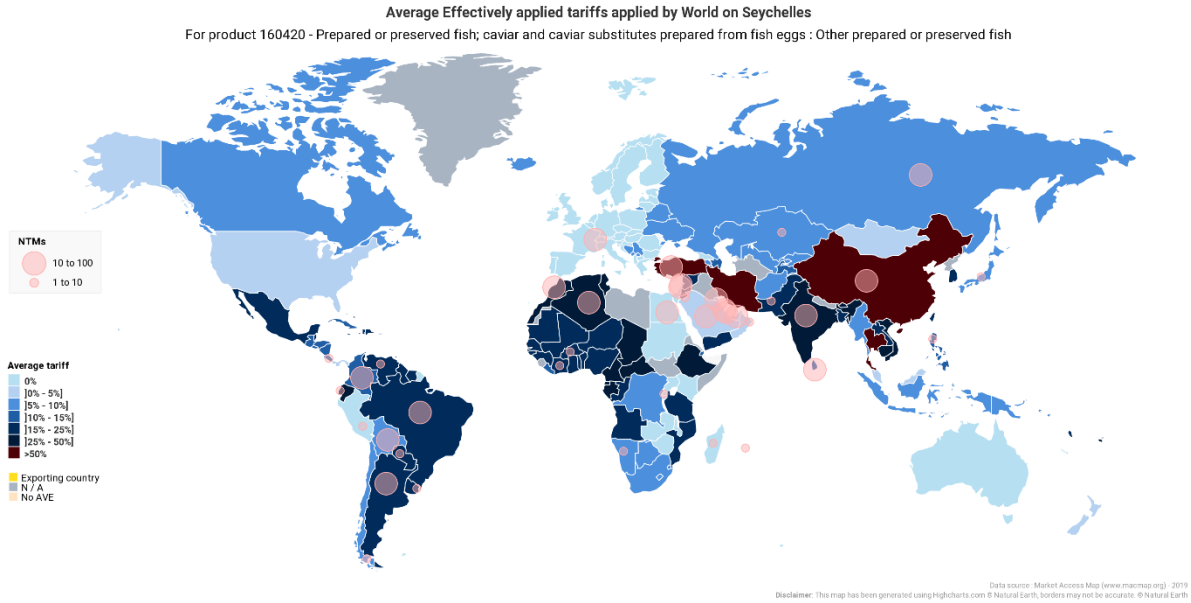


Figure 6-133: Tuna exports tariffs and NTMs faced by Seychelles on the International markets for commodity: 160420 - Tunas nei (prep not minced). Source: ITC (2019)

6.9 Somalia

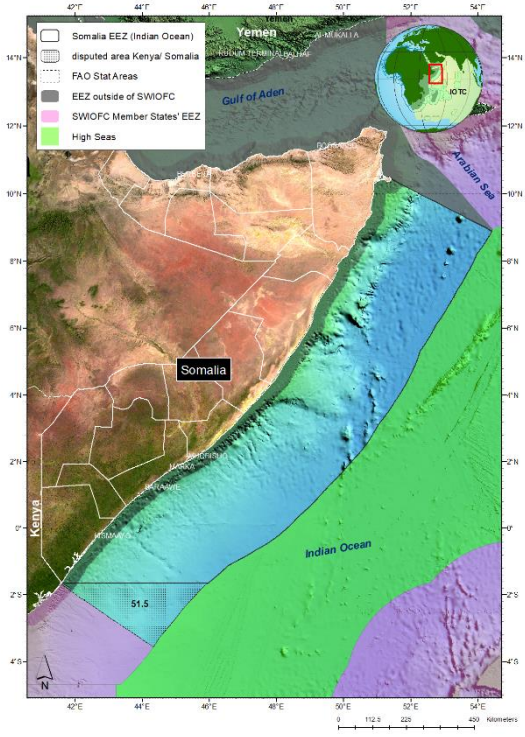


Figure 6-134: Somalia EEZ and surrounding waters.

Since the start of the Somali civil war and the subsequent collapse of the state in 1991, the country's 3,330 km (2,000 miles) of coastline- the longest in Africa- remains the country's most untapped resource.

Domestic fresh fish consumption is limited to coastal areas because of poor infrastructure, which has restricted access to fish for a large portion of the population. This is also coupled with the lack of familiarity with fish, seasonality of supply and a tradition of meat-eating among the Somali communities. While traditional tastes and lack of consumer education programs to promote fish consumption have confined the market to certain coastal areas, the shortage of meat experienced particularly during the recurring droughts has diverted some demand towards fish, especially among low income groups like internally displaced people (IDP).

Somalia's fisheries sector lacks key equipment such as jetties and fishing boats. Lack of research and training opportunities for fishing communities and the absence of a regulatory framework for the industry and serious limitations in the cold chain compound the problem further. Somalia has become the latest nation to join the Indian Ocean Tuna Commission (IOTC). The admission of Somalia into the IOTC was a great step in ensuring sustainability of tuna species in the Indian Ocean but also a bold step to completely eliminate piracy which has plagued ocean since 2009. Joining IOTC was an important step for Somalia which, among others, will enable Somalia to benefit from foreign tuna fleets operating under license in its EEZ, to develop its own fishing fleet in the future and contribute to the sustainability of the tuna resources. In addition, IOTC is in the process of developing a quota allocation criteria, and becoming a member ensures that Somalia will be included in future discussions on this important issue.. (FAO, 2018)

6.9.1 Fisheries Access Agreements

There is no known fisheries access agreement with any third party including the EU.

6.9.2 Tuna Production

No data vailable

Figure 6-135: Tuna Catch in the IOTC area by Somalia in 2017 by species and fishing method. Source (IOTC, 2019)

6.9.3 IUU Tuna Landings

Table 6-14: Reported and unreported tuna landings (Mt and USD) for Somalia by sector, method and tuna species in 2014. Source (SAU, 2019)

Tuna Landings						
	Reported		Unreported		Total Catch (metric tonnes)	Total Landed value (US$)[1]
Country/sector/method/ species	Catch (metric tonnes)	Landed value (US$)[1]	Catch (metric tonnes)	Landed value (US$)[1]		
Somalia	**4,282.8**	**12,021,063.2**	**57,670.9**	**164,553,895.6**	**61,953.7**	**176,574,958.8**
Artisanal	**4,224.2**	**11,869,016.7**	**1,026.5**	**2,884,249.5**	**5,250.6**	**14,753,266.2**
small scale encircling nets	3,047.2	9,785,876.5	740.5	2,378,032.7	3,787.7	12,163,909.2
KAW	256.4	453,779.0	62.3	110,271.3	318.7	564,050.3
LOT	256.4	453,779.0	62.3	110,271.3	318.7	564,050.3
YFT	2,534.5	8,878,318.5	615.9	2,157,490.1	3,150.4	11,035,808.6
small scale gillnets	535.3	947,507.9	130.1	230,250.7	665.4	1,177,758.6
KAW	267.7	473,753.9	65.0	115,125.3	332.7	588,879.3
LOT	267.7	473,753.9	65.0	115,125.3	332.7	588,879.3
small scale lines	623.5	1,103,508.6	151.5	268,159.9	775.0	1,371,668.5
KAW	311.7	551,754.3	75.8	134,079.9	387.5	685,834.3
LOT	311.7	551,754.3	75.8	134,079.9	387.5	685,834.3
small scale seine nets	18.1	32,123.6	4.4	7,806.3	22.6	39,929.9
KAW	9.1	16,061.8	2.2	3,903.1	11.3	19,964.9
LOT	9.1	16,061.8	2.2	3,903.1	11.3	19,964.9
Industrial	**58.7**	**152,046.6**	**56,644.4**	**161,669,646.1**	**56,703.1**	**161,821,692.6**
bottom trawl			56,644.4	161,669,646.1	56,644.4	161,669,646.1
FRI			7,013.2	12,413,369.3	7,013.2	12,413,369.3
FRZ			169.6	300,274.9	169.6	300,274.9
KAW			7,013.2	12,413,369.3	7,013.2	12,413,369.3
LOT			7,013.2	12,413,369.3	7,013.2	12,413,369.3
YFT			35,435.1	124,129,263.3	35,435.1	124,129,263.3
longline	58.6	151,747.1			58.6	151,747.1
ALB	45.4	120,039.7			45.4	120,039.7
BET	7.8	15,235.1			7.8	15,235.1
TUX	1.3	2,386.9			1.3	2,386.9
YFT	4.0	14,085.4			4.0	14,085.4
purse seine	0.1	299.5			0.1	299.5
SKJ	0.1	256.4			0.1	256.4
YFT	0.0	43.0			0.0	43.0
Grand Total	**4,282.8**	**12,021,063.2**	**57,670.9**	**164,553,895.6**	**61,953.7**	**176,574,958.8**

[1] value estimated applying 2017 ex-vessel prices from Poseidon (2019)

6.9.4 Tuna Export Markets

There was no export data for Somalia on the UN ComTrade database (UN Comtrade, 2019) but some data were available in the FAO FishStat database (FAO, 2019a).

6.9.4.1 Tuna exports volume

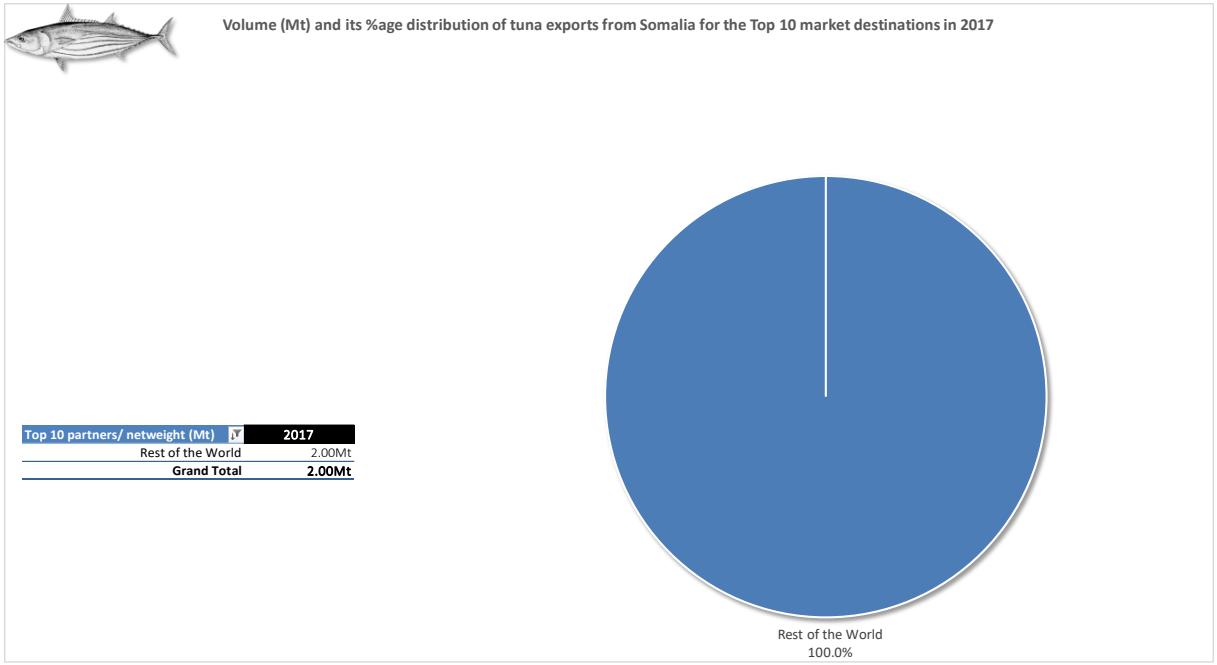


Figure 6-136: Share of tuna exports volume (% and Metric tonnes) between the top 10 market destination for Somalia and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

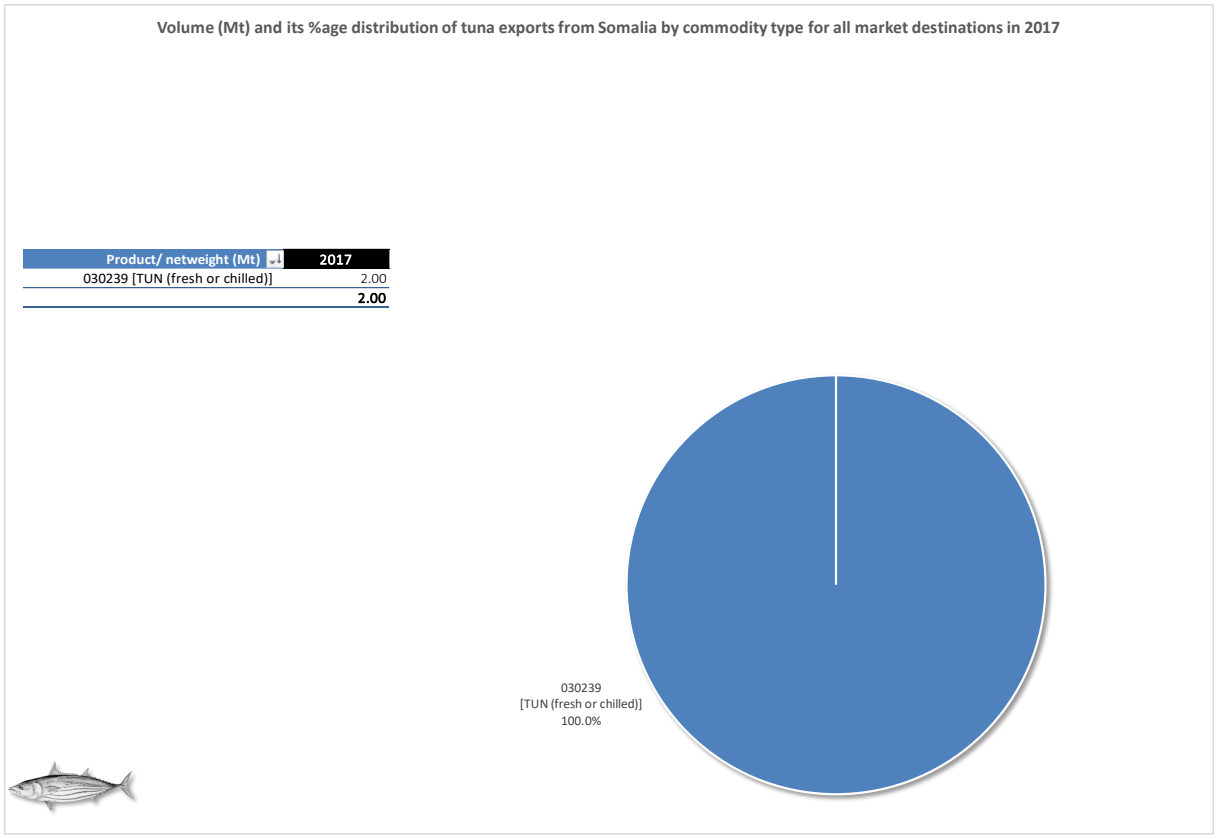


Figure 6-137: Share of tuna exports volume (% and metric tonnes) by product for Somalia in 2017. Source UN ComTrade (2019) and FAO (2019b)

Volume (Mt) of tuna exports from Somalia by commodity type and market destination in 2017

Netweight (Mt)	Year
Product/ Trading partner	2017
030239 [TUN (fresh or chilled)]	2.00
Rest of the World	2.00
Grand Total	2.00

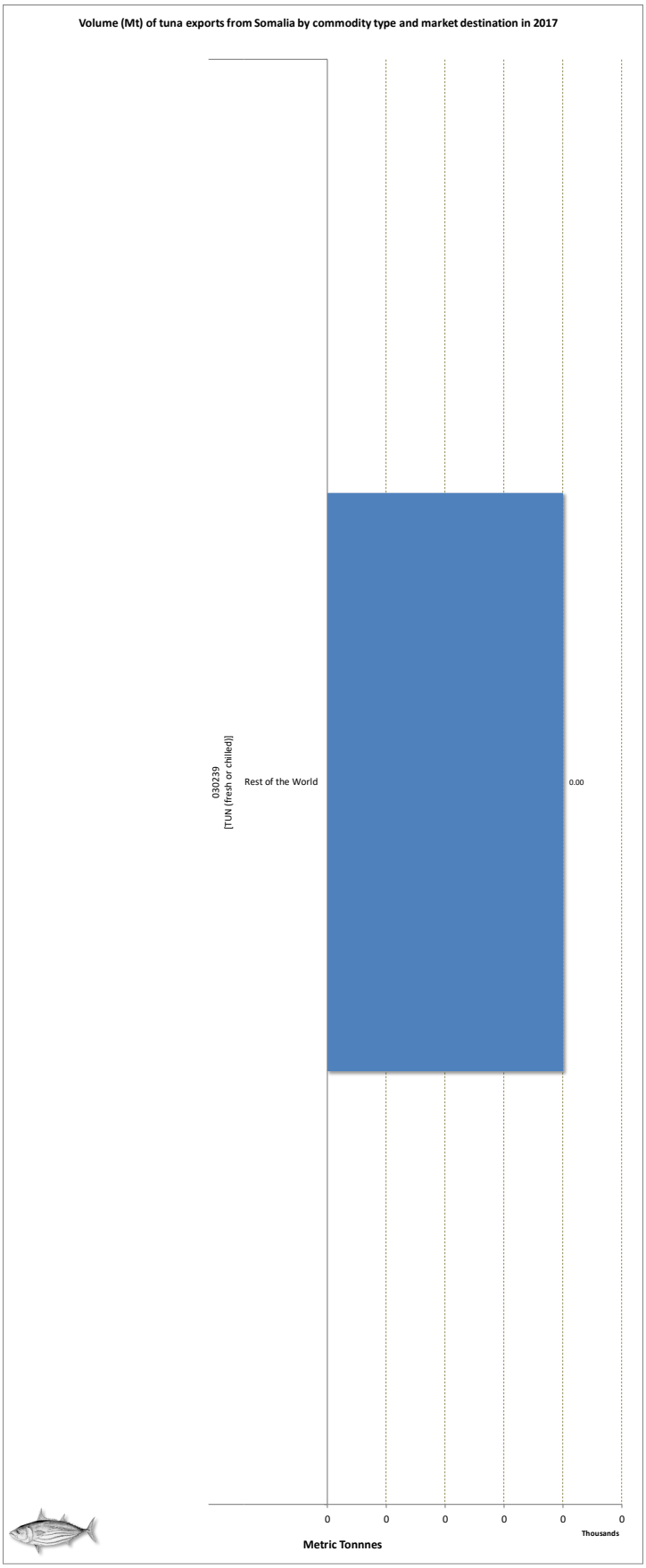


Figure 6-138: Tuna exports volume (Mt) for Somalia in 2017 by product and market destination. Source FAO (2019b)

6.9.4.2 Tuna exports value

All exports values are expressed c.i.f.

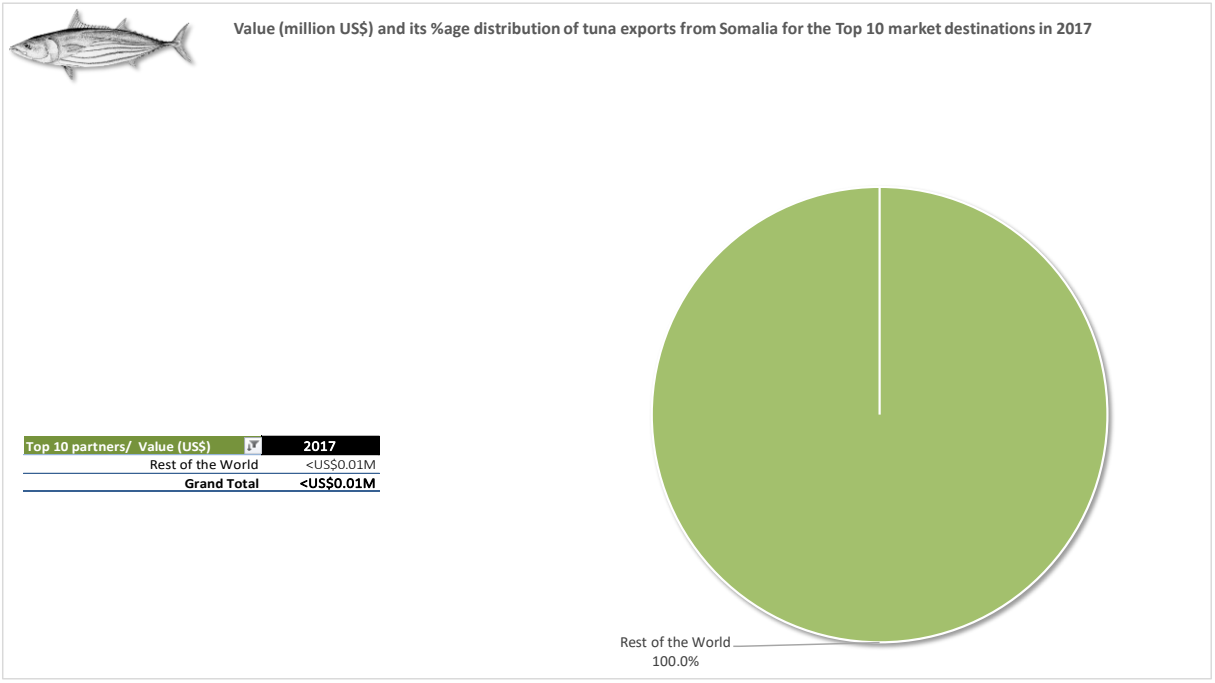


Figure 6-139: Share of tuna exports value (% and million USD) between the top 10 market destination for Somalia and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

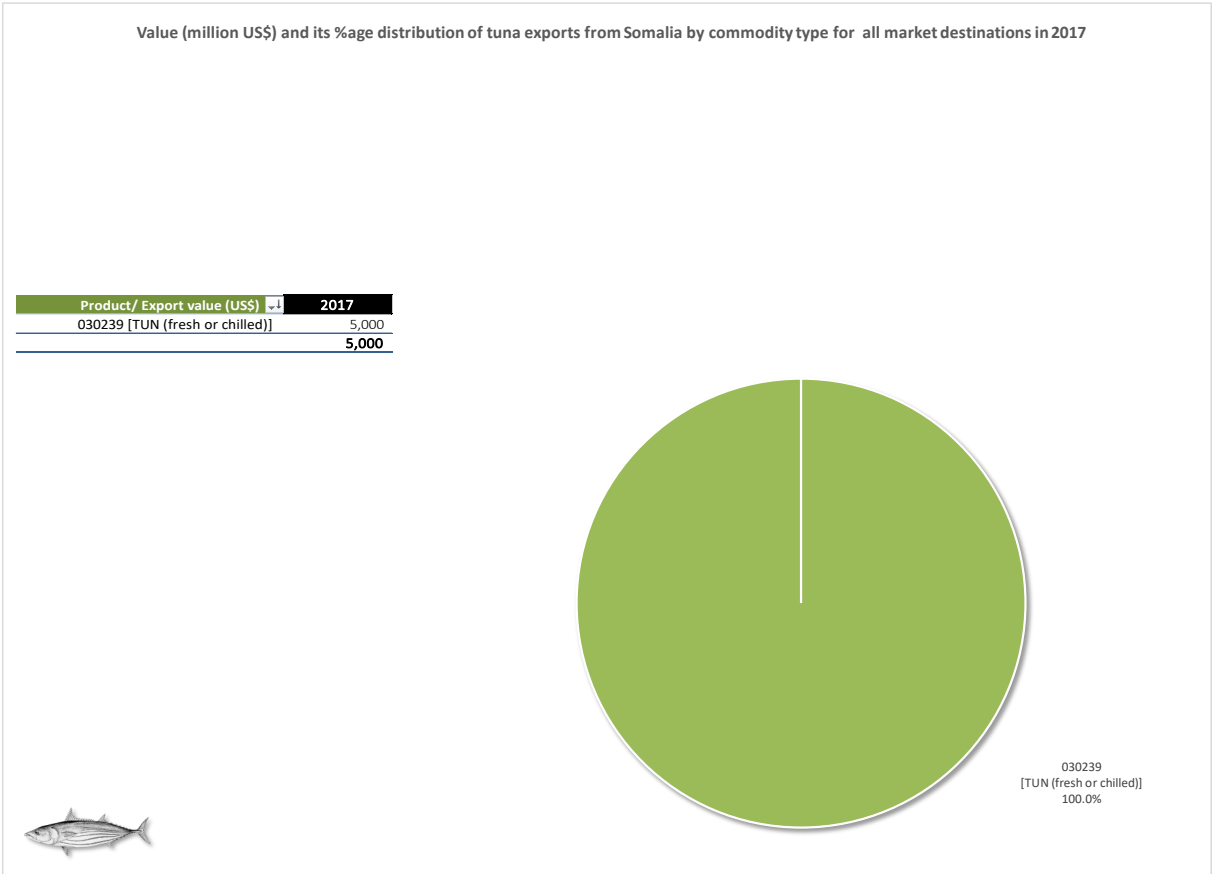


Figure 6-140: Share of tuna exports value (% and million USD) by product for Somalia in 2017. Source UN ComTrade (2019) and FAO (2019b)

Value ('000 US$) of tuna exports from Somalia by commodity type and market destination in 2017

Value (US$)	Year
Product/ Trading partner	2017
030239 [TUN (fresh or chilled)]	5,000
Rest of the World	5,000
Grand Total	5,000

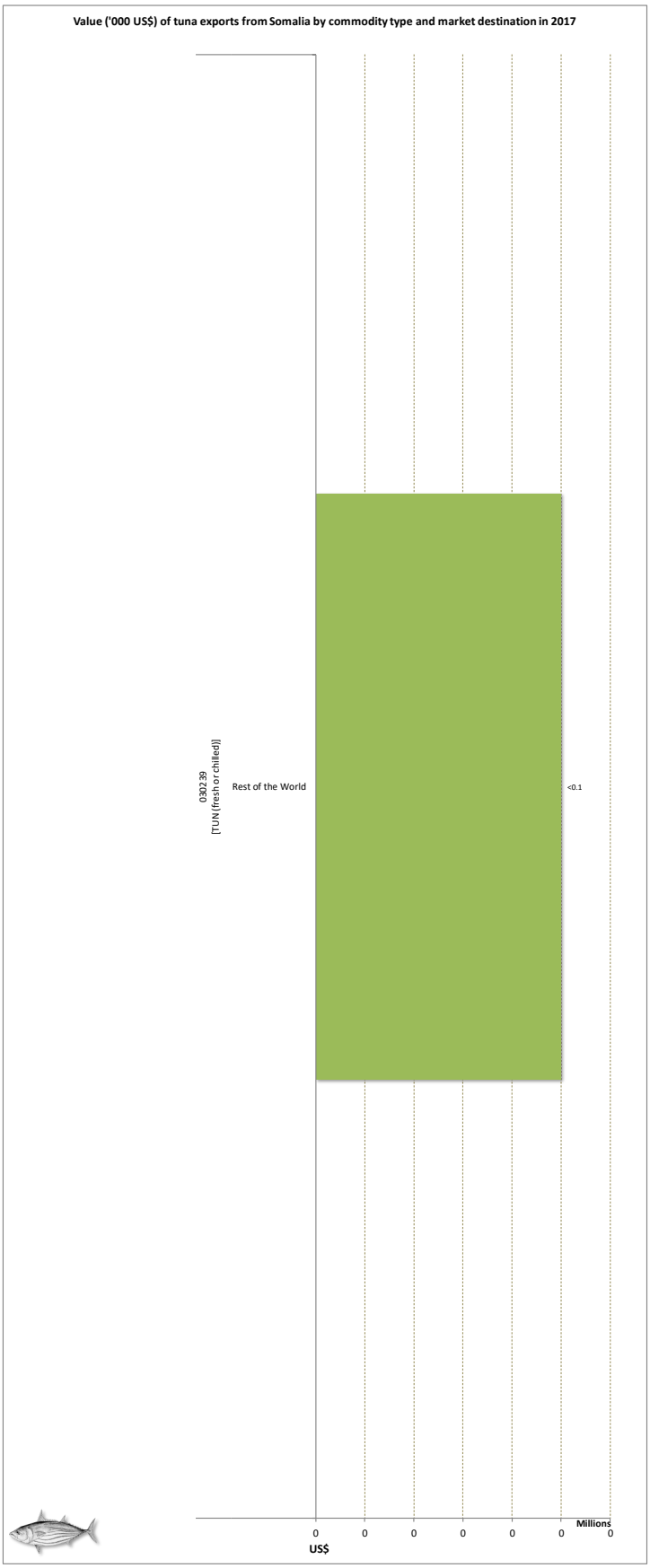


Figure 6-141: Tuna exports value (USD) for Somalia in 2017 by product and market destination. Source FAO (2019b)

6.9.4.3 Average prices of tuna exports

Average price (US$/ kg) of tuna exports from Somalia by commodity type and market destination in 2017

Average of Average price	Year
Product/ Trading partner	2017
030239 [TUN (fresh or chilled)]	2.50
Rest of the World	2.50
Average	2.50

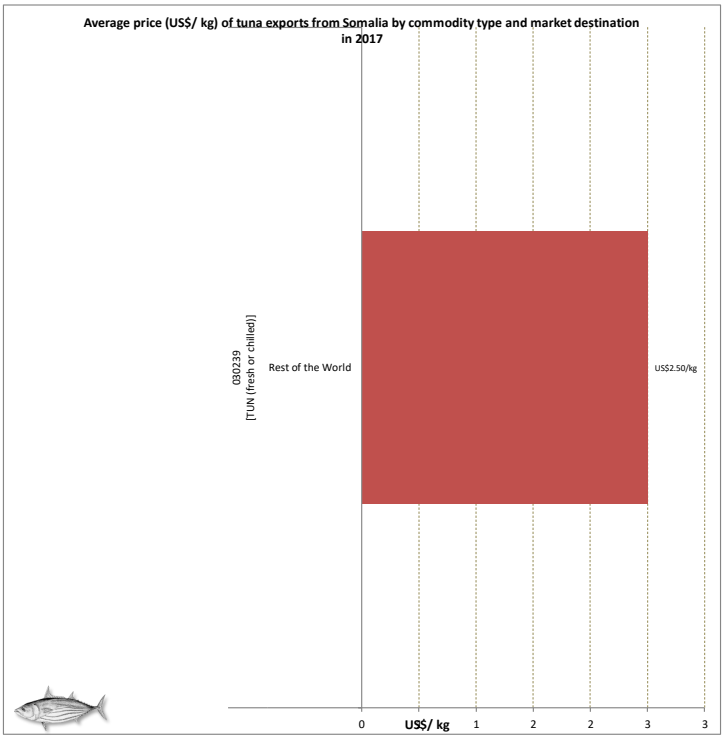


Figure 6-142: Average price of tuna exports (USD / kg) for Somalia in 2017 by product and market destination. Source FAO (2019b)

6.9.4.4 Exports tariff for main tuna products exported by Somalia

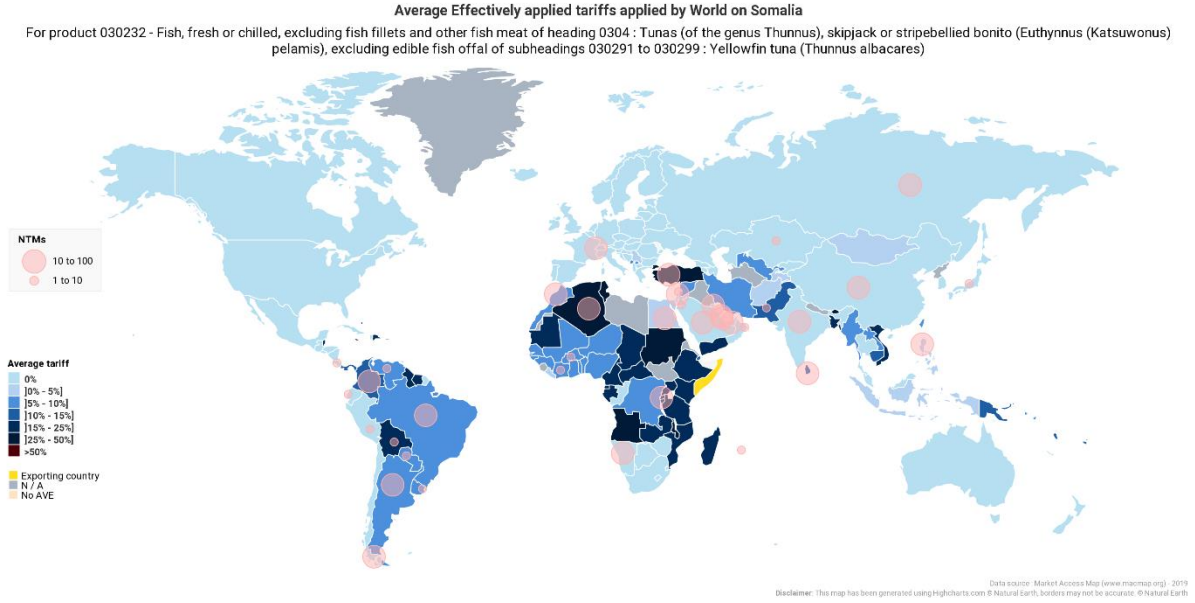


Figure 6-143: Tuna exports tariffs and NTMs faced by Somalia on the International markets for commodity: 30232 - Yellowfin tuna (fresh or chilled). Source: ITC (2019)

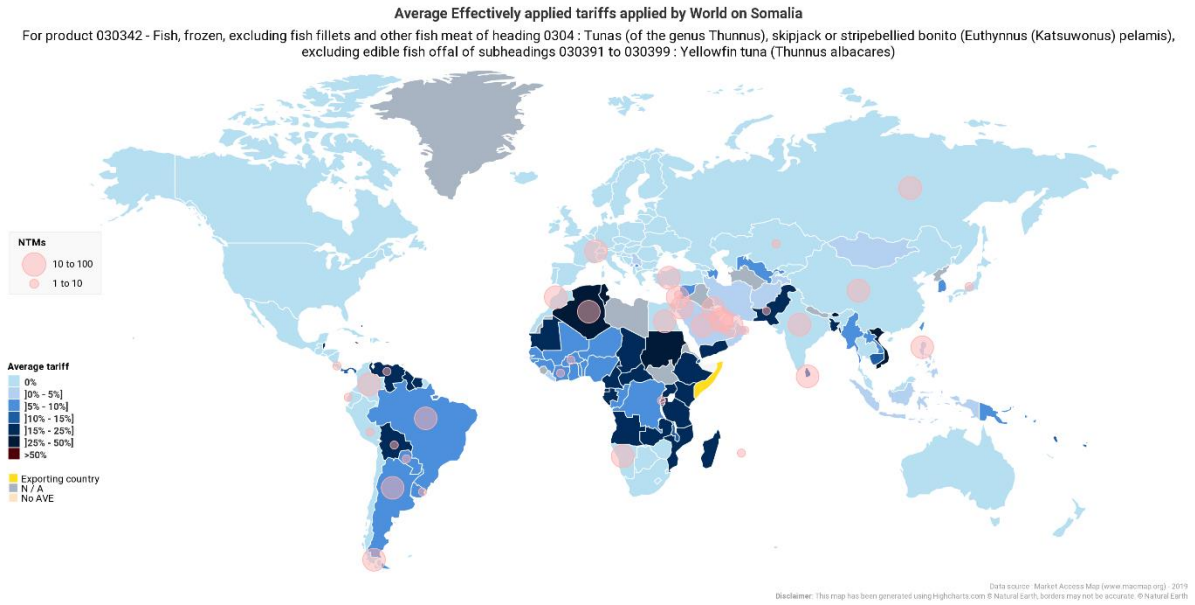


Figure 6-144: Tuna exports tariffs and NTMs faced by Somalia on the International markets for commodity: 30342 - Yellowfin tuna (frozen). Source: ITC (2019)

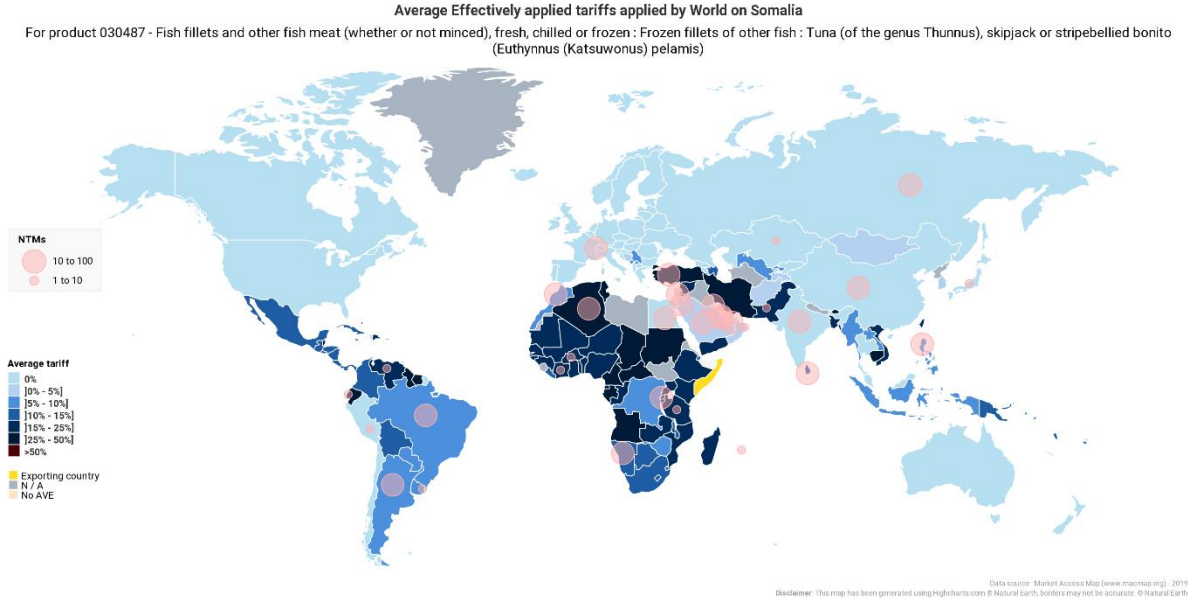


Figure 6-145: Tuna exports tariffs and NTMs faced by Somalia on the International markets for commodity: 30487 - Skipjack tuna (frozen fillets). Source: ITC (2019)

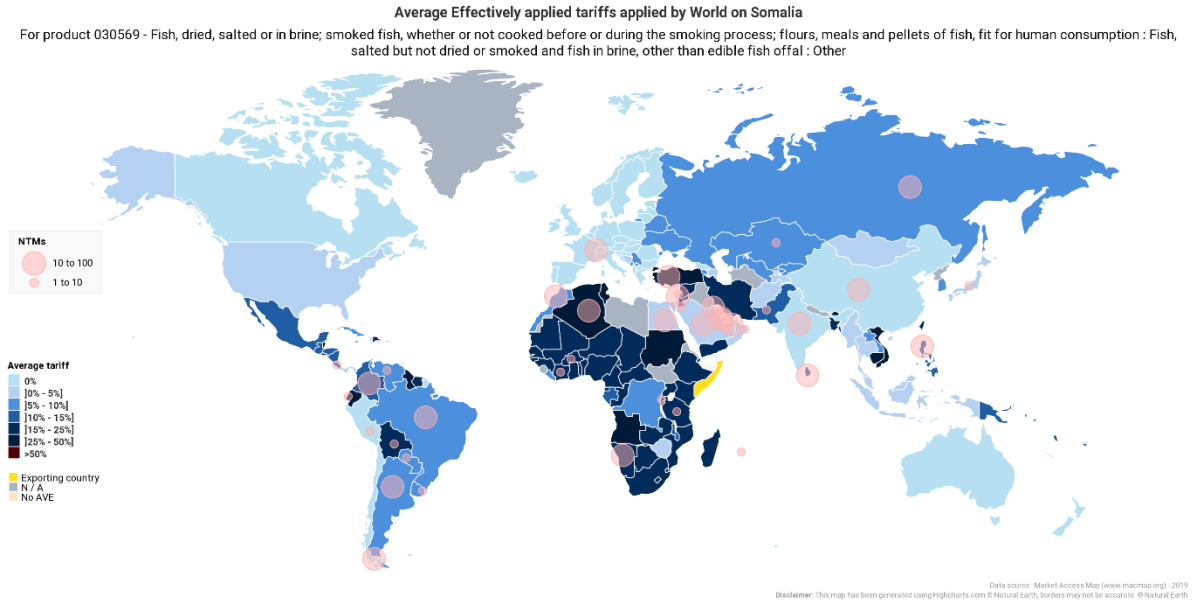


Figure 6-146: Tuna exports tariffs and NTMs faced by Somalia on the International markets for commodity: 30569 - Tunas nei (salted). Source: ITC (2019)

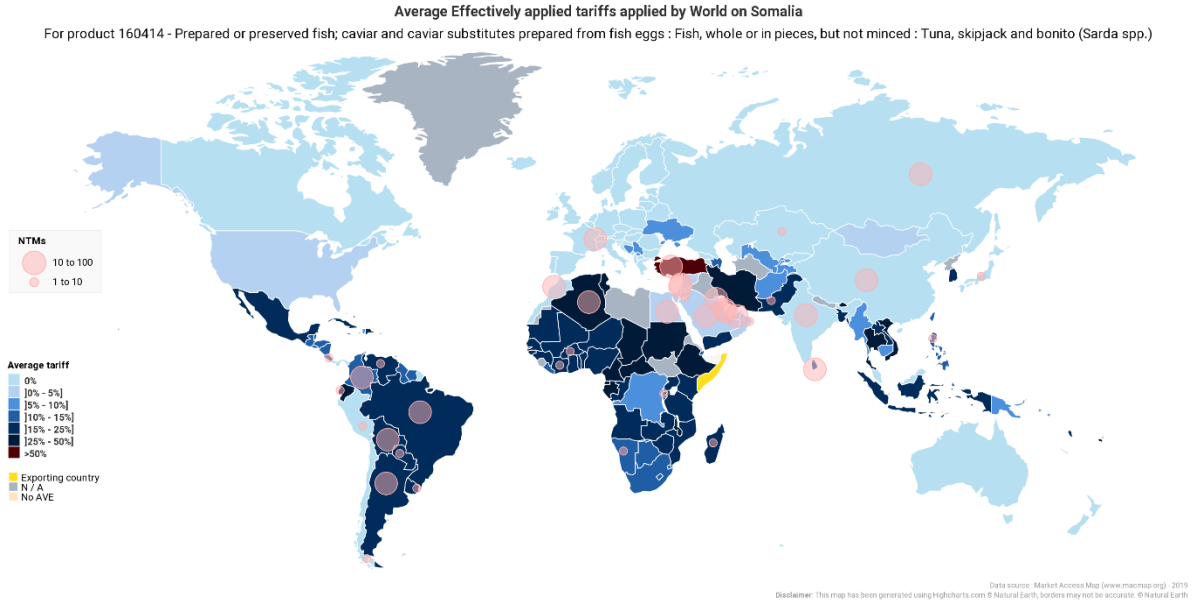


Figure 6-147: Tuna exports tariffs and NTMs faced by Somalia on the International markets for commodity: 160414 - Skipjack tuna (canned). Source: ITC (2019)

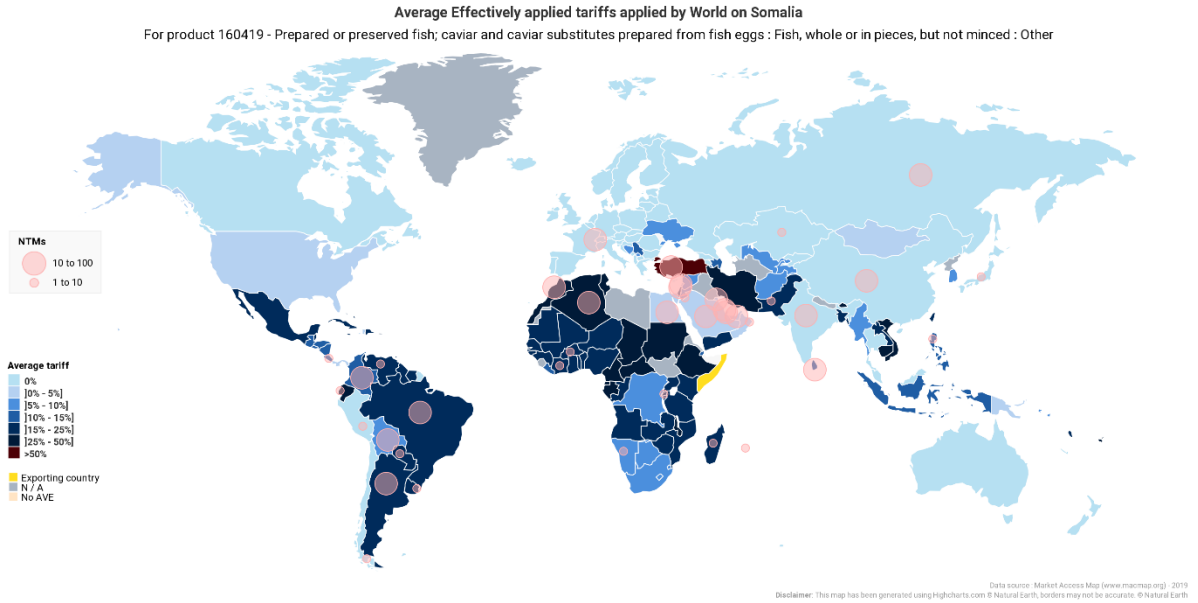


Figure 6-148: Tuna exports tariffs and NTMs faced by Somalia on the International markets for commodity: 160419 - Tunas nei (prep minced). Source: ITC (2019)

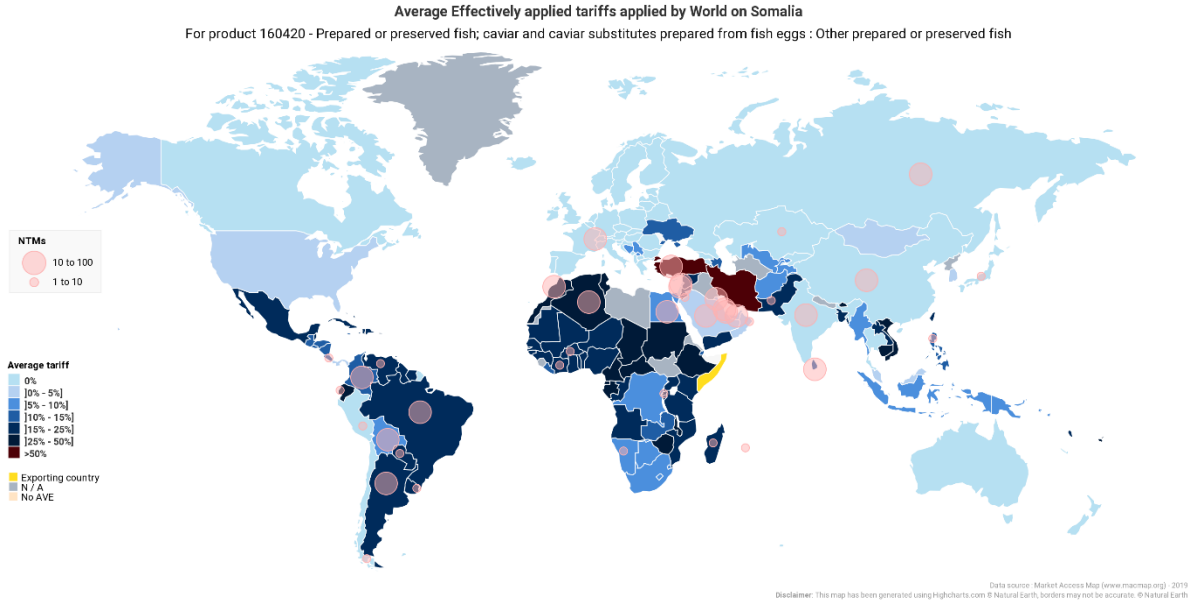


Figure 6-149: Tuna exports tariffs and NTMs faced by Somalia on the International markets for commodity: 160420 - Tunas nei (prep not minced). Source: ITC (2019)

6.10 South Africa

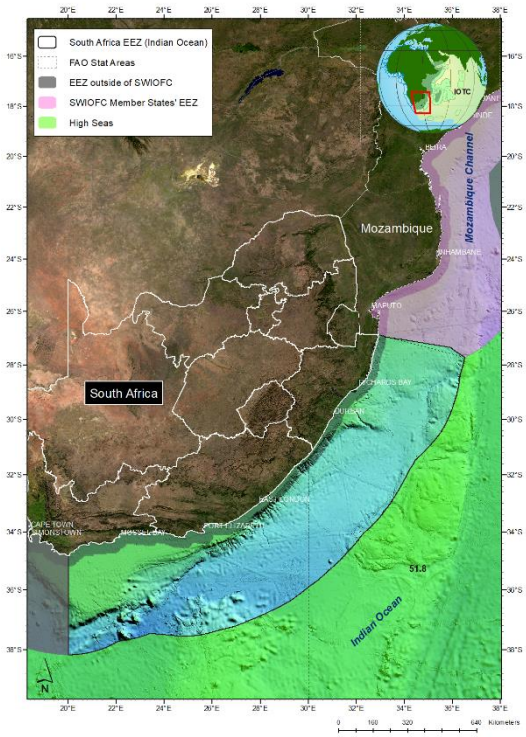


Figure 6-150: South Africa EEZ and surrounding waters.

South Africa has a coastline that spans two ecosystems over a distance of 3 623 km, extending from the Orange River in the west on the border with Namibia, to Ponta do Ouro in the east on the Mozambique border. The western coastal shelf has highly productive commercial fisheries similar to other upwelling ecosystems around the world, while the east coast is considerably less productive but has high species diversity, including both endemic and Indo-Pacific species. Marine fisheries in South Africa are diverse, and because of the different ecosystems and irregular coastline, are diversified, both with respect to species caught and gear deployed. One of the fishing sectors classified as "offshore" include a tuna bait and pole fishery for longfin and yellowfin tuna (operating from the Cape Town area), a large pelagic longline fishery for tuna, shark and billfish (operates around the whole coast and beyond the EEZ). Highly migratory tuna and tuna-like species are caught on the high seas and seasonally within the South African EEZ. Targeted species include yellowfin tuna (Thunnus albacares), bigeye tuna, T. obesus, longfin tuna (T. alalunga), swordfish and shark. These species are targeted by the large pelagic longline and tuna pole sectors. Large pelagic longlining is a developing sector in South Africa. Historically, foreign effort (mostly from Japan and Taiwan, province of China) dominated, with about 130 permits issued annually. After an experimental fishing period, long-term fishing rights for directed effort on tuna (30 rights) and swordfish (20 rights) were issued in November 2004 to exclusively South African rights holders. Many of these rights are now fished by foreign flag operators in joint ventures with the South African rights holders, with the main objective being to increase South Africa's catch history for tuna and to develop local capacity. Vessels active in South Africa's fisheries are generally reaching the end of their working life and many new vessels are being built (most locally). South Africa has introduced effort control and vessel restrictions in most commercial fisheries - rights holders have to justify new vessels within each sector through a Fishing Effort Allocation Committee. As a general rule, new effort can only replace existing effort in any sector, with replaced vessels not permitted back into the specific sector from which they came.
The tuna poling method using a baited hook or lure attached by a short line to a pole, is the primary means of exploitation, targeting longfin tuna (called albacore locally) and to a lesser extent yellowfin tuna. The fishery is seasonal (October to June) and operates on the West Coast. There are currently a couple of hundreds vessels registered within the fishery. Vessels are relatively small and store catch on ice, thus staying at sea for short periods (approximately five days). The fishing method involves locating a shoal of tuna, and then spraying water alongside the vessel to attract the fish to the surface, at which point they are caught with baited hooks and gaffed aboard. (FAO, 2018).

6.10.1 Fisheries Access Agreements

Due to the development of its own fishing fleet, South Africa do not rely on fisheries access agreement to exploit its marine resources. As a consequence there is no known fisheries access agreement with any foreign entity other than possible private joint venture with foreign capital.
As mentioned in section 6.4.1 above, in 2017 South Africa signed a fisheries agreement with the Maldives to improve the livelihood of their respective fishing communities and improve the

management of tuna and tuna fisheries in the Indian Ocean.

6.10.2 Tuna Production

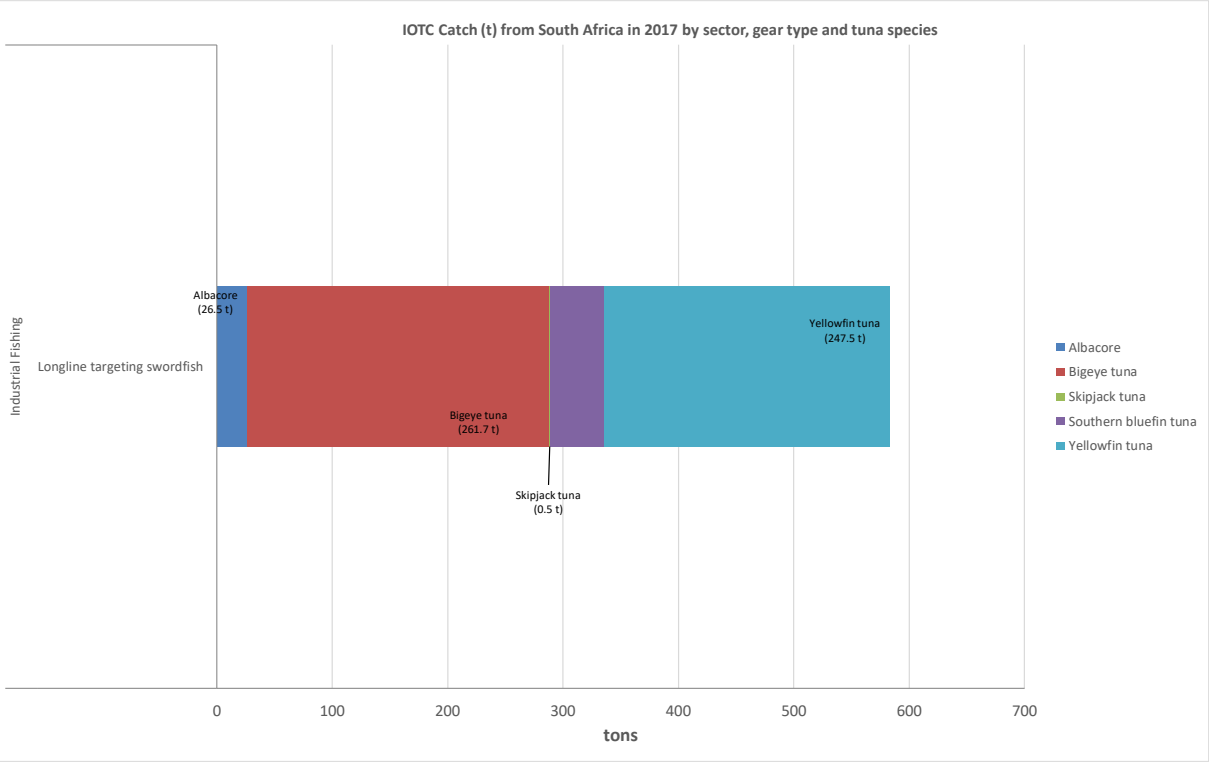


Figure 6-151: Tuna Catch in the IOTC area by South Africa in 2017 by species and fishing method. Source (IOTC, 2019)

6.10.3 IUU Tuna Landings

Table 6-15: Reported and unreported tuna landings (Mt and USD) for South Africa by sector, method and tuna species in 2014. Source (SAU, 2019)

Tuna Landings						
	Reported		Unreported		Total Catch (metric tonnes)	Total Landed value (US$)[1]
Country/sector/method/ species	Catch (metric tonnes)	Landed value (US$)[1]	Catch (metric tonnes)	Landed value (US$)[1]		
South Africa (Indian Ocean Coast)	**437.6**	**1,237,502.2**	**40.6**	**105,597.1**	**478.2**	**1,343,099.3**
Artisanal	**169.3**	**439,988.0**	**40.6**	**105,597.1**	**209.9**	**545,585.1**
small scale encircling nets	81.1	256,091.2	19.5	61,461.9	100.5	317,553.1
BET	18.0	35,298.0	4.3	8,471.5	22.3	43,769.5
SKJ	0.1	104.2	0.0	25.0	0.1	129.2
YFT	63.0	220,689.0	15.1	52,965.4	78.1	273,654.4
small scale gillnets	23.4	49,498.2	5.6	11,879.6	29.0	61,377.8
ALB	5.3	14,096.0	1.3	3,383.0	6.6	17,479.0
BET	18.0	35,298.0	4.3	8,471.5	22.3	43,769.5
SKJ	0.1	104.2	0.0	25.0	0.1	129.2
small scale lines	28.7	63,594.2	6.9	15,262.6	35.6	78,856.8
ALB	10.7	28,192.0	2.6	6,766.1	13.2	34,958.1
BET	18.0	35,298.0	4.3	8,471.5	22.3	43,769.5
SKJ	0.1	104.2	0.0	25.0	0.1	129.2
small scale seine nets	36.1	70,804.4	8.7	16,993.1	44.8	87,797.5
BET	36.0	70,596.0	8.6	16,943.0	44.6	87,539.0
SKJ	0.1	208.4	0.0	50.0	0.1	258.4
Industrial	**268.3**	**797,514.2**			**268.3**	**797,514.2**
longline	268.3	797,494.8			268.3	797,494.8
ALB	41.9	110,700.5			41.9	110,700.5
BET	127.6	250,240.1			127.6	250,240.1
BOP	1.1	7,972.3			1.1	7,972.3
SBF	10.1	121,726.4			10.1	121,726.4
YFT	87.6	306,855.5			87.6	306,855.5
purse seine	0.0	19.3			0.0	19.3
BOP	0.0	19.3			0.0	19.3
Grand Total	**437.6**	**1,237,502.2**	**40.6**	**105,597.1**	**478.2**	**1,343,099.3**

[1] value estimated applying 2017 ex-vessel prices from Poseidon (2019)

6.10.4 Volume of Tuna processed

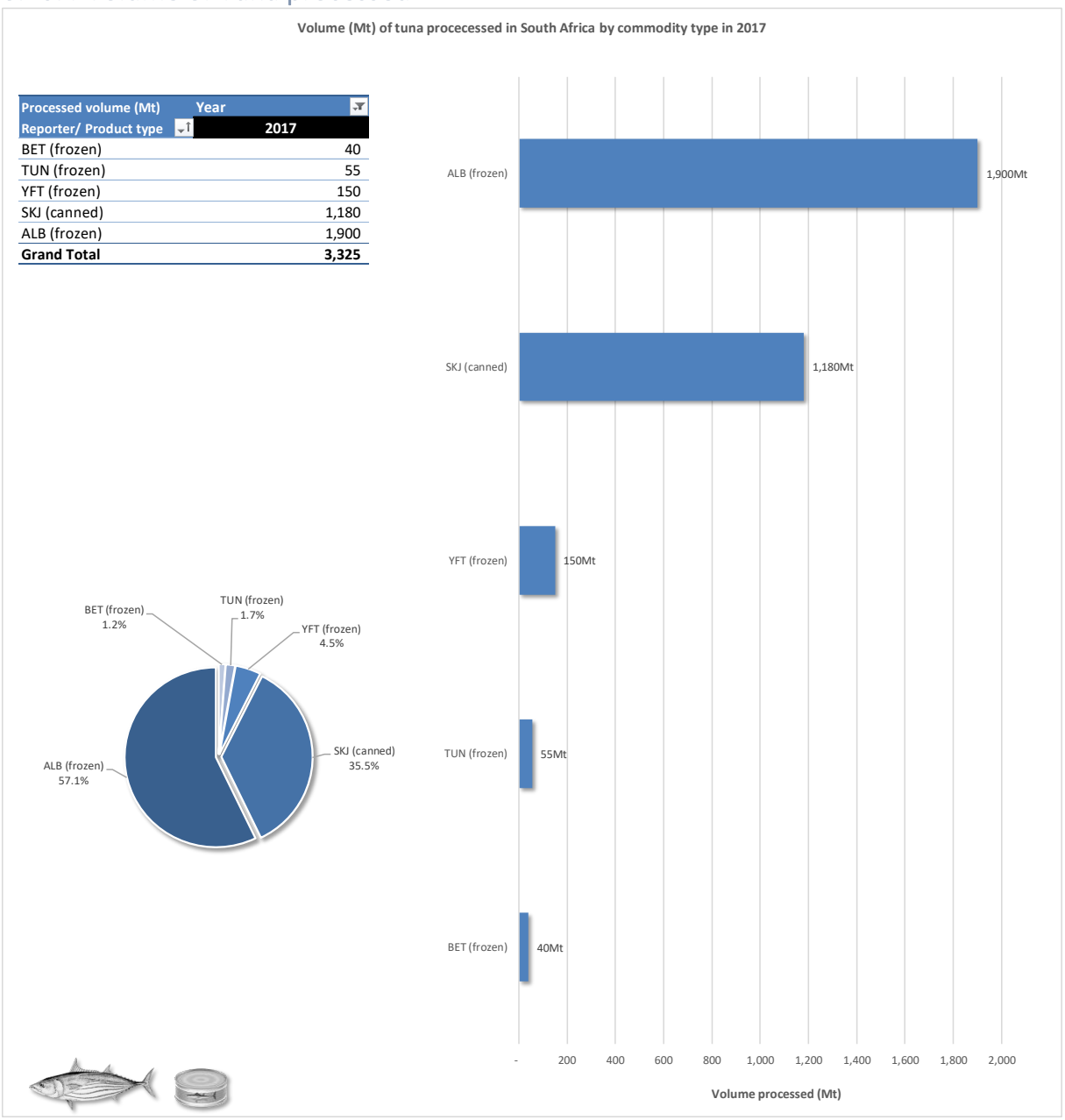
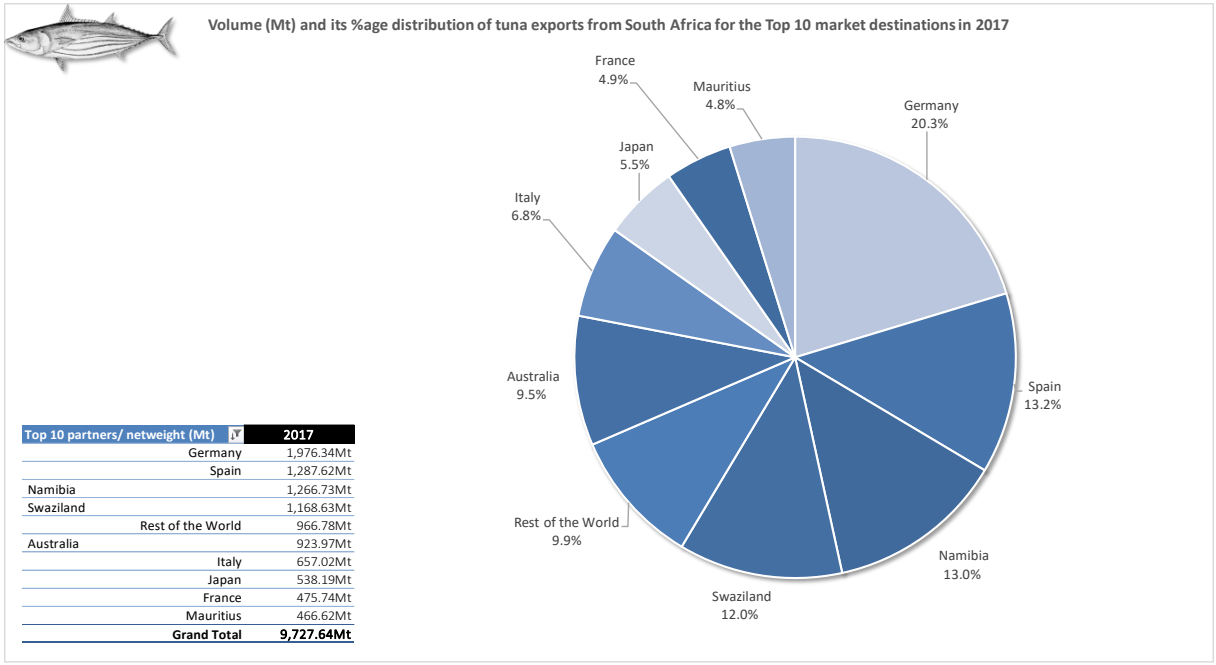


Figure 6-152: Tuna processed (metric tonnes) in Mauritius in 2017 by product type. Source FAO (2019b)

6.10.5 Tuna Export Markets

6.10.5.1 Tuna exports volume



Top 10 partners/ netweight (Mt)	2017
Germany	1,976.34Mt
Spain	1,287.62Mt
Namibia	1,266.73Mt
Swaziland	1,168.63Mt
Rest of the World	966.78Mt
Australia	923.97Mt
Italy	657.02Mt
Japan	538.19Mt
France	475.74Mt
Mauritius	466.62Mt
Grand Total	**9,727.64Mt**

Figure 6-153: Share of tuna exports volume (% and Metric tonnes) between the top 10 market destination for South Africa and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

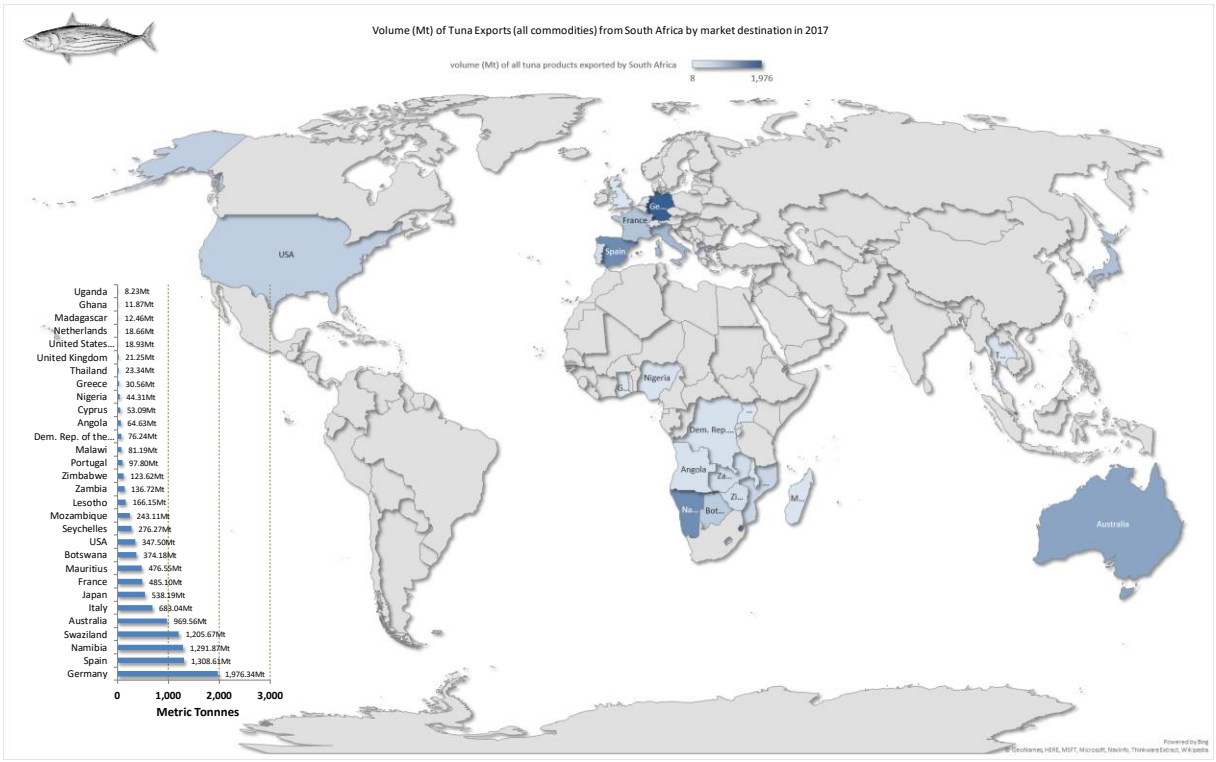
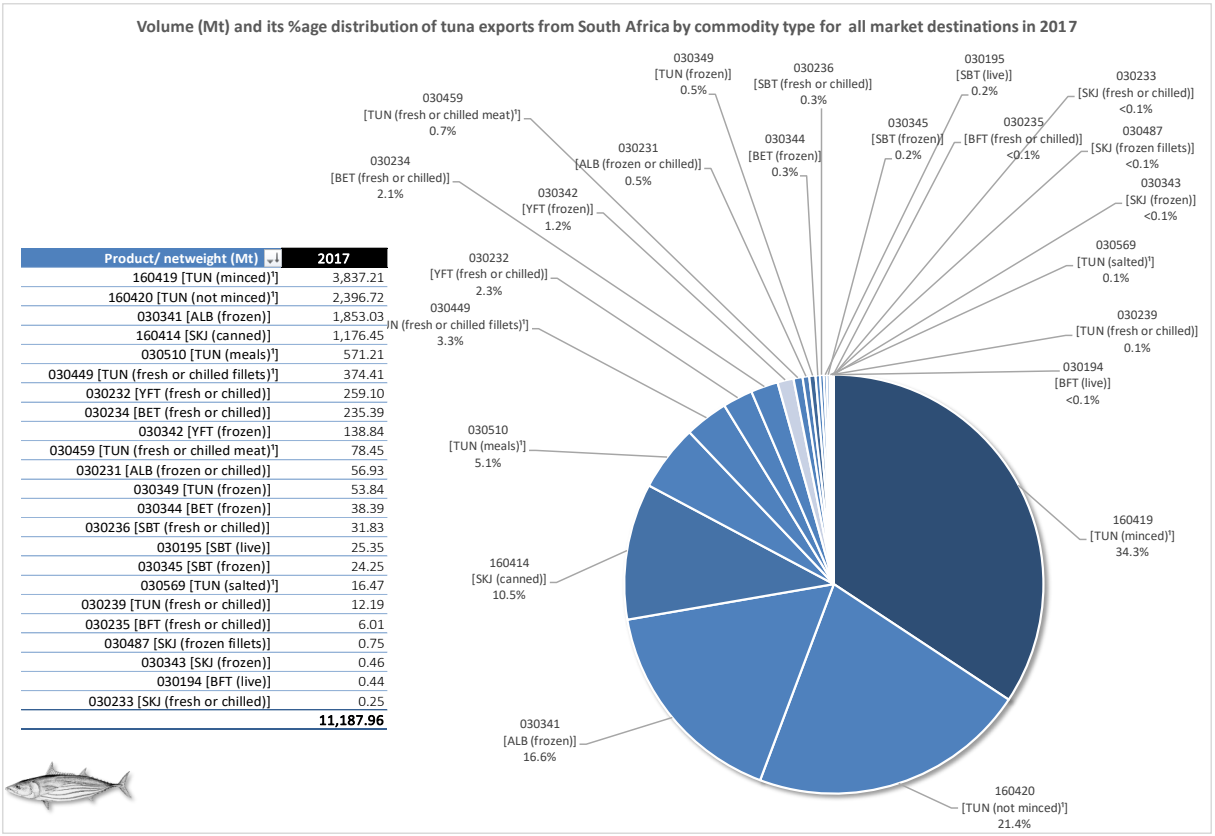


Figure 6-154: Geographic distribution by market destination of tuna exports volume (Mt) for South Africa and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)



Product/ netweight (Mt)	2017
160419 [TUN (minced)¹]	3,837.21
160420 [TUN (not minced)¹]	2,396.72
030341 [ALB (frozen)]	1,853.03
160414 [SKJ (canned)]	1,176.45
030510 [TUN (meals)¹]	571.21
030449 [TUN (fresh or chilled fillets)¹]	374.41
030232 [YFT (fresh or chilled)]	259.10
030234 [BET (fresh or chilled)]	235.39
030342 [YFT (frozen)]	138.84
030459 [TUN (fresh or chilled meat)¹]	78.45
030231 [ALB (frozen or chilled)]	56.93
030349 [TUN (frozen)]	53.84
030344 [BET (frozen)]	38.39
030236 [SBT (fresh or chilled)]	31.83
030195 [SBT (live)]	25.35
030345 [SBT (frozen)]	24.25
030569 [TUN (salted)¹]	16.47
030239 [TUN (fresh or chilled)]	12.19
030235 [BFT (fresh or chilled)]	6.01
030487 [SKJ (frozen fillets)]	0.75
030343 [SKJ (frozen)]	0.46
030194 [BFT (live)]	0.44
030233 [SKJ (fresh or chilled)]	0.25
	11,187.96

Figure 6-155: Share of tuna exports volume (% and metric tonnes) by product for South Africa in 2017. Source UN ComTrade (2019) and FAO (2019b)

Volume (Mt) of tuna exports from South Africa by commodity type and market destination in 2017

Netweight (Mt)	Year
Product/ Trading partner	2017
030233 [SKJ (fresh or chilled)]	**0.25**
Mozambique	0.25
030194 [BFT (live)]	**0.44**
Japan	0.44
030343 [SKJ (frozen)]	**0.46**
USA	0.02
Botswana	0.09
Portugal	0.35
030487 [SKJ (frozen fillets)]	**0.75**
Rest of the World	0.01
Lesotho	0.02
Botswana	0.02
Malawi	0.04
China, Hong Kong SAR	0.16
Dem. Rep. of the Congo	0.51
030235 [BFT (fresh or chilled)]	**6.01**
Lesotho	0.01
Botswana	0.01
Japan	1.04
USA	4.95
030239 [TUN (fresh or chilled)]	**12.19**
Botswana	0.47
Rest of the World	0.70
Japan	0.83
Lesotho	1.53
USA	1.97
Namibia	6.68
030569 [TUN (salted)']	**16.47**
Namibia	0.22
Rest of the World	0.25
Dem. Rep. of the Congo	0.50
Malawi	1.13
Botswana	1.16
Zambia	13.21
030345 [SBT (frozen)]	**24.25**
Botswana	0.01
Ethiopia	0.15
Namibia	24.09
030195 [SBT (live)]	**25.35**
Namibia	0.38
United States Minor Outlying Islands	1.22
USA	10.73
Japan	13.02
030236 [SBT (fresh or chilled)]	**31.83**
Lesotho	0.00
Botswana	0.12
United States Minor Outlying Islands	0.22
USA	10.54
Japan	20.96
030344 [BET (frozen)]	**38.39**
USA	2.36
Japan	14.29
Spain	21.74
030349 [TUN (frozen)]	**53.84**
Zimbabwe	0.99
Rest of the World	1.71
Angola	1.88
Botswana	9.47
Namibia	12.79
Mozambique	27.01
030231 [ALB (frozen or chilled)]	**56.93**
Lesotho	0.00
Swaziland	0.50
Spain	56.43
030459 [TUN (fresh or chilled meat)']	**78.45**
Zambia	0.26
Namibia	1.19
Rest of the World	2.50
Swaziland	12.58
Botswana	22.57
Lesotho	39.35
030342 [YFT (frozen)]	**138.84**
Namibia	0.55
Dem. Rep. of the Congo	0.92
USA	1.63
Rest of the World	1.65
France	50.28
Spain	83.80
030234 [BET (fresh or chilled)]	**235.39**
Canada	0.08
Rest of the World	0.11
Switzerland	0.99
United States Minor Outlying Islands	8.80
Japan	99.26
USA	126.15
030232 [YFT (fresh or chilled)]	**259.10**
Netherlands	4.74
Italy	8.39
Rest of the World	13.66
Japan	21.54
Spain	21.87
USA	188.91
030449 [TUN (fresh or chilled fillets)']	**374.41**
Rest of the World	1.36
Mozambique	11.56
Dem. Rep. of the Congo	61.31
Swaziland	62.21
Botswana	65.13
Namibia	172.83
030510 [TUN (meals)']	**571.21**
Rest of the World	0.57
Mozambique	0.65
Saint Helena	0.69
Botswana	2.12
Australia	200.37
Japan	366.80
160414 [SKJ (canned)]	**1,176.45**
Mozambique	56.34
Zimbabwe	64.14
Zambia	76.99
Botswana	185.45
Rest of the World	229.51
Namibia	564.03
030341 [ALB (frozen)]	**1,853.03**
Angola	3.13
Rest of the World	14.04
Greece	30.56
Seychelles	276.06
France	425.46
Spain	1,103.78
160420 [TUN (not minced)']	**2,396.72**
Germany	52.00
Lesotho	76.74
Mauritius	230.92
Rest of the World	459.77
Namibia	483.96
Swaziland	1,093.34
160419 [TUN (minced)']	**3,837.21**
Portugal	63.99
Mauritius	235.71
Rest of the World	240.93
Italy	648.64
Australia	723.60
Germany	1,924.34
Grand Total	**11,187.96**

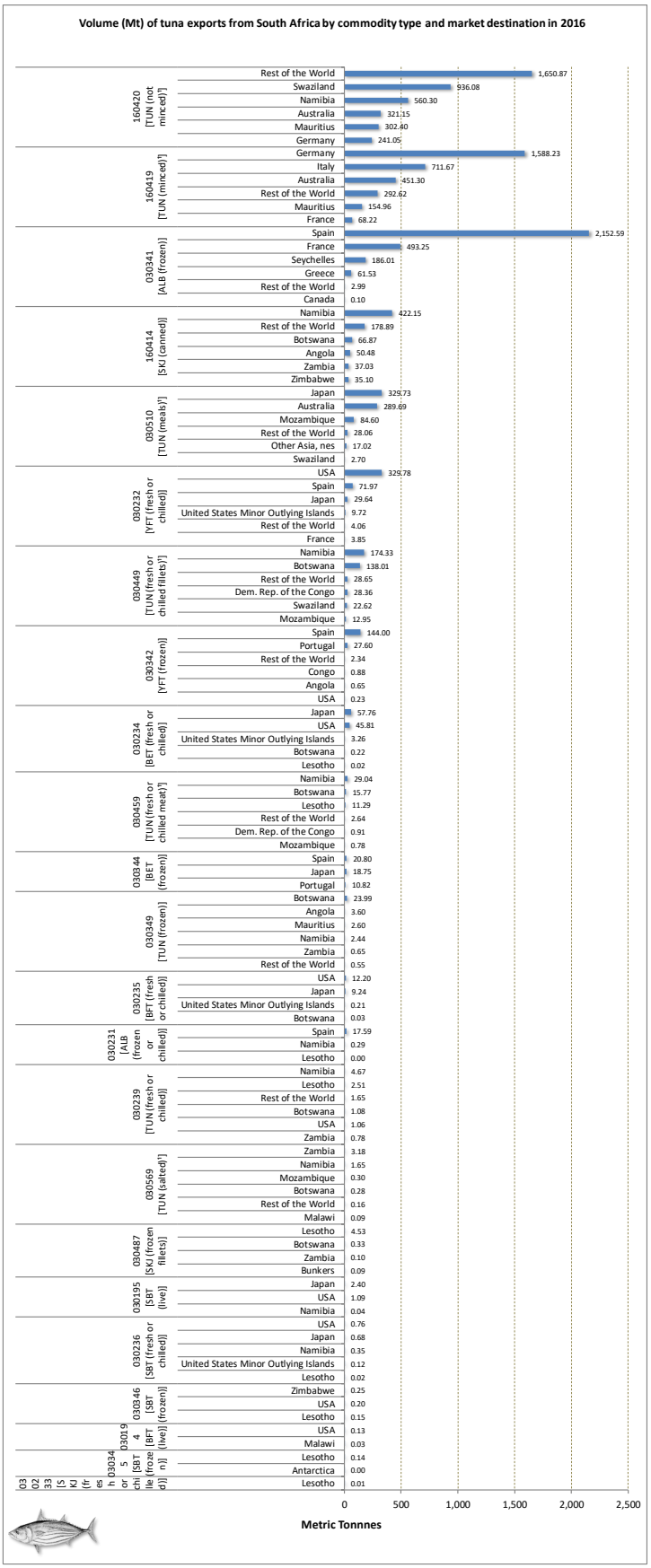
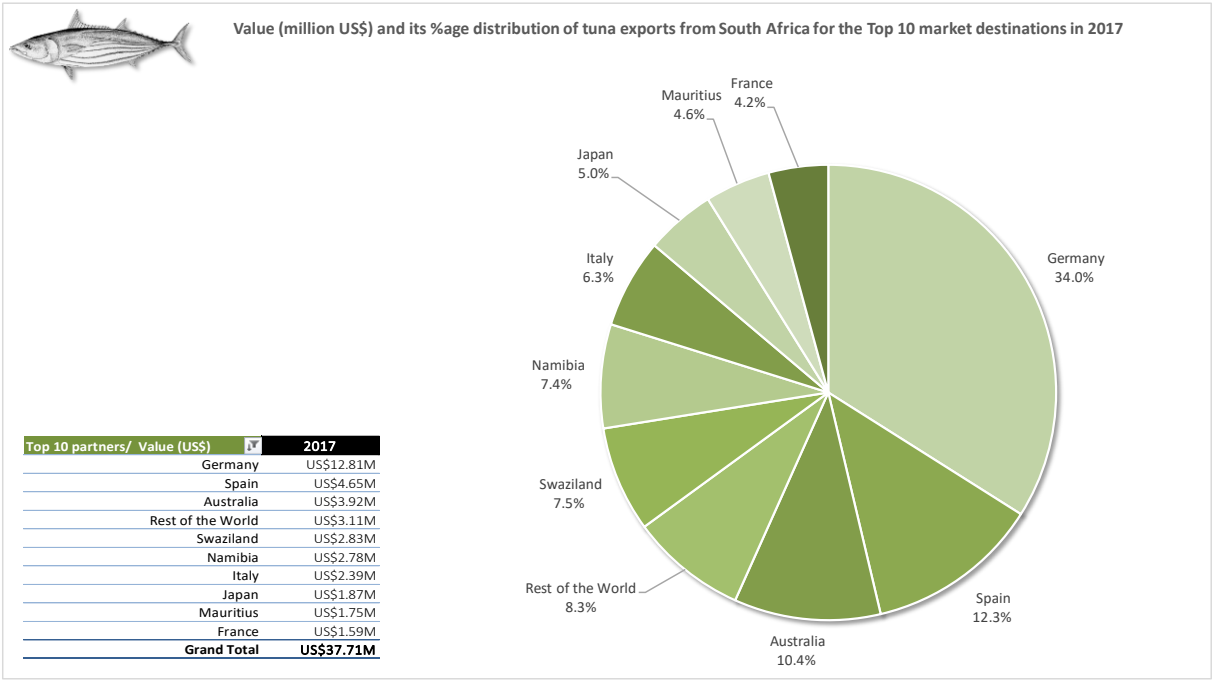


Figure 6-156: Tuna exports volume (Mt) for South Africa in 2017 by product and market destination. Source UN ComTrade (2019)

6.10.5.2 Tuna exports value

All exports values are expressed f.o.b.



Top 10 partners/ Value (US$)	2017
Germany	US$12.81M
Spain	US$4.65M
Australia	US$3.92M
Rest of the World	US$3.11M
Swaziland	US$2.83M
Namibia	US$2.78M
Italy	US$2.39M
Japan	US$1.87M
Mauritius	US$1.75M
France	US$1.59M
Grand Total	**US$37.71M**

Figure 6-157: Share of tuna exports value (% and million USD) between the top 10 market destination South Africa and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

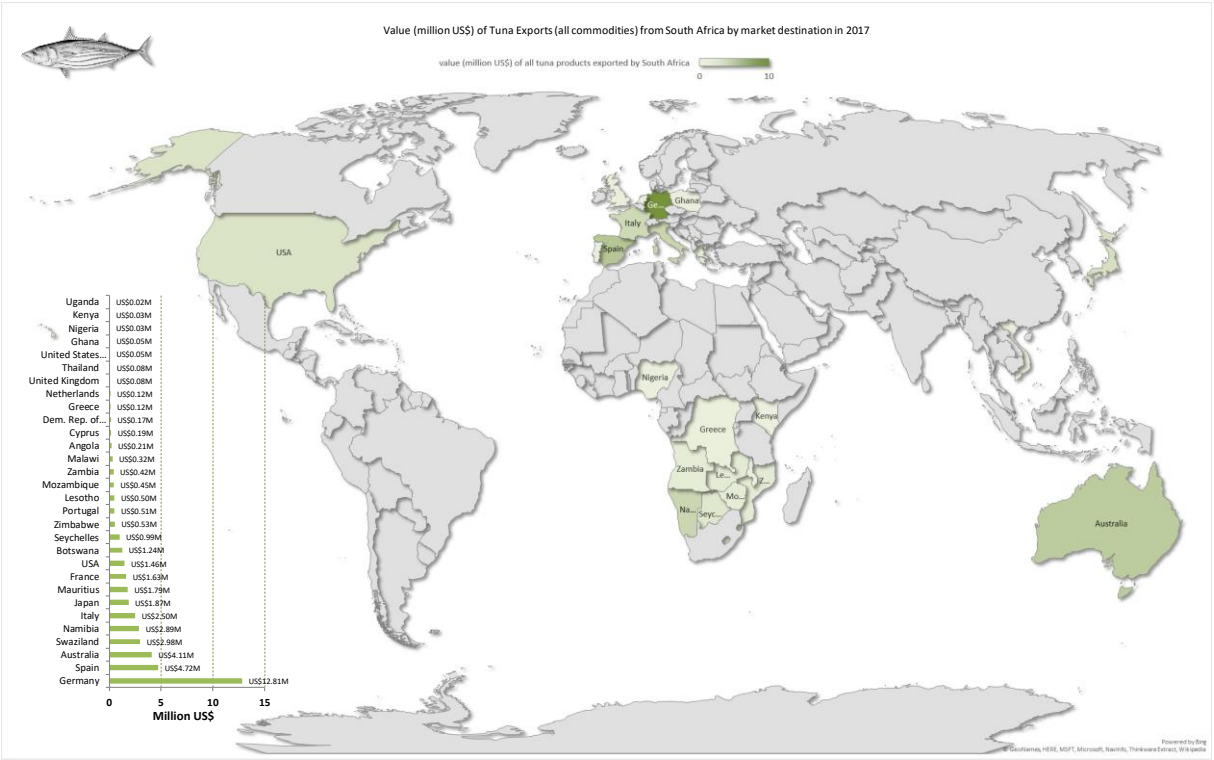
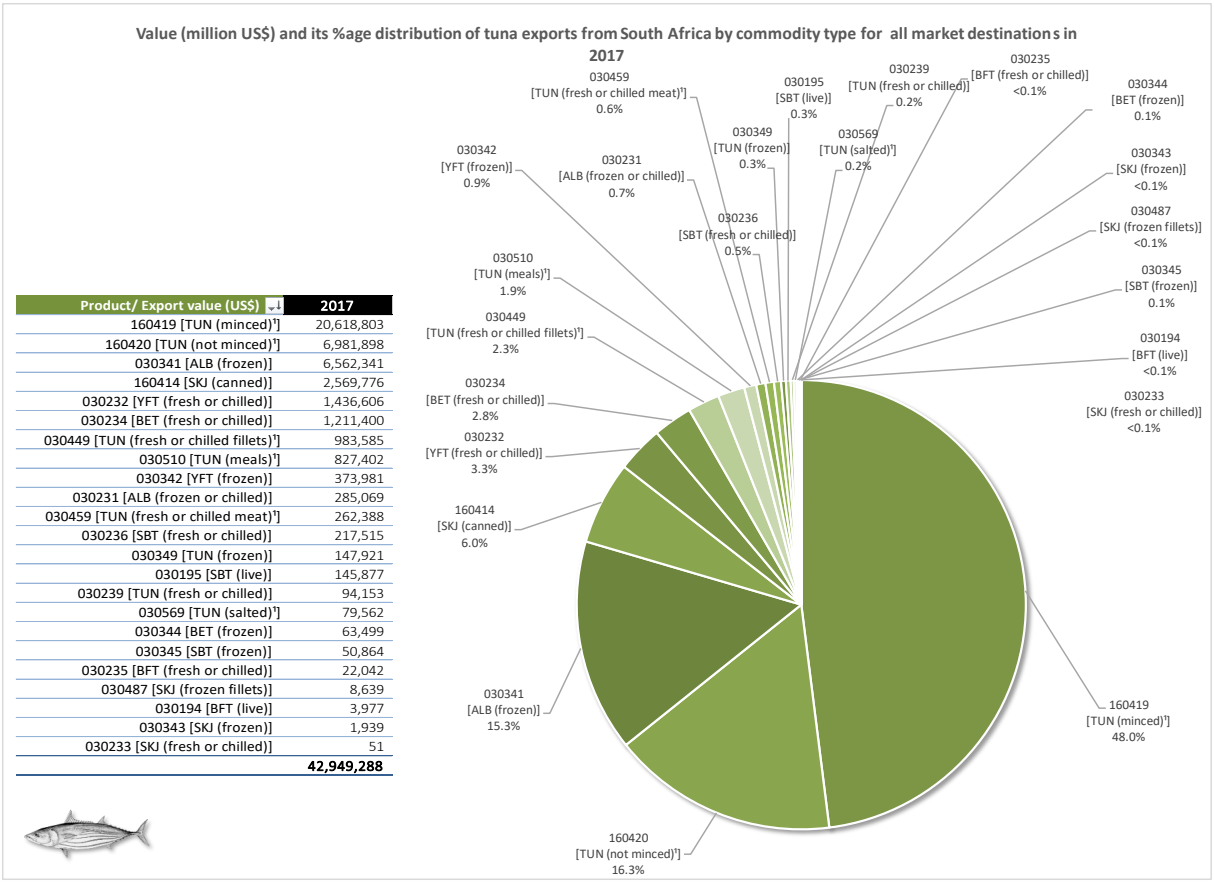


Figure 6-158: Geographic distribution by market destination of tuna exports value (million USD) for South Africa and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)



Product/ Export value (US$)	2017
160419 [TUN (minced)¹]	20,618,803
160420 [TUN (not minced)¹]	6,981,898
030341 [ALB (frozen)]	6,562,341
160414 [SKJ (canned)]	2,569,776
030232 [YFT (fresh or chilled)]	1,436,606
030234 [BET (fresh or chilled)]	1,211,400
030449 [TUN (fresh or chilled fillets)¹]	983,585
030510 [TUN (meals)¹]	827,402
030342 [YFT (frozen)]	373,981
030231 [ALB (frozen or chilled)]	285,069
030459 [TUN (fresh or chilled meat)¹]	262,388
030236 [SBT (fresh or chilled)]	217,515
030349 [TUN (frozen)]	147,921
030195 [SBT (live)]	145,877
030239 [TUN (fresh or chilled)]	94,153
030569 [TUN (salted)¹]	79,562
030344 [BET (frozen)]	63,499
030345 [SBT (frozen)]	50,864
030235 [BFT (fresh or chilled)]	22,042
030487 [SKJ (frozen fillets)]	8,639
030194 [BFT (live)]	3,977
030343 [SKJ (frozen)]	1,939
030233 [SKJ (fresh or chilled)]	51
	42,949,288

Figure 6-159: Share of tuna exports value (% and million USD) by product for South Africa in 2017. Source UN ComTrade (2019) and FAO (2019b)

Value ('000 US$) of tuna exports from South Africa by commodity type and market destination in 2017

Value (US$) / Product/ Trading partner	Year 2017
030233 [SKJ (fresh or chilled)]	**51**
Mozambique	51
030343 [SKJ (frozen)]	**1,939**
USA	6
Botswana	163
Portugal	1,770
030194 [BFT (live)]	**3,977**
Japan	3,977
030487 [SKJ (frozen fillets)]	**8,639**
Lesotho	149
Rest of the World	151
Botswana	425
Malawi	562
Dem. Rep. of the Congo	2,872
China, Hong Kong SAR	4,480
030235 [BFT (fresh or chilled)]	**22,042**
Botswana	97
Lesotho	421
Japan	6,987
USA	14,537
030345 [SBT (frozen)]	**50,864**
Botswana	24
Ethiopia	77
Namibia	50,763
030344 [BET (frozen)]	**63,499**
Japan	3,774
USA	6,758
Spain	52,967
030569 [TUN (salted)']	**79,562**
Rest of the World	132
Malawi	244
Namibia	1,134
Dem. Rep. of the Congo	1,425
Botswana	5,920
Zambia	70,707
030239 [TUN (fresh or chilled)]	**94,153**
Botswana	1,720
Lesotho	3,253
Rest of the World	3,768
Japan	8,192
USA	17,992
Namibia	59,228
030195 [SBT (live)]	**145,877**
Namibia	809
United States Minor Outlying Islands	2,343
USA	24,210
Japan	118,515
030349 [TUN (frozen)]	**147,921**
Angola	5,997
Zimbabwe	6,738
Rest of the World	10,288
Mozambique	30,041
Botswana	38,294
Namibia	56,563
030236 [SBT (fresh or chilled)]	**217,515**
Lesotho	19
United States Minor Outlying Islands	645
Botswana	714
USA	25,361
Japan	190,776
030459 [TUN (fresh or chilled meat)']	**262,388**
Zambia	4,518
Namibia	5,678
Rest of the World	8,465
Swaziland	47,703
Botswana	79,462
Lesotho	116,562
030231 [ALB (frozen or chilled)]	**285,069**
Lesotho	100
Swaziland	562
Spain	284,407
030342 [YFT (frozen)]	**373,981**
Dem. Rep. of the Congo	4,552
USA	4,667
Rest of the World	5,407
Namibia	6,944
France	130,645
Spain	221,766
030510 [TUN (meals)']	**827,402**
Mozambique	1,647
Rest of the World	1,651
Botswana	4,280
Saint Helena	4,723
Australia	283,197
Japan	531,904
030449 [TUN (fresh or chilled fillets)']	**983,585**
Rest of the World	6,264
Mozambique	53,419
Dem. Rep. of the Congo	95,200
Swaziland	168,400
Botswana	290,956
Namibia	369,346
030234 [BET (fresh or chilled)]	**1,211,400**
Rest of the World	341
Canada	717
Switzerland	3,074
United States Minor Outlying Islands	22,797
USA	356,633
Japan	827,838
030232 [YFT (fresh or chilled)]	**1,436,606**
Netherlands	33,493
Rest of the World	43,625
Italy	46,160
Spain	125,271
Japan	179,257
USA	1,008,800
160414 [SKJ (canned)]	**2,569,776**
Mozambique	128,146
Zambia	184,337
Zimbabwe	304,633
Botswana	540,558
Rest of the World	562,682
Namibia	849,420
030341 [ALB (frozen)]	**6,562,341**
Rest of the World	8,830
Angola	16,517
Greece	116,423
Seychelles	991,748
France	1,462,631
Spain	3,966,192
160420 [TUN (not minced)']	**6,981,898**
Lesotho	298,142
Germany	335,566
Mauritius	839,157
Namibia	1,380,178
Rest of the World	1,513,833
Swaziland	2,615,022
160419 [TUN (minced)']	**20,618,803**
Portugal	305,937
Mauritius	907,455
Rest of the World	947,901
Italy	2,344,371
Australia	3,638,292
Germany	12,474,847
Grand Total	**42,949,288**

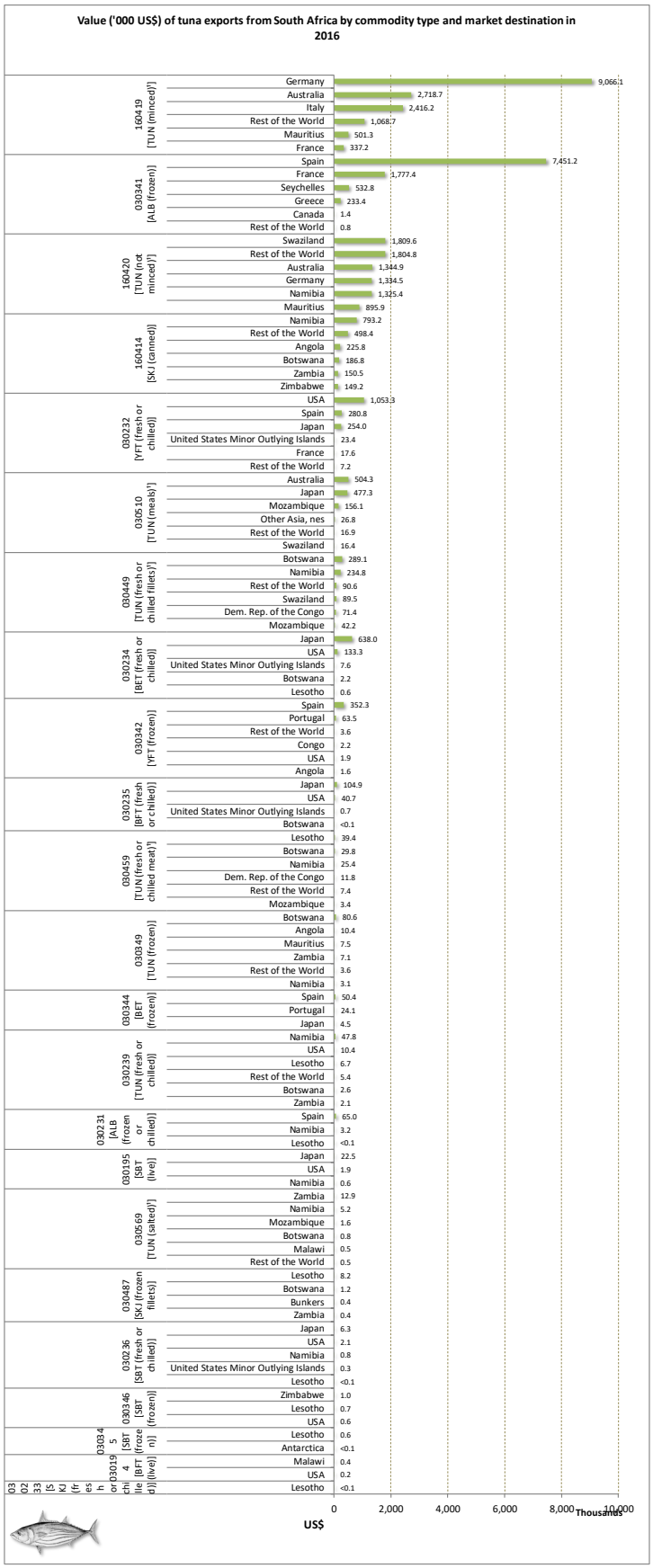


Figure 6-160: Tuna exports value (USD) for South Africa in 2017 by product and market destination. Source UN ComTrade (2019)

6.10.5.3 Average prices of tuna exports

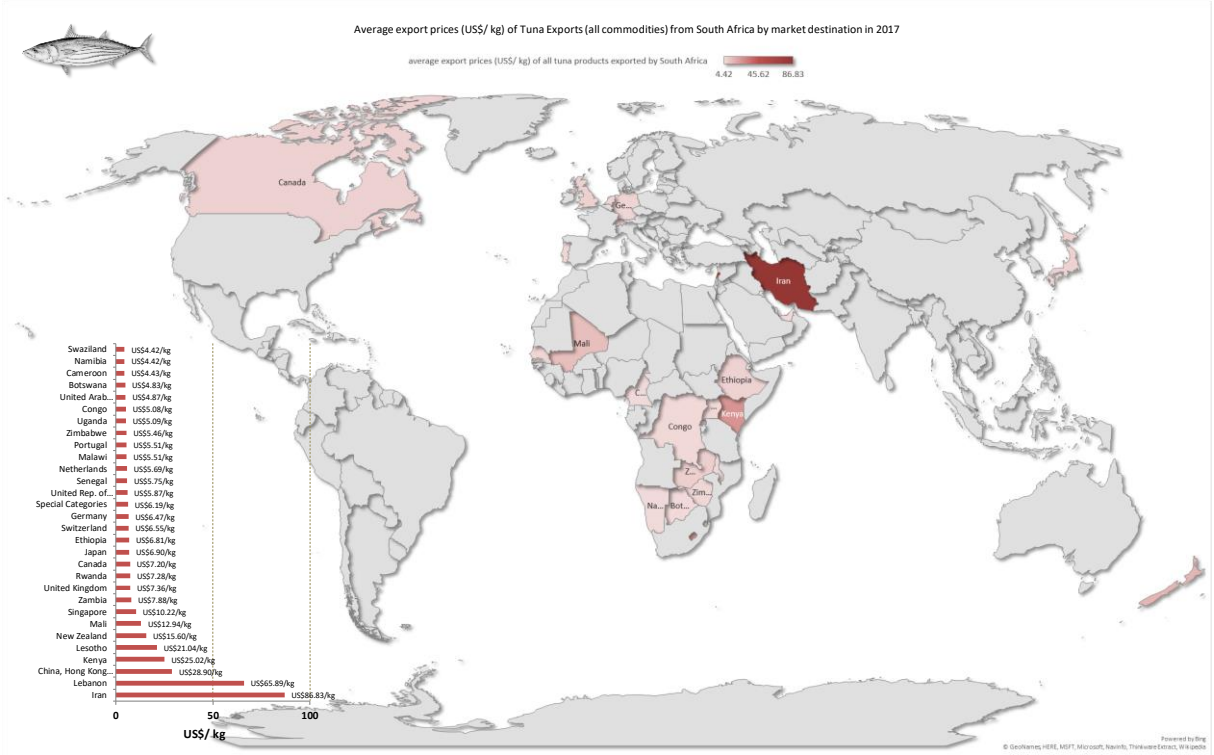


Figure 6-161: Geographic distribution by market destination of the average price of tuna exports for South Africa and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

Average price (US$/ kg) of tuna exports from South Africa by commodity type and market destination in 2017	
Average of Average price	Year
Product/ Trading partner	2017
030233 [SKJ (fresh or chilled)]	**0.20**
Mozambique	0.20
030345 [SBT (frozen)]	**1.60**
Ethiopia	0.51
Namibia	2.11
Botswana	2.18
030344 [BET (frozen)]	**1.86**
Japan	0.26
Spain	2.44
USA	2.87
030343 [SKJ (frozen)]	**2.39**
USA	0.30
Botswana	1.75
Portugal	5.13
030341 [ALB (frozen)]	**2.94**
Rest of the World	0.45
France	3.44
Seychelles	3.59
Spain	3.59
Greece	3.81
Angola	5.28
030510 [TUN (meals)']	**3.00**
Australia	1.41
Japan	1.45
Botswana	2.02
Mozambique	2.53
Rest of the World	3.14
Saint Helena	6.86
030569 [TUN (salted)']	**3.19**
Malawi	0.22
Rest of the World	0.53
Dem. Rep. of the Congo	2.85
Namibia	5.09
Botswana	5.11
Zambia	5.35
160414 [SKJ (canned)]	**3.67**
Namibia	1.51
Mozambique	2.27
Zambia	2.39
Botswana	2.91
Rest of the World	3.85
Zimbabwe	4.75
030195 [SBT (live)]	**3.85**
United States Minor Outlying Islands	1.92
Namibia	2.13
USA	2.26
Japan	9.10
160419 [TUN (minced)']	**4.25**
Italy	3.61
Mauritius	3.85
Rest of the World	4.14
Portugal	4.78
Australia	5.03
Germany	6.48
030449 [TUN (fresh or chilled fillets)']	**4.33**
Dem. Rep. of the Congo	1.55
Namibia	2.14
Swaziland	2.71
Botswana	4.47
Mozambique	4.62
Rest of the World	5.21
030234 [BET (fresh or chilled)]	**4.36**
Rest of the World	2.36
United States Minor Outlying Islands	2.59
USA	2.83
Switzerland	3.10
Japan	8.34
Canada	8.96
030349 [TUN (frozen)]	**5.26**
Mozambique	1.11
Angola	3.19
Botswana	4.04
Namibia	4.42
Rest of the World	6.59
Zimbabwe	6.83
030232 [YFT (fresh or chilled)]	**5.84**
USA	5.34
Rest of the World	5.50
Italy	5.50
Spain	5.73
Netherlands	7.06
Japan	8.32
030342 [YFT (frozen)]	**6.00**
France	2.60
Spain	2.65
USA	2.86
Dem. Rep. of the Congo	4.97
Rest of the World	6.88
Namibia	12.53
030459 [TUN (fresh or chilled meat)']	**6.08**
Lesotho	2.96
Botswana	3.52
Swaziland	3.79
Namibia	4.77
Rest of the World	5.83
Zambia	17.38
030236 [SBT (fresh or chilled)]	**7.94**
USA	2.41
United States Minor Outlying Islands	3.00
Botswana	6.21
Japan	9.10
Lesotho	19.00
030194 [BFT (live)]	**8.96**
Japan	8.96
030239 [TUN (fresh or chilled)]	**9.08**
Lesotho	2.12
Botswana	3.69
Namibia	8.86
USA	9.11
Japan	9.86
Rest of the World	11.05
160420 [TUN (not minced)']	**10.25**
Swaziland	2.39
Namibia	2.85
Mauritius	3.63
Lesotho	3.88
Germany	6.45
Rest of the World	11.25
030487 [SKJ (frozen fillets)]	**15.03**
Dem. Rep. of the Congo	5.63
Lesotho	9.93
Rest of the World	10.95
Malawi	15.19
Botswana	23.61
China, Hong Kong SAR	28.90
030235 [BFT (fresh or chilled)]	**26.16**
USA	2.93
Japan	6.72
Botswana	10.78
Lesotho	84.20
030231 [ALB (frozen or chilled)]	**35.39**
Swaziland	1.12
Spain	5.04
Lesotho	100.00
Average	**6.69**

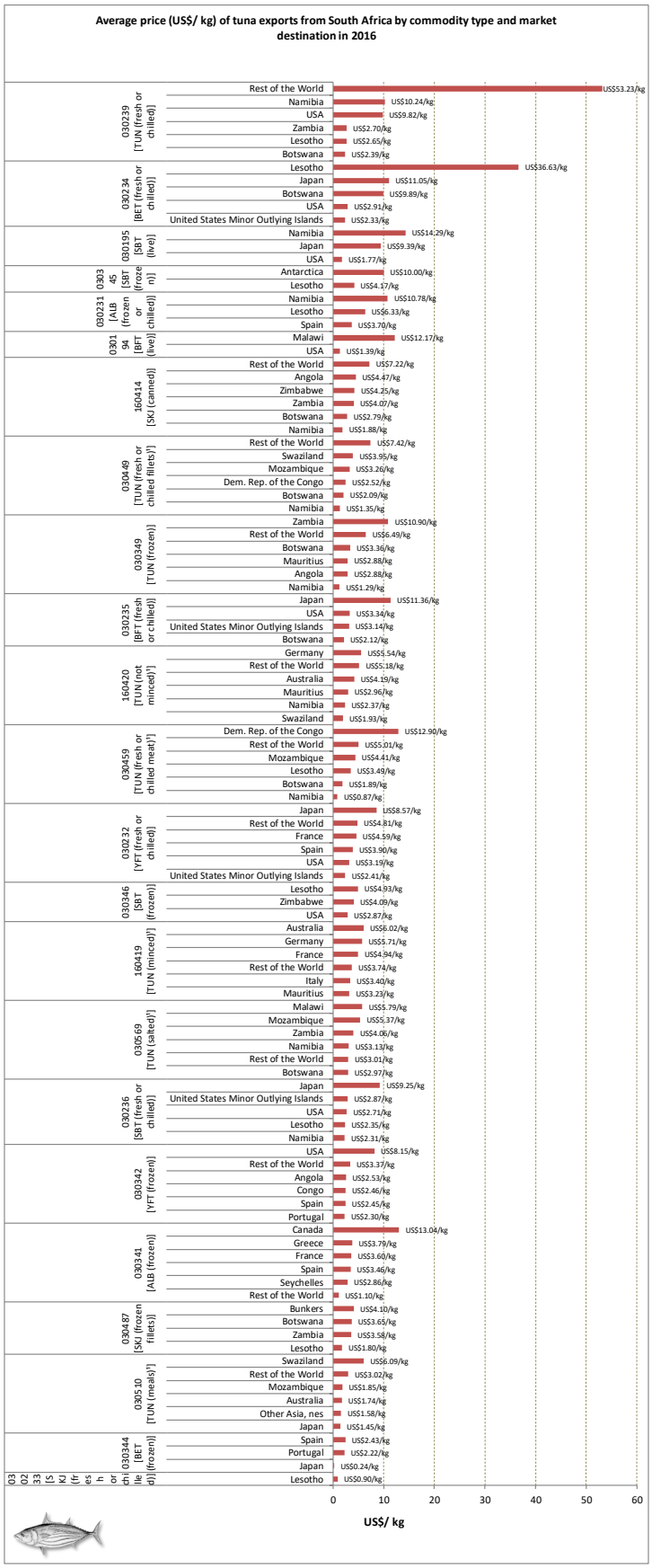


Figure 6-162: Average price of tuna exports (USD / kg) for South Africa in 2017 by product and market destination. Source UN ComTrade (2019)

6.10.5.4 Exports tariff for main tuna products exported by South Africa

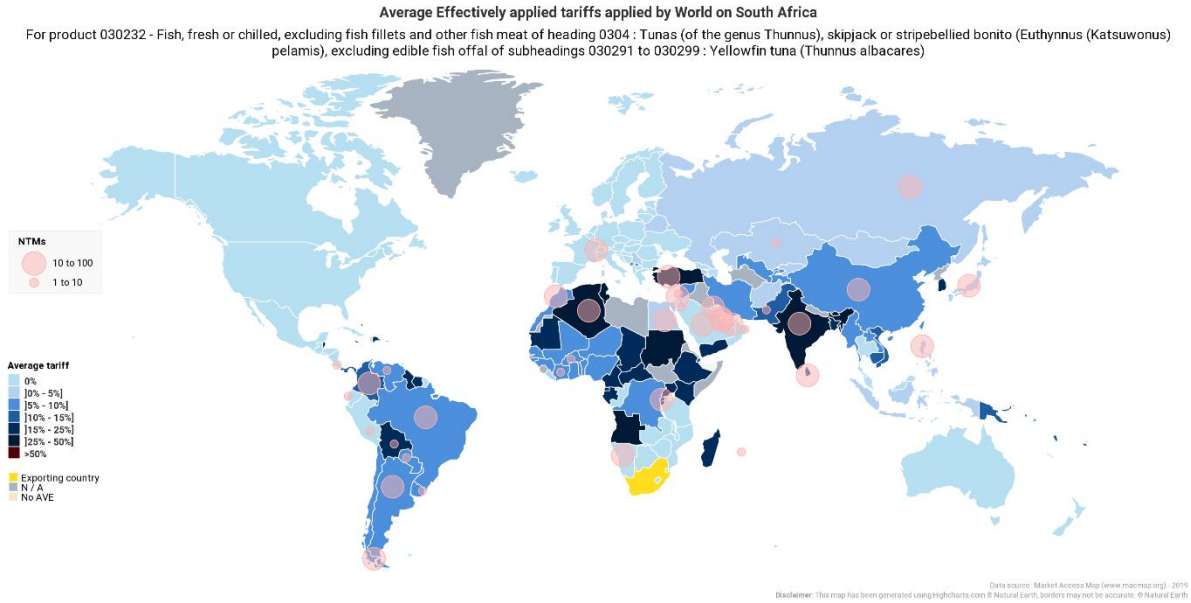


Figure 6-163: Tuna exports tariffs and NTMs faced by South Africa on the International markets for commodity: 30232 - Yellowfin tuna (fresh or chilled). Source: ITC (2019)

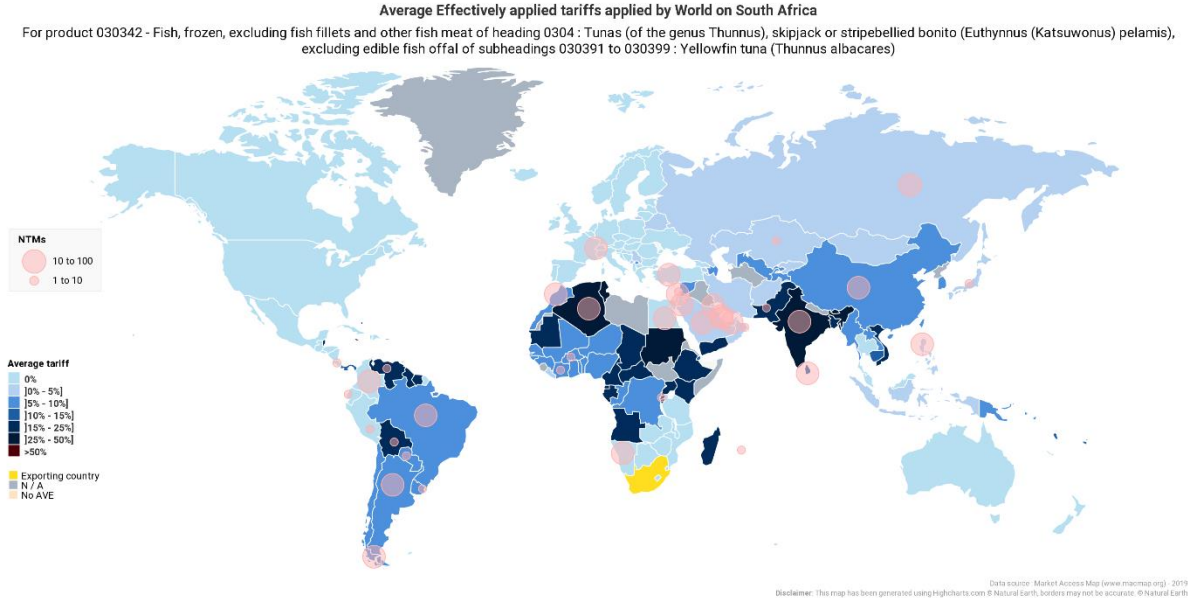


Figure 6-164: Tuna exports tariffs and NTMs faced by South Africa on the International markets for commodity: 30342 - Yellowfin tuna (frozen). Source: ITC (2019)

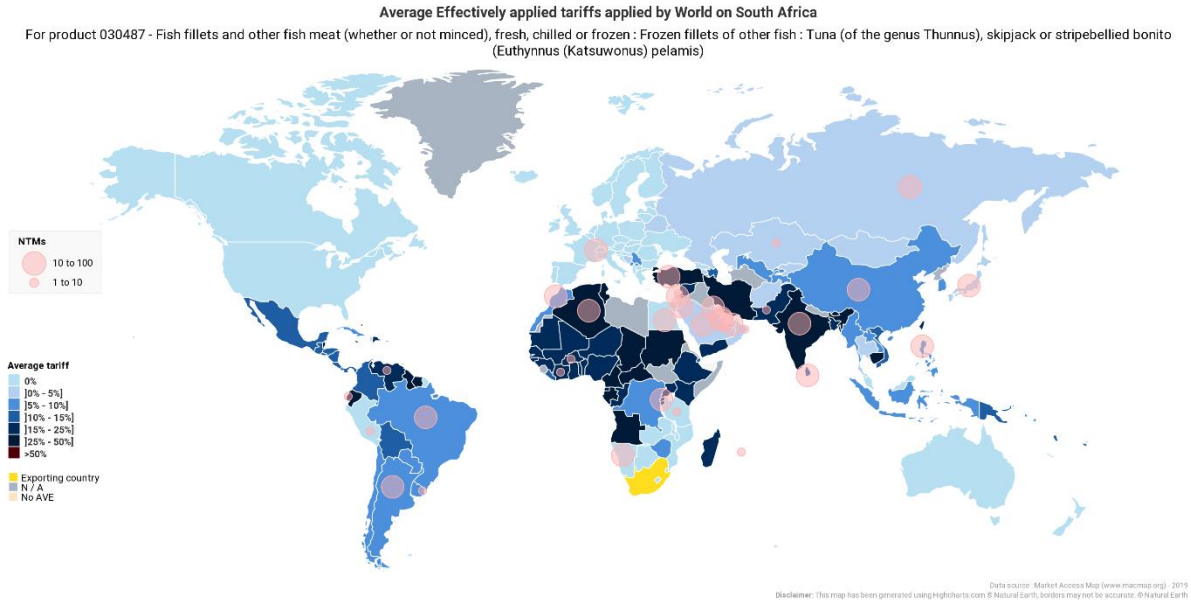


Figure 6-165: Tuna exports tariffs and NTMs faced by South Africa on the International markets for commodity: 30487 - Skipjack tuna (frozen fillets). Source: ITC (2019)

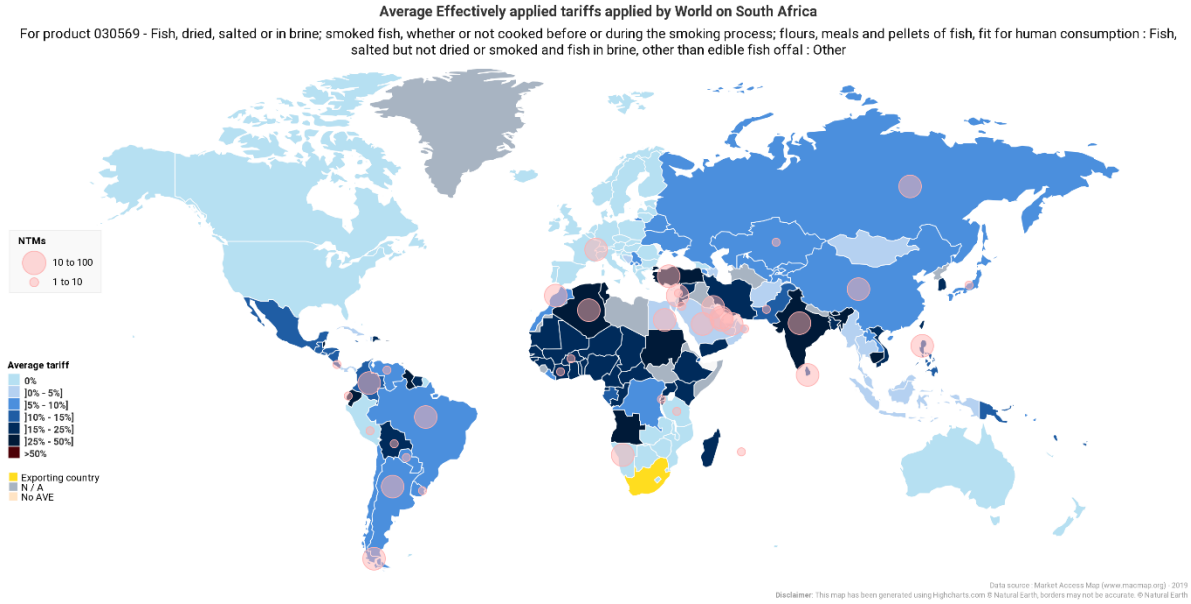


Figure 6-166: Tuna exports tariffs and NTMs faced by South Africa on the International markets for commodity: 30569 - Tunas nei (salted). Source: ITC (2019)

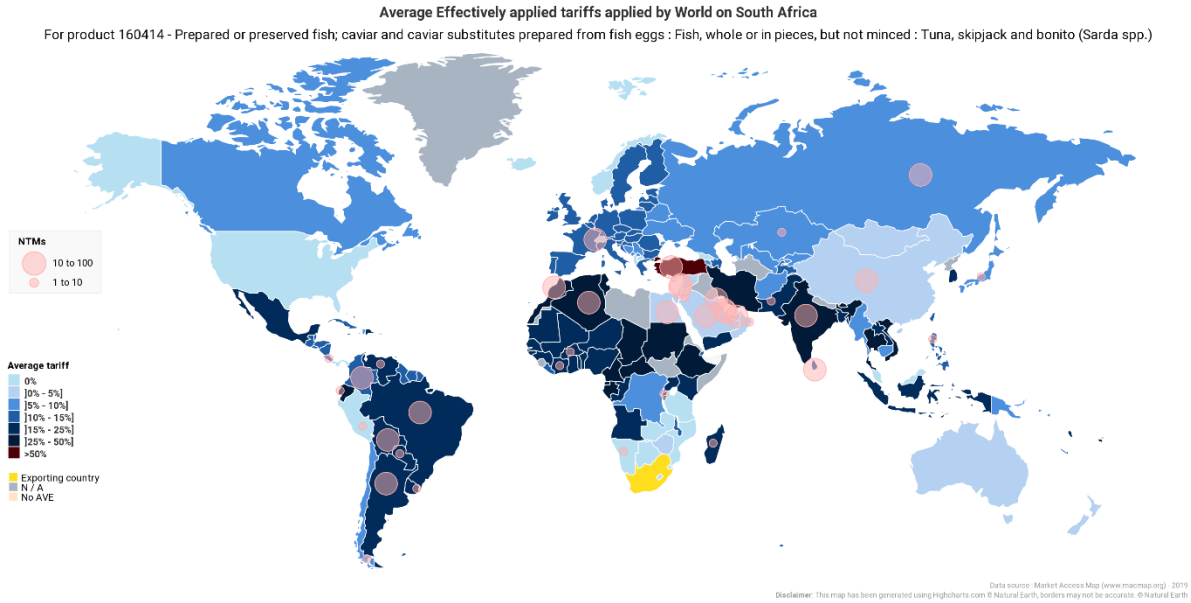


Figure 6-167: Tuna exports tariffs and NTMs faced by South Africa on the International markets for commodity: 160414 - Skipjack tuna (canned). Source: ITC (2019)

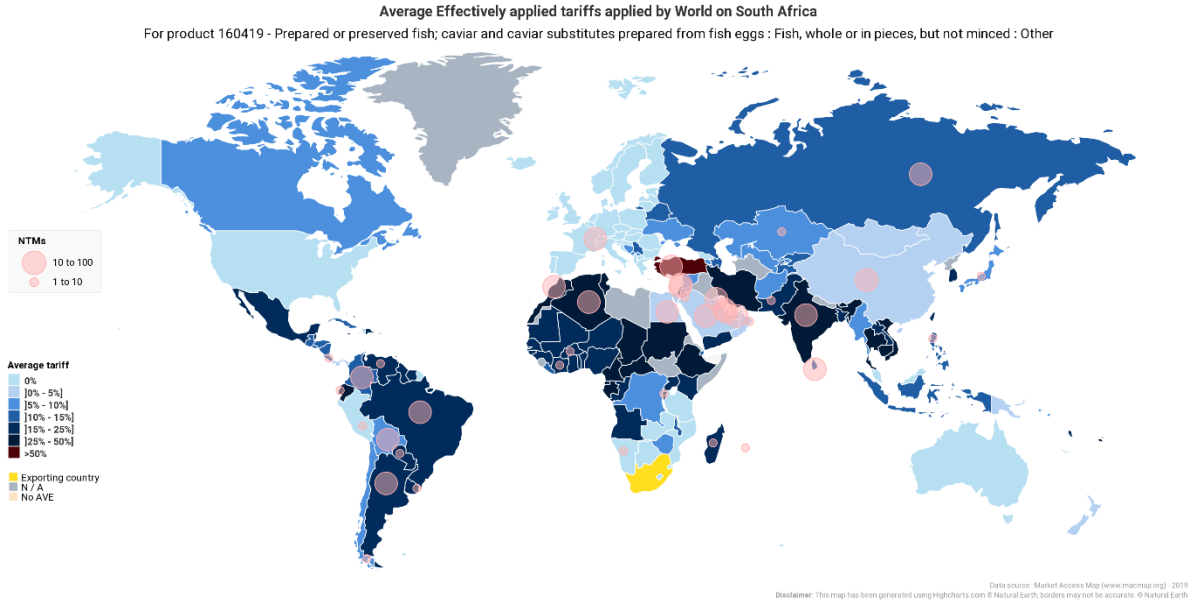


Figure 6-168: Tuna exports tariffs and NTMs faced by South Africa on the International markets for commodity: 160419 - Tunas nei (prep minced). Source: ITC (2019)

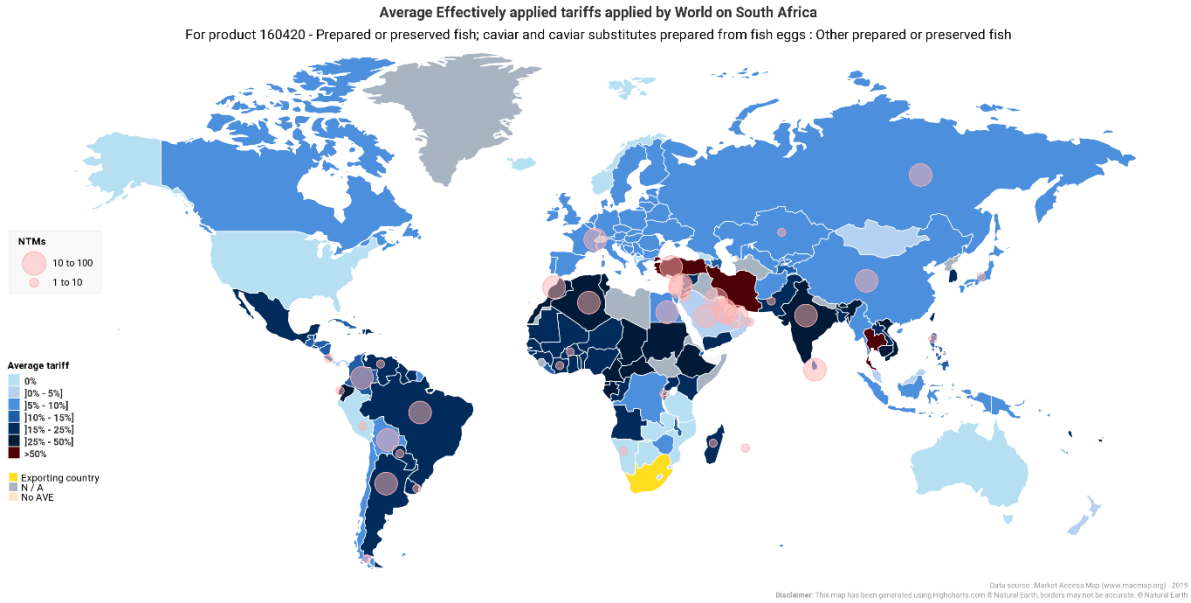


Figure 6-169: Tuna exports tariffs and NTMs faced by South Africa on the International markets for commodity: 160420 - Tunas nei (prep not minced). Source: ITC (2019)

6.11 Tanzania

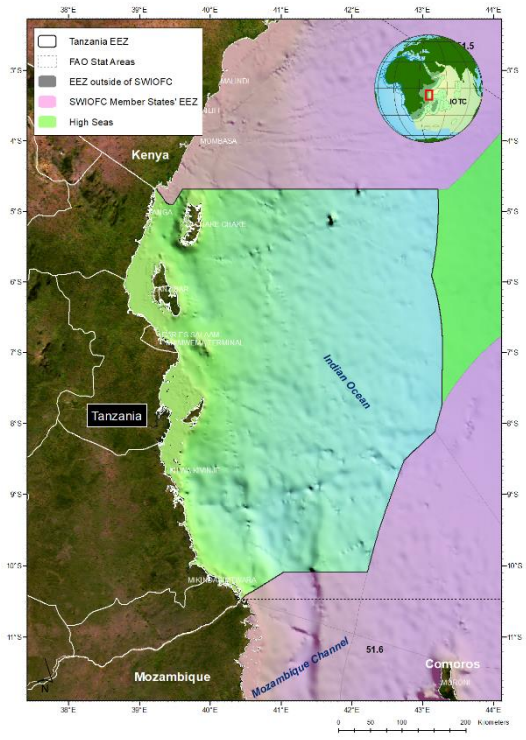


Figure 6-170: Tanzania EEZ and surrounding waters.

In Tanzania, the fishery sector is divided into 2 marine sub-sectors, artisanal and industrial. All artisanal fisheries in marine waters takes place within the territorial waters (12 nautical miles stretch). The catch consists mostly of fin fish and to a small extent of shrimps. It is dominated by the artisanal fishers using poor crafts and fishing methods. The marine industrial sub sector fish both the territorial waters and beyond in the Exclusive Economic Zone (EEZ). The main target species in the territorial waters are shellfish (shrimps and lobsters), cephalopods and crabs. In the EEZ industrial fisheries generally target tuna, tuna-like species, marlin, sword fish and sharks. Most of the fisheries taking place in the Tanzanian EEZ mainly targets fin-fish. The main fish species are tuna and tuna-like species. Other fish species caught from the EEZ include marlin, sword fish and sharks. This fishery is solely industrial and the bulk of the catch is exported. This fishery is mainly conducted by licensed foreign vessels flying the flags of major fishing countries. The fishing vessels used in this fishery are purse seiners and longliners. Within the marine fisheries of Tanzania investment opportunities exist in the Exclusive Economic Zone (EEZ). Possibilities exist for the exploitation of pelagic species such as Tuna, tuna-like and other species. (FAO, 2018)

6.11.1 Fisheries Access Agreements

The Deep Sea Fishing Authority (DSFA), established jointly by the MALF[9] and MNALF[10], is located in Zanzibar, and has overall responsibility for fisheries resource management of the Exclusive Economic Zone (EEZ), including access by foreign vessels. Since 1998 the Government of Tanzania has licensed foreign-flagged fishing vessels to operate in the EEZ. The number of licences varies from year to year (since the fishery is highly dynamic, and depends on the variable migratory patterns). Seventy-four vessels were licenced in 2014, of which 25 were for purse seiners which came from four countries Spain, (14 vessels), France, (2 vessels) Seychelles (7 vessels) and South Korea (2 vessels). In 2011 and 2012, no foreign-flagged longliners applied for authorisations to fish in the Tanzanian EEZ, due to the threat of piracy from Somalia. However, with the decline of piracy activities, 41 longliners drew licences to fish in the Tanzanian EEZ in 2014. It should be understood that, although vessels pay for the licences to fish in the Tanzanian EEZ they may not fish exclusively in the EEZ. They may sometimes use the license only for short periods, or not at all. The Government of Tanzania has held discussions with the EU regarding the possibility of a Fisheries Partnership Agreement, but these have not yet resulted in any formal proposals. Although the income from foreign fishing makes a valuable contribution to the nation, the Government has indicated that it would like to see these fisheries exploited by national operators. This would require the provision of infrastructure and other incentives to international fleet operators to attract their operations which, in the case of tuna for canning, are increasingly centred on Seychelles and Mauritius. (MALF, 2016)

[9] The Ministry of Agriculture, Livestock and Fisheries
[10] The Ministry of Natural Resources, Agriculture Livestock and Fisheries

Moreover, there are possible opportunities for fishing of some tunas in the EEZ by medium-sized long liners and purse seiners, and for exploitation of demersal resources at the edge of the continental shelf, but more study is required to assess their feasibility. Whilst many countries in the region (Kenya, Madagascar, Seychelles and Mauritius) have developed shore-based infrastructure to serve the industrial tuna fisheries of the Indian ocean, these are now mostly fully exploited and, in the case of yellow fin tunas, subject to effort reduction measures. Under these circumstances, it would be difficult for Tanzania to break into this market. National benefits are presently derived from the presence of these migratory fish in Tanzanian waters, through foreign fishing access arrangements with fleets operating in the region. There appears to be some potential for these arrangements to be optimised beyond the current annual ad hoc licensing by entering into more formal and longer term arrangements, for example via an EU Fisheries Partnership Agreement. (MALF, 2016)

6.11.2 Tuna Production

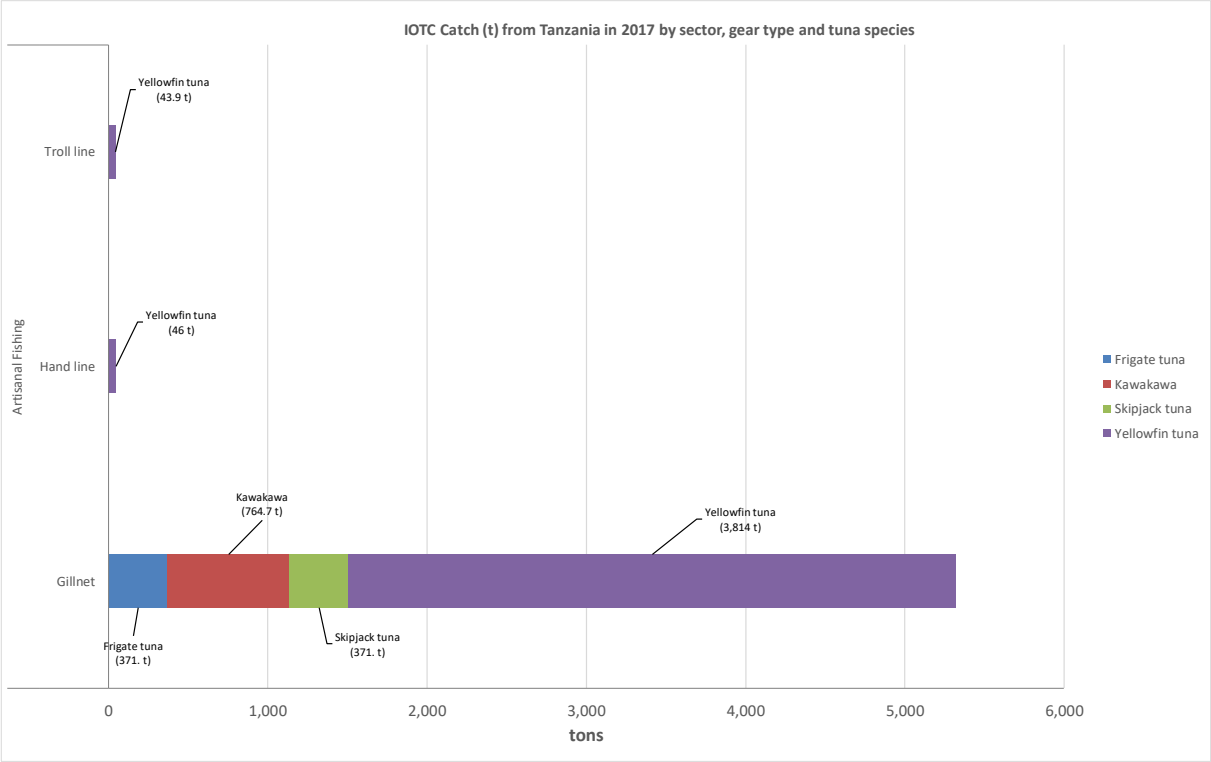


Figure 6-171: Tuna Catch in the IOTC area by Tanzania in 2017 by species and fishing method. Source (IOTC, 2019)

6.11.3 IUU Tuna Landings

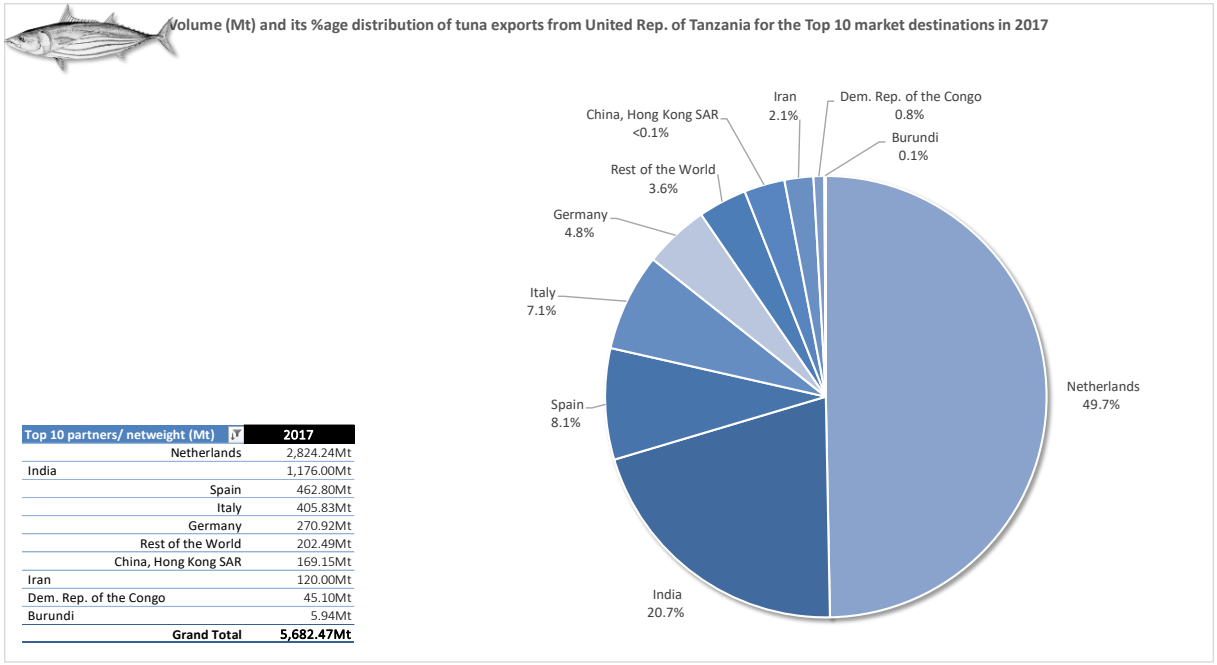
Table 6-16: Reported and unreported tuna landings (Mt and USD) for Tanzania by sector, method and tuna species in 2014. Source (SAU, 2019)

Tuna Landings						
	Reported		Unreported		Total Catch (metric tonnes)	Total Landed value (US$)[1]
Country/sector/method/ species	Catch (metric tonnes)	Landed value (US$)[1]	Catch (metric tonnes)	Landed value (US$)[1]		
Tanzania	**6,107.7**	**19,048,747.6**	**2,131.9**	**6,652,997.8**	**8,239.5**	**25,701,745.4**
Artisanal	**6,075.0**	**18,980,245.0**	**2,126.3**	**6,643,085.8**	**8,201.3**	**25,623,330.8**
small scale encircling nets	5,024.9	17,023,736.1	1,758.7	5,958,307.6	6,783.6	22,982,043.7
BET	22.8	44,710.8	8.0	15,648.8	30.8	60,359.6
FRZ	60.8	107,616.0	21.3	37,665.6	82.1	145,281.6
KAW	200.3	354,502.3	70.1	124,075.8	270.4	478,578.1
SKJ	64.0	133,376.0	22.4	46,681.6	86.4	180,057.6
YFT	4,677.0	16,383,531.0	1,637.0	5,734,235.9	6,314.0	22,117,766.9
small scale gillnets	356.7	655,809.9	124.8	229,533.5	481.5	885,343.4
BET	22.8	44,710.8	8.0	15,648.8	30.8	60,359.6
FRZ	60.8	107,616.0	21.3	37,665.6	82.1	145,281.6
KAW	209.1	370,107.1	73.2	129,537.5	282.3	499,644.6
SKJ	64.0	133,376.0	22.4	46,681.6	86.4	180,057.6
small scale lines	391.1	716,745.6	136.9	250,860.9	528.0	967,606.5
BET	22.8	44,710.8	8.0	15,648.8	30.8	60,359.6
FRZ	60.8	107,616.0	21.3	37,665.6	82.1	145,281.6
KAW	243.5	431,042.8	85.2	150,865.0	328.8	581,907.7
SKJ	64.0	133,376.0	22.4	46,681.6	86.4	180,057.6
small scale seine nets	302.3	583,953.4	105.8	204,383.7	408.1	788,337.1
BET	45.6	89,421.6	16.0	31,297.6	61.6	120,719.2
FRZ	121.6	215,232.0	42.6	75,331.2	164.2	290,563.2
KAW	7.1	12,547.8	2.5	4,391.7	9.6	16,939.6
SKJ	128.0	266,752.0	44.8	93,363.2	172.8	360,115.2
Industrial	**16.7**	**40,182.6**			**16.7**	**40,182.6**
longline	14.1	31,430.2			14.1	31,430.2
ALB	0.5	1,422.9			0.5	1,422.9
BET	11.2	21,865.4			11.2	21,865.4
BOP	0.0	36.9			0.0	36.9
TUX	0.2	423.4			0.2	423.4
YFT	2.2	7,681.6			2.2	7,681.6
purse seine	2.5	8,752.4			2.5	8,752.4
SKJ	0.1	189.4			0.1	189.4
YFT	2.4	8,563.0			2.4	8,563.0
Subsistence	**16.0**	**28,320.0**	**5.6**	**9,912.0**	**21.6**	**38,232.0**
subsistence fishing gear	16.0	28,320.0	5.6	9,912.0	21.6	38,232.0
FRZ	16.0	28,320.0	5.6	9,912.0	21.6	38,232.0
Grand Total	**6,107.7**	**19,048,747.6**	**2,131.9**	**6,652,997.8**	**8,239.5**	**25,701,745.4**

[1] value estimated applying 2017 ex-vessel prices from Poseidon (2019)

6.11.4 Tuna Export Markets

6.11.4.1 Tuna exports volume



Top 10 partners/ netweight (Mt)	2017
Netherlands	2,824.24Mt
India	1,176.00Mt
Spain	462.80Mt
Italy	405.83Mt
Germany	270.92Mt
Rest of the World	202.49Mt
China, Hong Kong SAR	169.15Mt
Iran	120.00Mt
Dem. Rep. of the Congo	45.10Mt
Burundi	5.94Mt
Grand Total	**5,682.47Mt**

Figure 6-172: Share of tuna exports volume (% and Metric tonnes) between the top 10 market destination for Tanzania and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

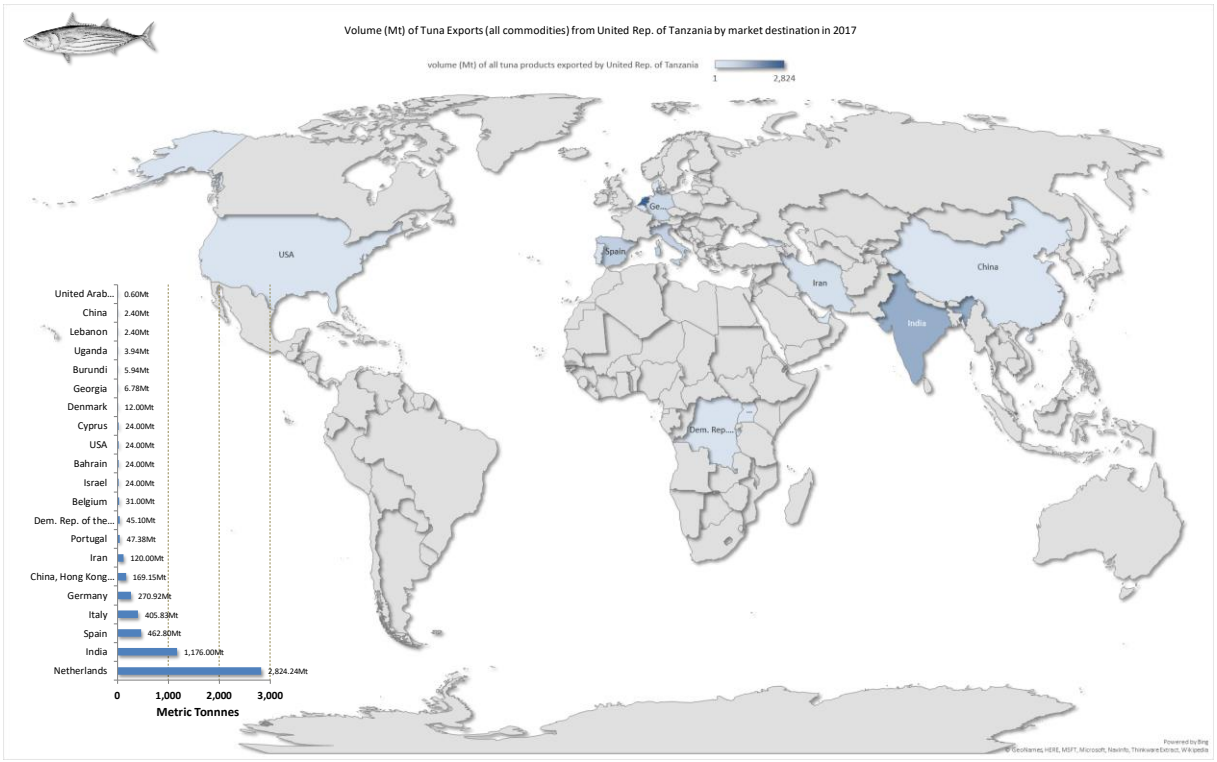


Figure 6-173: Geographic distribution by market destination of tuna exports volume (Mt) for Tanzania and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

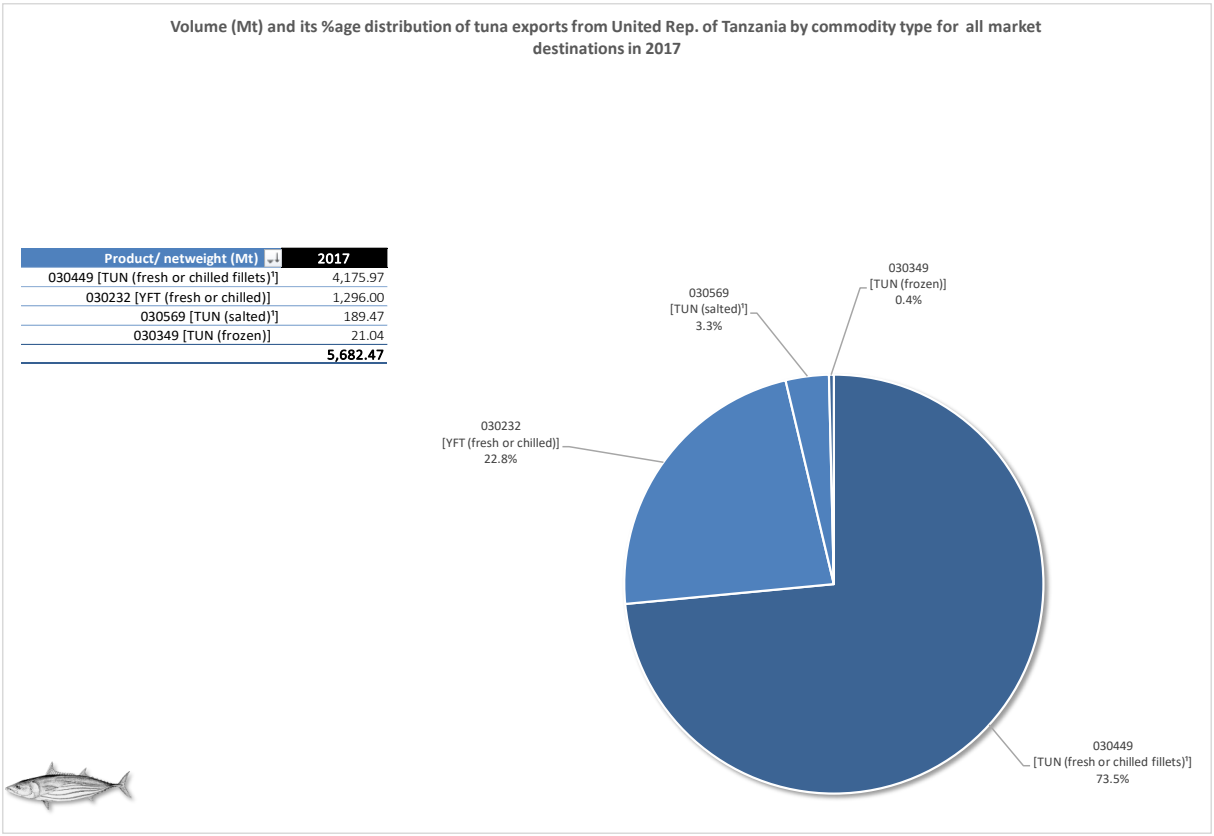


Figure 6-174: Share of tuna exports volume (% and metric tonnes) by product for Tanzania in 2017. Source UN ComTrade (2019) and FAO (2019b)

Volume (Mt) of tuna exports from United Rep. of Tanzania by commodity type and market destination in 2017

Netweight (Mt) Product/ Trading partner	Year 2017
030349 [TUN (frozen)]	**21.04**
Burundi	5.94
Dem. Rep. of the Congo	15.10
030569 [TUN (salted)[1]]	**189.47**
Dem. Rep. of the Congo	30.00
China, Hong Kong SAR	159.47
030232 [YFT (fresh or chilled)]	**1,296.00**
Iran	120.00
India	1,176.00
030449 [TUN (fresh or chilled fillets)[1]]	**4,175.97**
China, Hong Kong SAR	9.69
Rest of the World	202.49
Germany	270.92
Italy	405.83
Spain	462.80
Netherlands	2,824.24
Grand Total	**5,682.47**

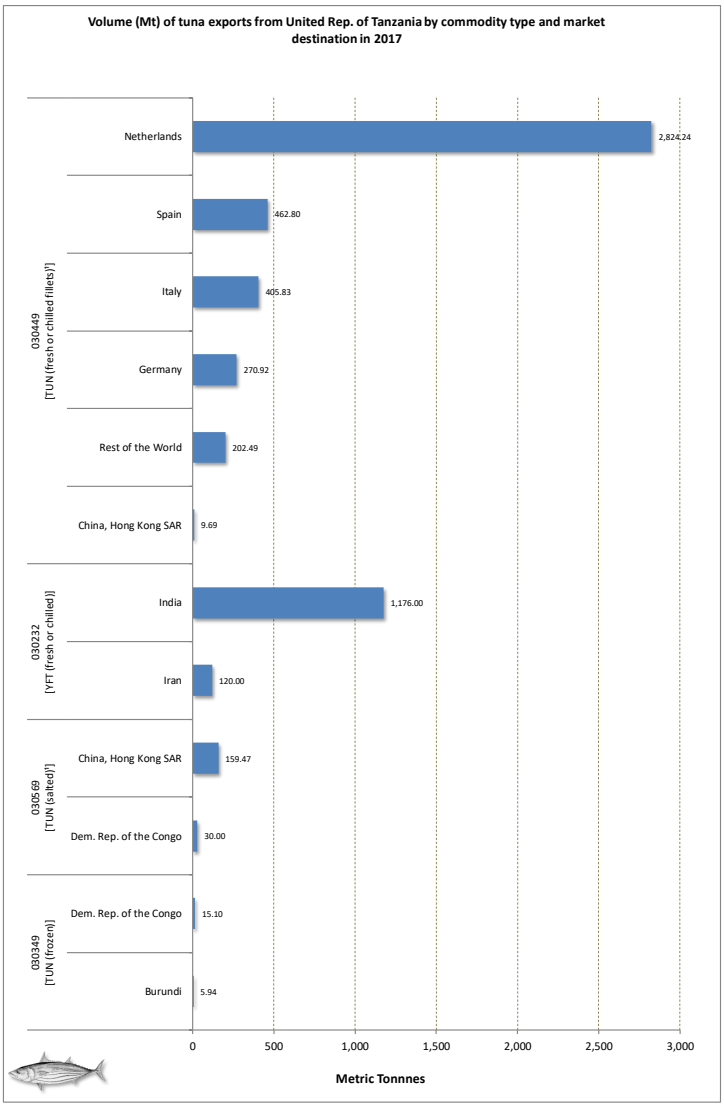
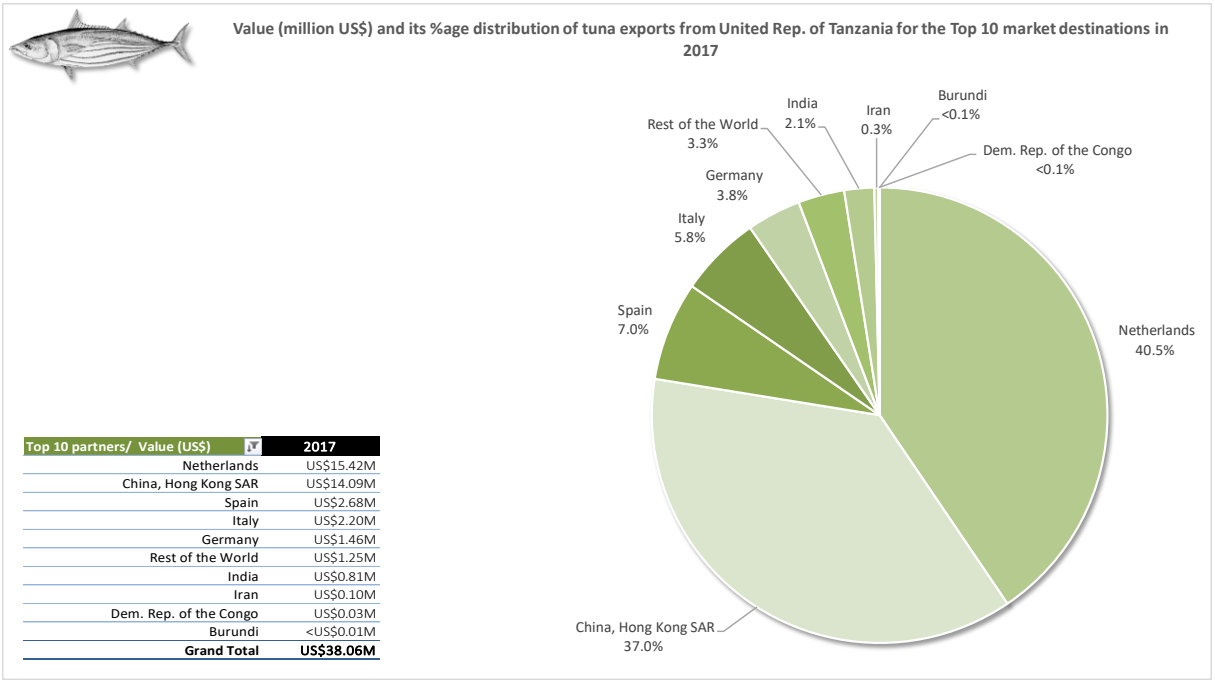


Figure 6-175: Tuna exports volume (Mt) for Tanzania in 2017 by product and market destination. Source UN ComTrade (2019)

6.11.4.2 Tuna exports value

All exports values are expressed c.i.f.



Top 10 partners/ Value (US$)	2017
Netherlands	US$15.42M
China, Hong Kong SAR	US$14.09M
Spain	US$2.68M
Italy	US$2.20M
Germany	US$1.46M
Rest of the World	US$1.25M
India	US$0.81M
Iran	US$0.10M
Dem. Rep. of the Congo	US$0.03M
Burundi	<US$0.01M
Grand Total	**US$38.06M**

Figure 6-176: Share of tuna exports value (% and million USD) between the top 10 market destination for Tanzania and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

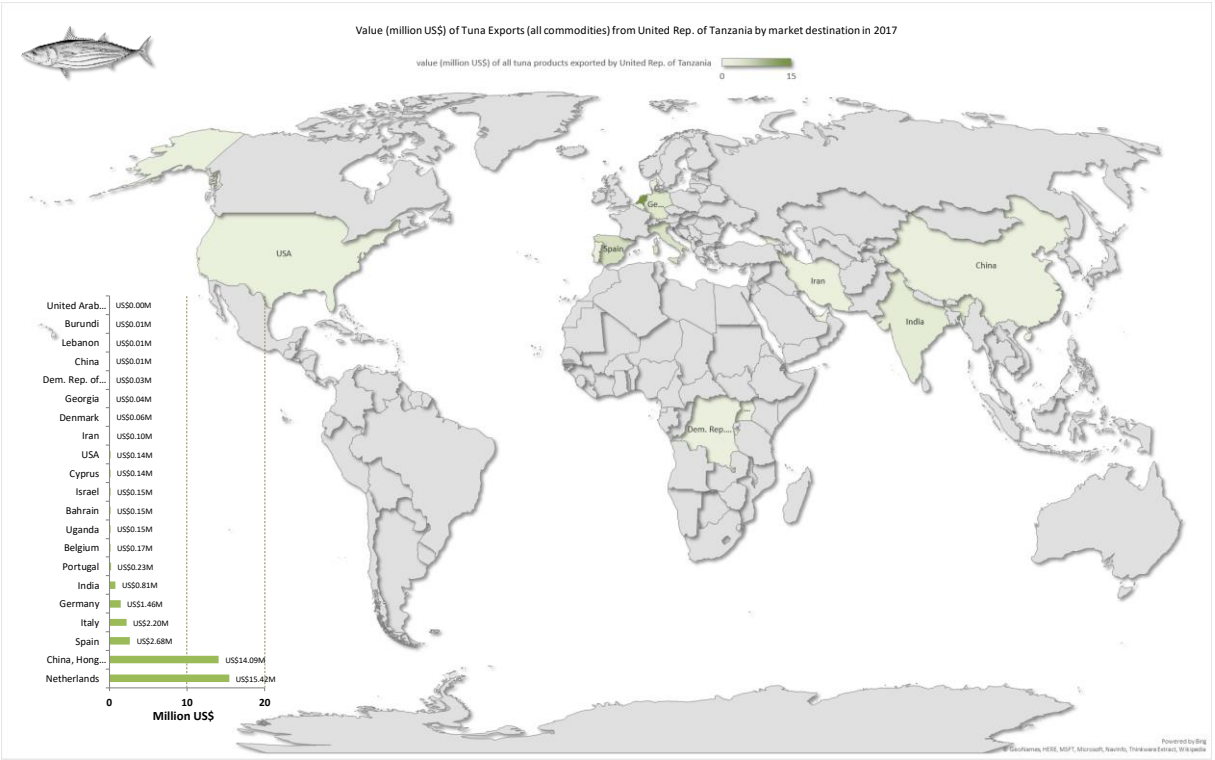


Figure 6-177: Geographic distribution by market destination of tuna exports value (million USD) for Tanzania and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

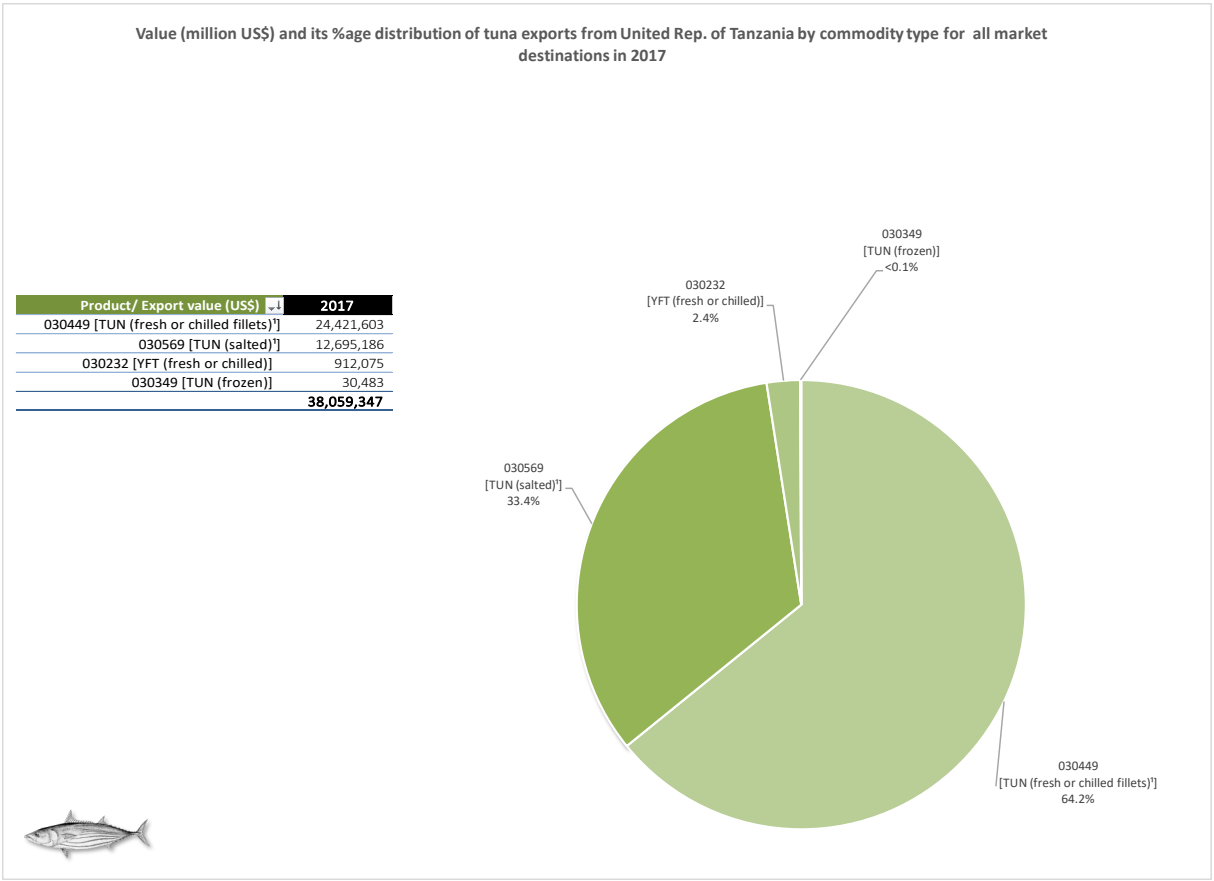


Figure 6-178: Share of tuna exports value (% and million USD) by product for Tanzania in 2017. Source UN ComTrade (2019) and FAO (2019b)

Value ('000 US$) of tuna exports from United Rep. of Tanzania by commodity type and market destination in 2017

Value (US$)	Year
Product/ Trading partner	2017
030349 [TUN (frozen)]	**30,483**
Burundi	5,020
Dem. Rep. of the Congo	25,463
030232 [YFT (fresh or chilled)]	**912,075**
Iran	103,825
India	808,250
030569 [TUN (salted)¹]	**12,695,186**
Dem. Rep. of the Congo	6,750
China, Hong Kong SAR	12,688,436
030449 [TUN (fresh or chilled fillets)¹]	**24,421,603**
Rest of the World	1,248,797
China, Hong Kong SAR	1,404,470
Germany	1,464,136
Italy	2,204,474
Spain	2,677,251
Netherlands	15,422,475
Grand Total	**38,059,347**

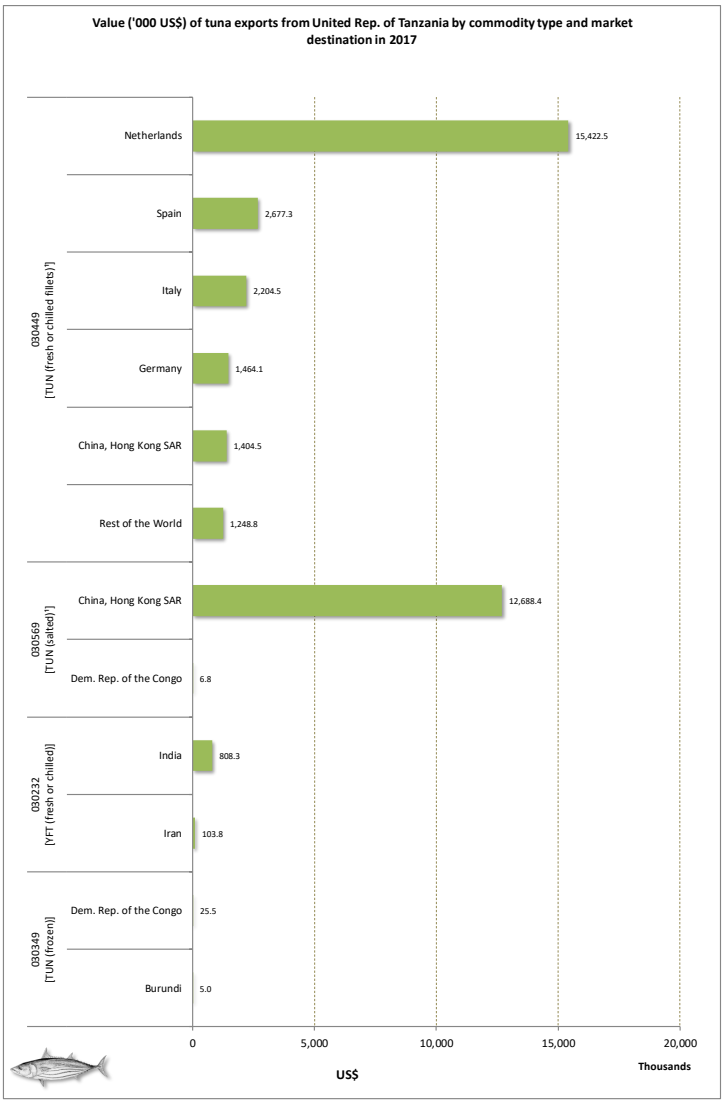


Figure 6-179: Tuna exports value (USD) for Tanzania in 2017 by product and market destination. Source UN ComTrade (2019)

6.11.4.3 Average prices of tuna exports

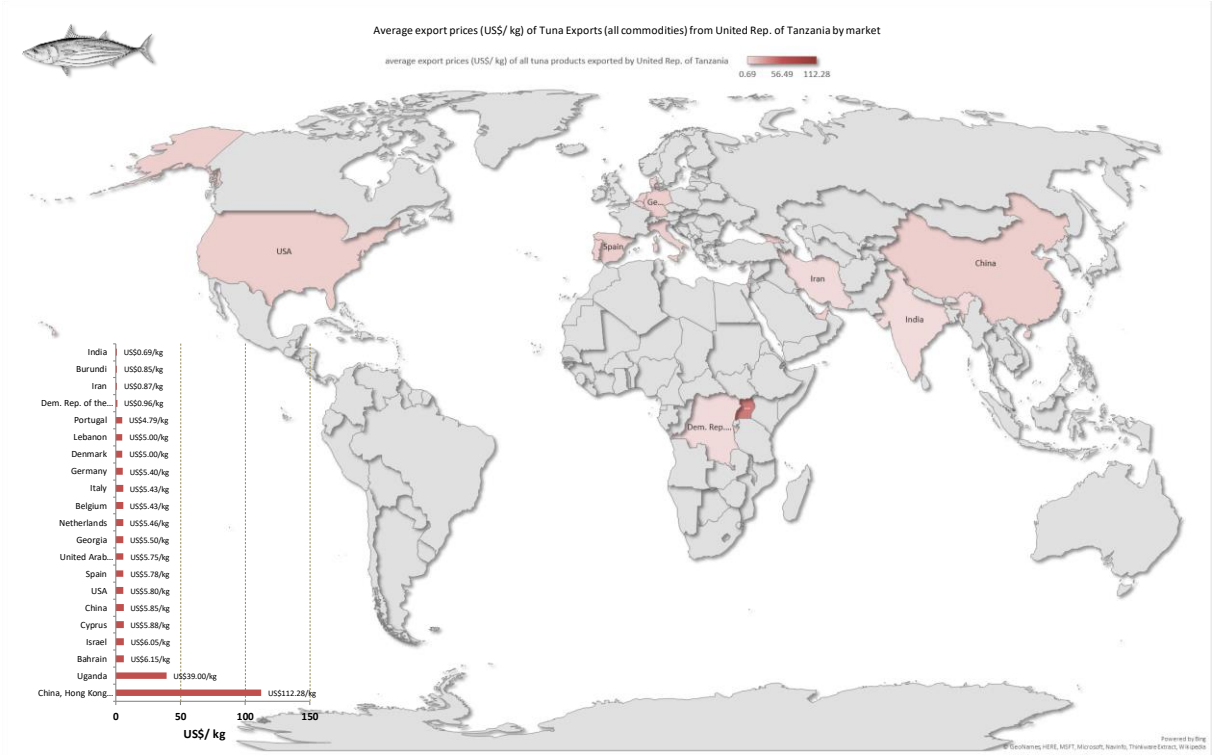


Figure 6-180: Geographic distribution by market destination of the average price of tuna exports for Tanzania and products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

Average price (US$/ kg) of tuna exports from United Rep. of Tanzania by commodity type and market destination in 2017

Average of Average price	Year
Product/ Trading partner	2017
030232 [YFT (fresh or chilled)]	**0.78**
India	0.69
Iran	0.87
030349 [TUN (frozen)]	**1.27**
Burundi	0.85
Dem. Rep. of the Congo	1.69
030449 [TUN (fresh or chilled fillets)¹]	**15.72**
Germany	5.40
Italy	5.43
Netherlands	5.46
Spain	5.78
Rest of the World	8.35
China, Hong Kong SAR	145.00
030569 [TUN (salted)¹]	**39.90**
Dem. Rep. of the Congo	0.23
China, Hong Kong SAR	79.57
Average	**15.27**

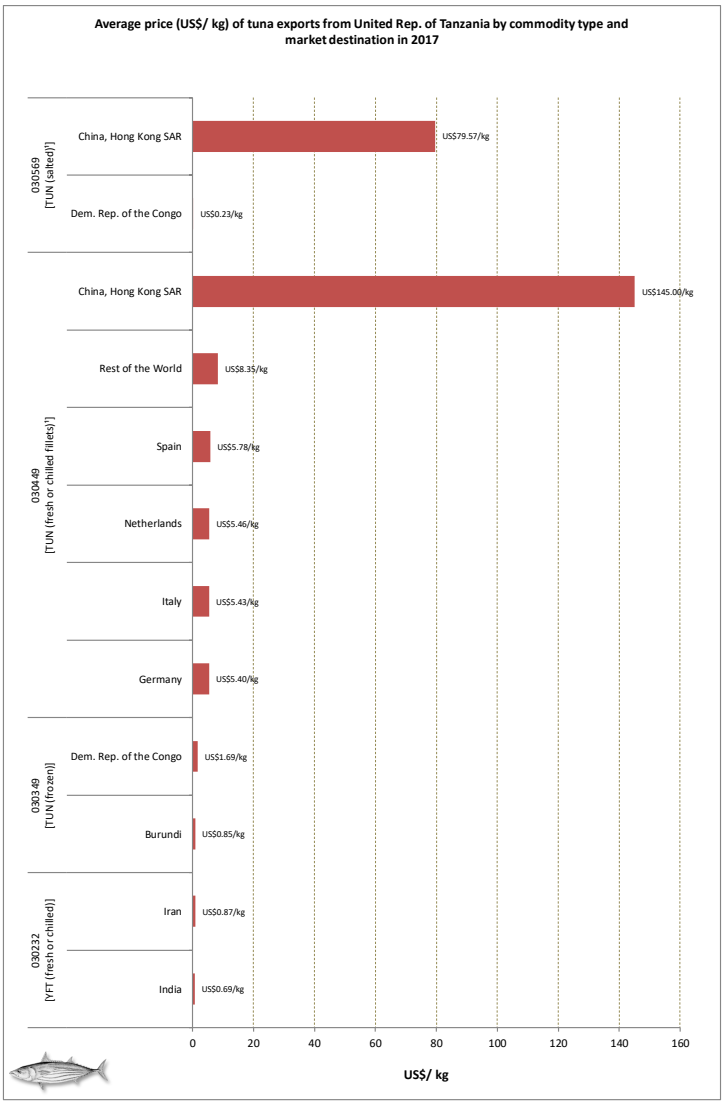


Figure 6-181: Average price of tuna exports (USD / kg) for Tanzania in 2017 by product and market destination. Source UN ComTrade (2019)

6.11.4.4 Exports tariff for main tuna products exported by Tanzania

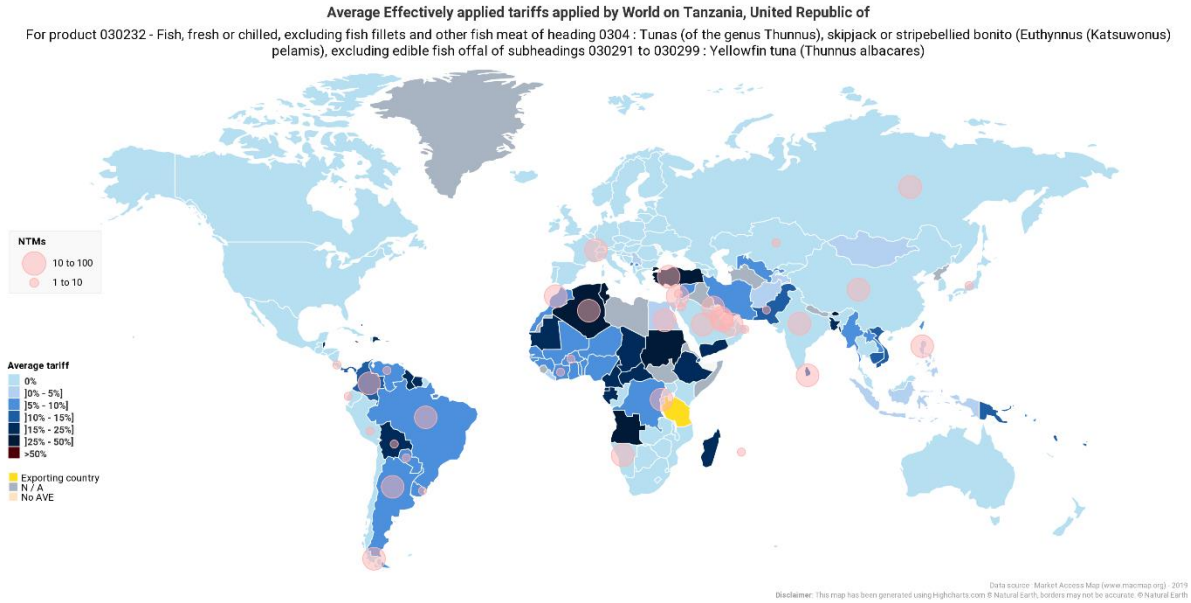


Figure 6-182: Tuna exports tariffs and NTMs faced by Tanzania on the International markets for commodity: 30232 - Yellowfin tuna (fresh or chilled). Source: ITC (2019)

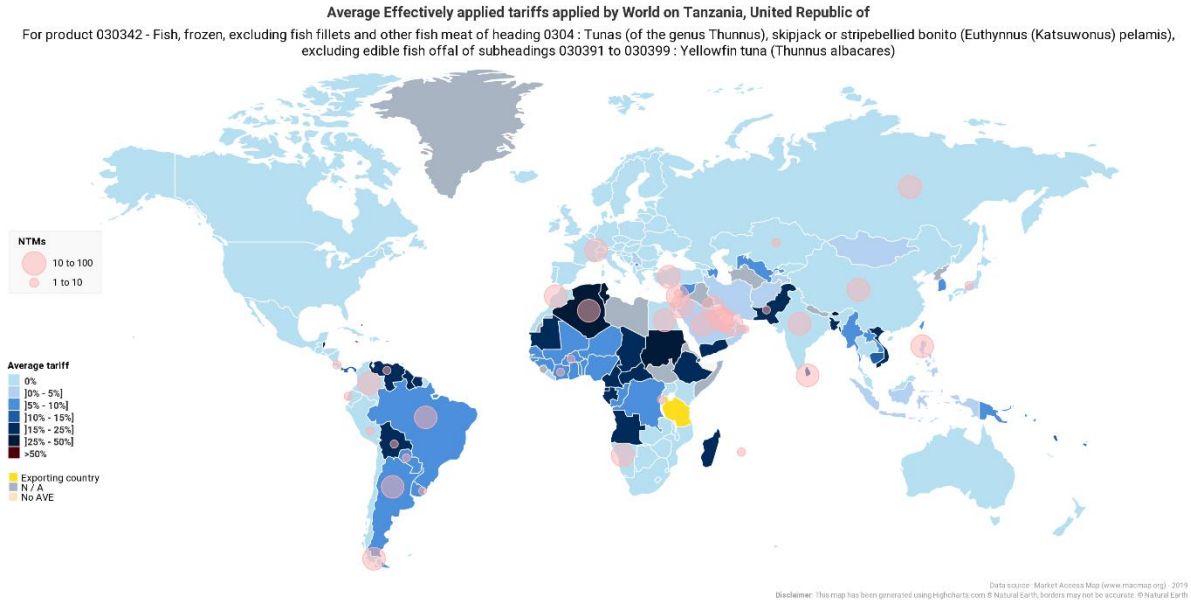


Figure 6-183: Tuna exports tariffs and NTMs faced by Tanzania on the International markets for commodity: 30342 - Yellowfin tuna (frozen). Source: ITC (2019)

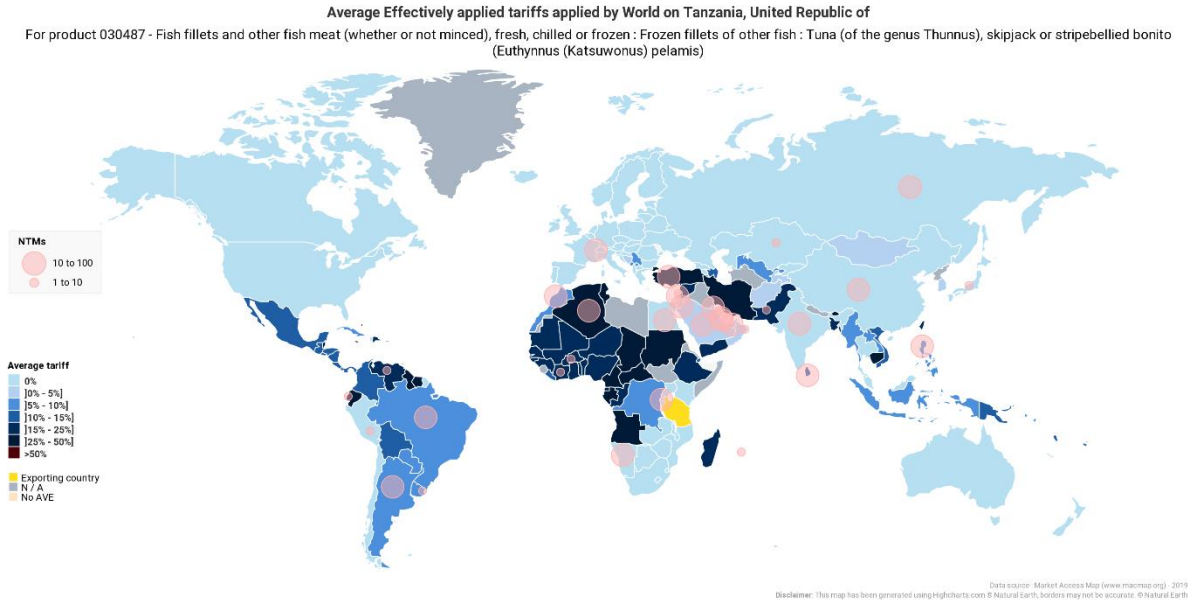


Figure 6-184: Tuna exports tariffs and NTMs faced by Tanzania on the International markets for commodity: 30487 - Skipjack tuna (frozen fillets). Source: ITC (2019)

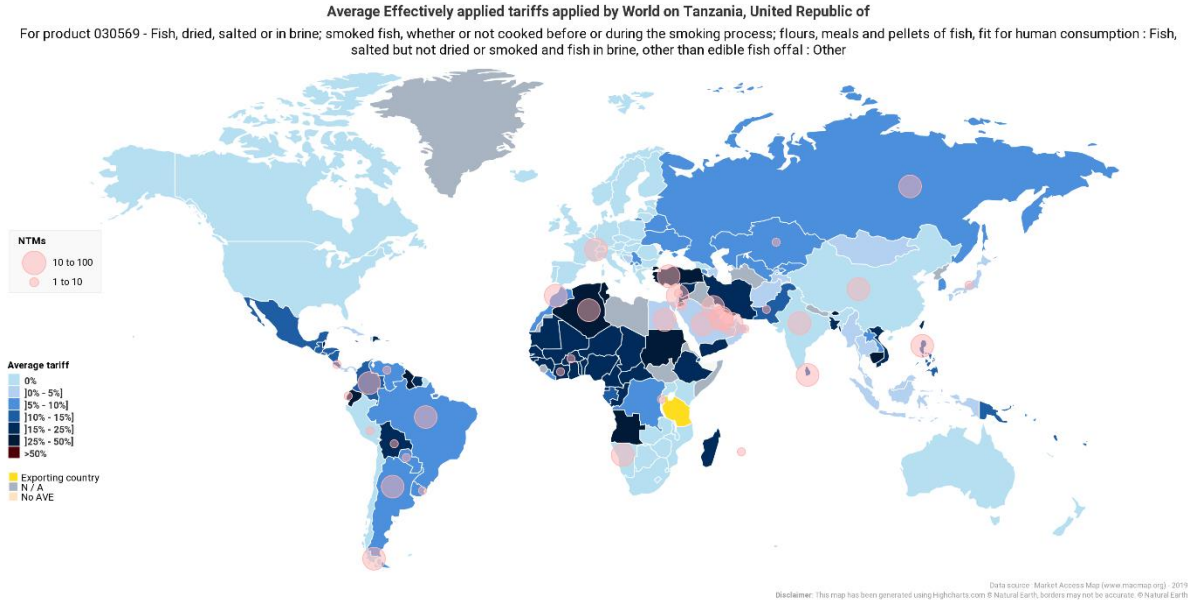


Figure 6-185: Tuna exports tariffs and NTMs faced by Tanzania on the International markets for commodity: 30569 - Tunas nei (salted). Source: ITC (2019)

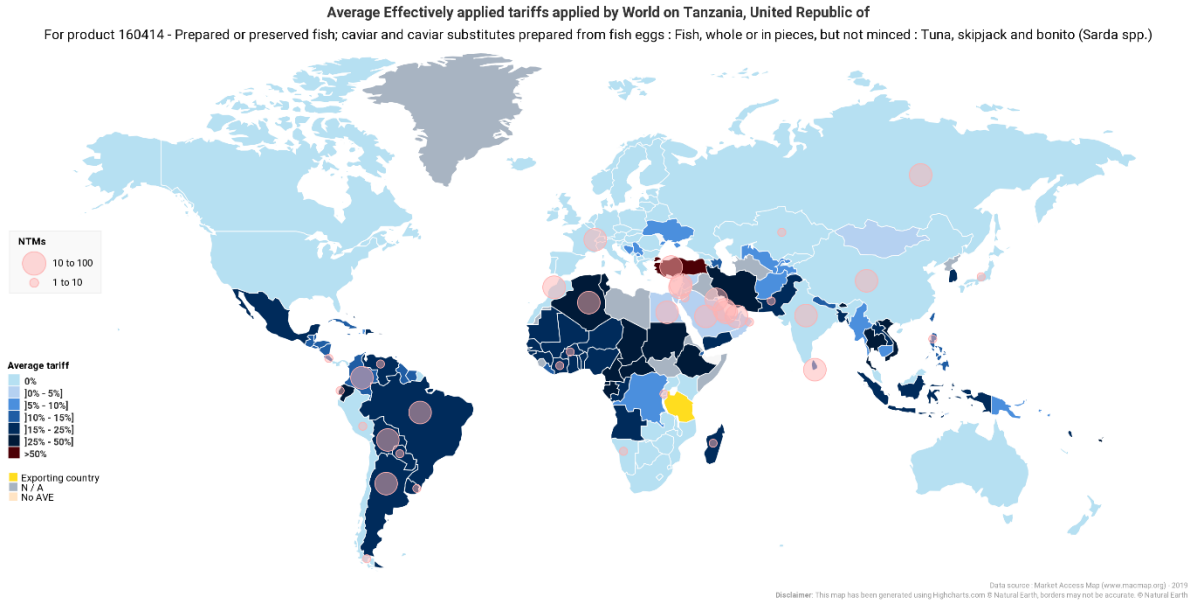


Figure 6-186: Tuna exports tariffs and NTMs faced by Tanzania on the International markets for commodity: 160414 - Skipjack tuna (canned). Source: ITC (2019)

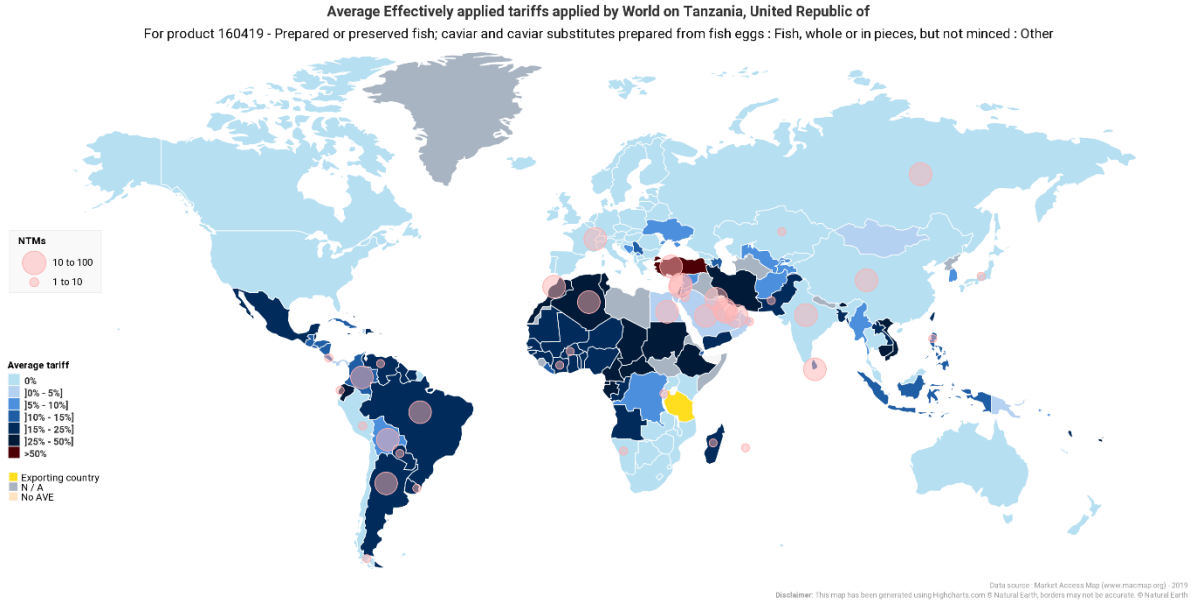


Figure 6-187: Tuna exports tariffs and NTMs faced by Tanzania on the International markets for commodity: 160419 - Tunas nei (prep minced). Source: ITC (2019)

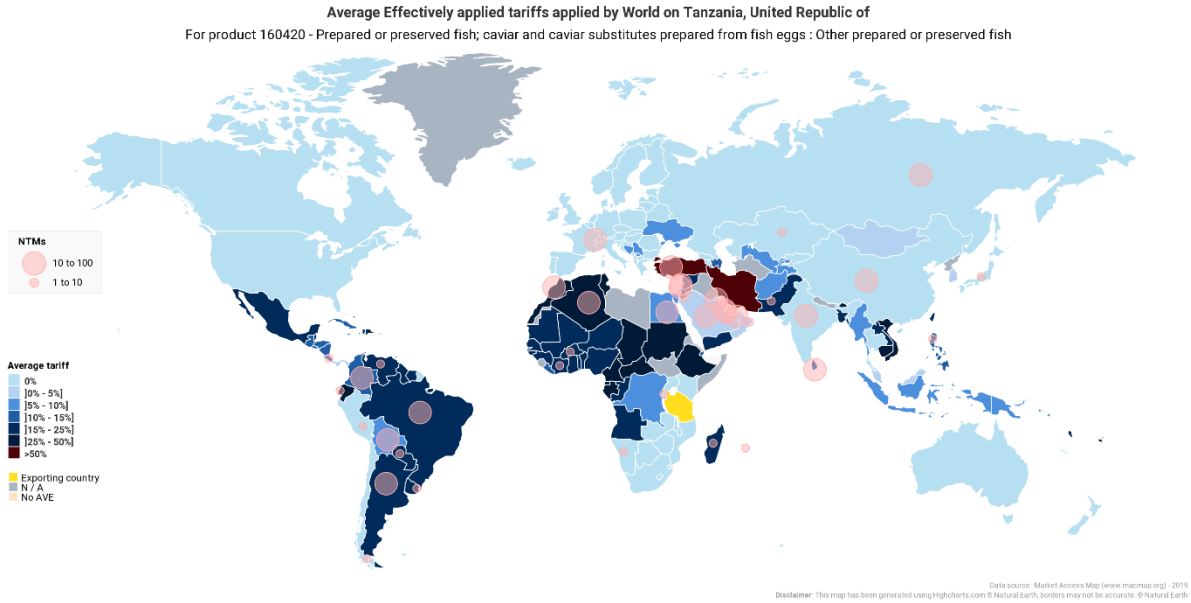


Figure 6-188: Tuna exports tariffs and NTMs faced by Tanzania on the International markets for commodity: 160420 - Tunas nei (prep not minced). Source: ITC (2019)

6.12 Yemen

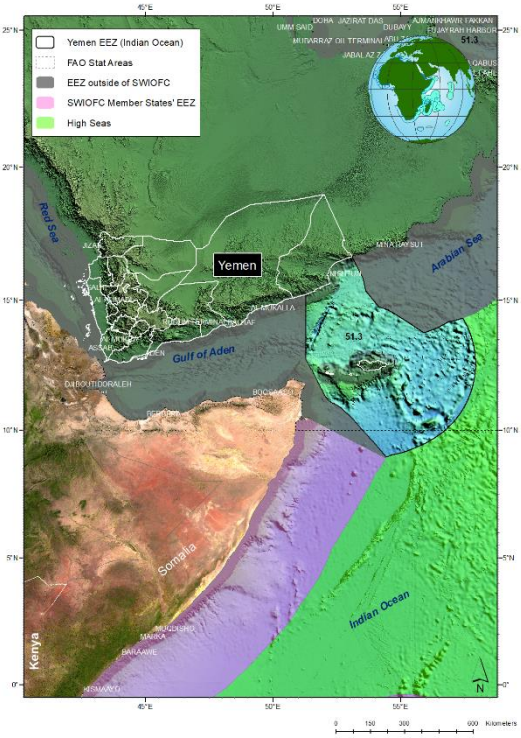


Figure 6-189: Yemen EEZ and surrounding waters.

The fishing activities in Yemen include both Artisanal and Industrial fisheries. The artisan fishermen use different fishing methods depending upon the target species and season. These include seines, handlines, gillnet and trap. The most important species included tunas, large jacks, sardines, mackerel, barracuda, snappers, solefish, shrimp, lobster and cuttlefish. The industrial fishery catch principally demersal fish and cuttlefish. The government has created two fishing ports, and built a considerable number of fisheries facilities along the coast, including cold storage facilities, ice plants, workshops, fuel depots, processing and packaging facilities and fishing gear stores. The private sector is now contributing to the development of the fisheries sector, and some investors have built ice plants, cold storage facilities, fish markets, canning factories, processing facilities, etc. The fish products that are caught by the industrial fishing fleet are frozen at sea in whole form. These products are usually transshipped to the Chinese and European markets, and some are also sold to Arab countries. The artisan fish products are sold fresh or frozen in the local markets. Yemen, with its large population, understands the importance of increasing the annual fishing catch in order to help guarantee food security for its people. This can be achieved in two ways; first, by renewing the stock assessment studies in order to know what stocks are available at present; second, by studying the offshore fish species in the EEZ, particularly migratory fish such as tuna. (FAO, 2018)

6.12.1 Fisheries Access Agreements

In Yemen, fishery is an important source of income and food for coastal populations. Yet, this economic sector has suffered severely from the ongoing armed conflict and the deteriorating economic situation in the country. Rising prices for fishing gear and fuel are aggravating their vulnerable situation, while restrictions imposed by security forces and the risks of mines and violent confrontations prevent fishermen from accessing crucial fishing zones and the seasonality of fishing causes many families to lose their source of food and income during the off season. In cooperation with the Norwegian Refugee Council (NRC), the EU is supporting these conflict-affected coastal communities by providing fishing gear and safety equipment to the fishermen. Further, the NRC organises trainings on the maintenance of engines, the use of modern navigation technology and raising awareness of safety issues. The project also supports coastal communities by rehabilitating essential facilities such as fish landing sites, where fishermen arrive from sea and sell their catch. A central fish laboratory was equally rehabilitated as part of the project. (EU, 2019b)

Due to the explosive situation in the region, there is no know fisheries partnership agreement currently active and most of the tuna catch is taken by artisanal fishers.

6.12.2 Tuna Production

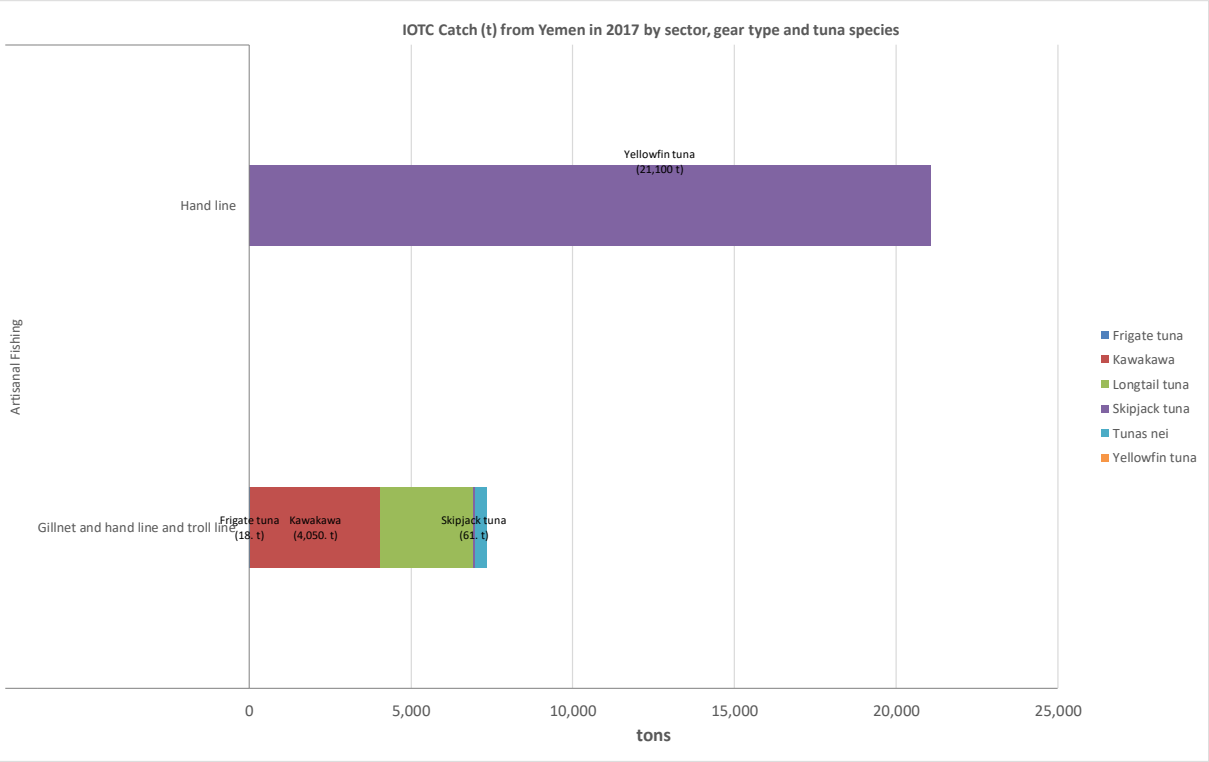


Figure 6-190: Tuna Catch in the IOTC area by Yemen in 2017 by species and fishing method. Source (IOTC, 2019)

6.12.3 IUU Tuna Landings

Table 6-17: Reported and unreported tuna landings (Mt and USD) for Yemen by sector, method and tuna species in 2014. Source (SAU, 2019)

Tuna Landings						
	Reported		Unreported		Total Catch (metric tonnes)	Total Landed value (US$)[1]
Country/sector/method/ species	Catch (metric tonnes)	Landed value (US$)[1]	Catch (metric tonnes)	Landed value (US$)[1]		
Yemen (Arabian Sea)	**37,935.4**	**117,425,552.3**	**84,989.3**	**268,444,222.3**	**122,924.7**	**385,869,774.6**
Artisanal	**37,935.4**	**117,425,552.3**	**66,520.6**	**210,469,658.6**	**104,456.0**	**327,895,210.9**
small scale encircling nets	21.3	37,673.5	476.6	843,661.5	497.9	881,334.9
FRI	21.3	37,673.5	476.6	843,661.5	497.9	881,334.9
small scale gillnets	3,070.8	5,617,153.4	4,159.6	7,697,640.5	7,230.5	13,314,793.8
FRI	0.4	789.7	10.0	17,684.8	10.4	18,474.6
KAW	2,027.1	3,587,966.8	2,406.0	4,258,568.4	4,433.1	7,846,535.2
LOT	938.4	1,660,971.1	1,550.3	2,744,026.2	2,488.7	4,404,997.4
YFT	104.9	367,425.7	193.4	677,361.0	298.3	1,044,786.7
small scale lines	34,840.8	111,766,293.3	61,828.3	201,829,102.3	96,669.0	313,595,395.6
FRI	2.8	4,894.7	61.9	109,611.1	64.7	114,505.8
KAW	3,112.3	5,508,773.2	3,694.0	6,538,379.2	6,806.3	12,047,152.4
LOT	2,757.6	4,880,919.2	4,555.7	8,063,577.8	7,313.3	12,944,497.0
SKJ	73.0	152,132.0	247.6	516,017.7	320.6	668,149.7
YFT	28,895.1	101,219,574.3	53,269.1	186,601,516.5	82,164.2	287,821,090.8
small scale other nets	2.5	4,432.2	56.1	99,254.3	58.6	103,686.5
FRI	2.5	4,432.2	56.1	99,254.3	58.6	103,686.5
Subsistence			**18,468.7**	**57,974,563.7**	**18,468.7**	**57,974,563.7**
subsistence fishing gear			18,468.7	57,974,563.7	18,468.7	57,974,563.7
FRI			111.7	197,671.9	111.7	197,671.9
KAW			1,987.2	3,517,367.2	1,987.2	3,517,367.2
LOT			1,733.1	3,067,533.0	1,733.1	3,067,533.0
SKJ			56.7	118,134.3	56.7	118,134.3
YFT			14,580.0	51,073,857.4	14,580.0	51,073,857.4
Grand Total	**37,935.4**	**117,425,552.3**	**84,989.3**	**268,444,222.3**	**122,924.7**	**385,869,774.6**

[1] value estimated applying 2017 ex-vessel prices from Poseidon (2019)

6.12.4 Tuna Export Markets

There was no export data for Yemen on the UN ComTrade database (UN Comtrade, 2019) but some data were available in the FAO FishStat database (FAO, 2019a).

6.12.4.1 Tuna exports volume

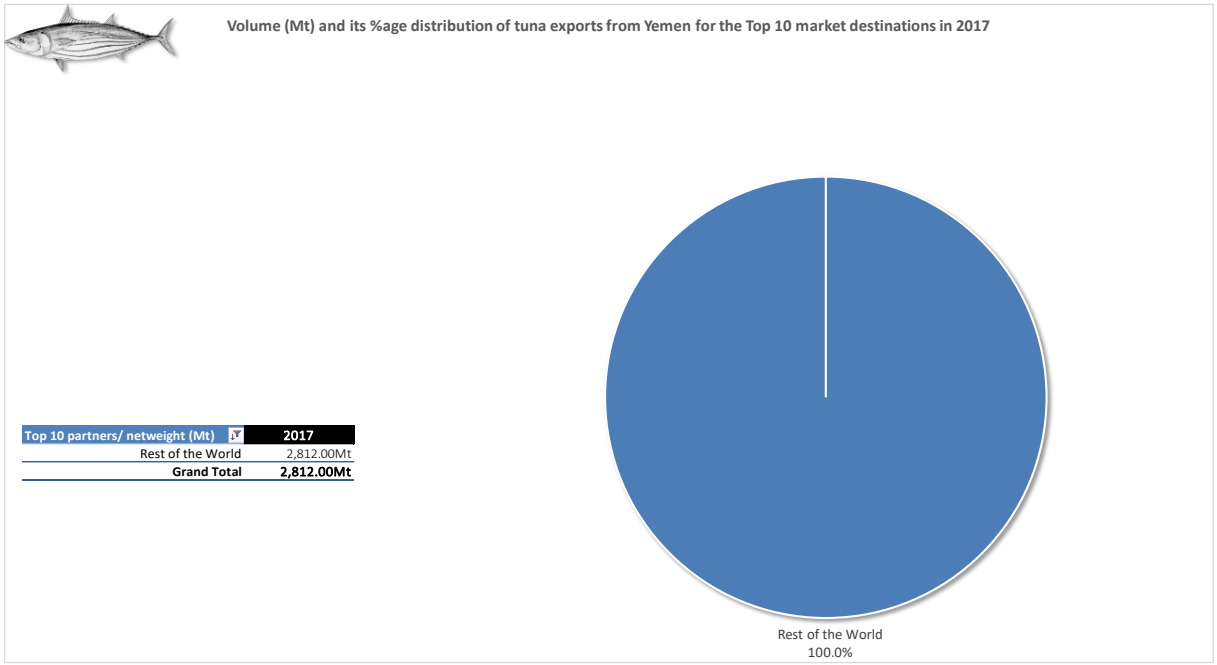


Figure 6-191: Share of tuna exports volume (% and Metric tonnes) between the top 10 market destination for Yemen and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

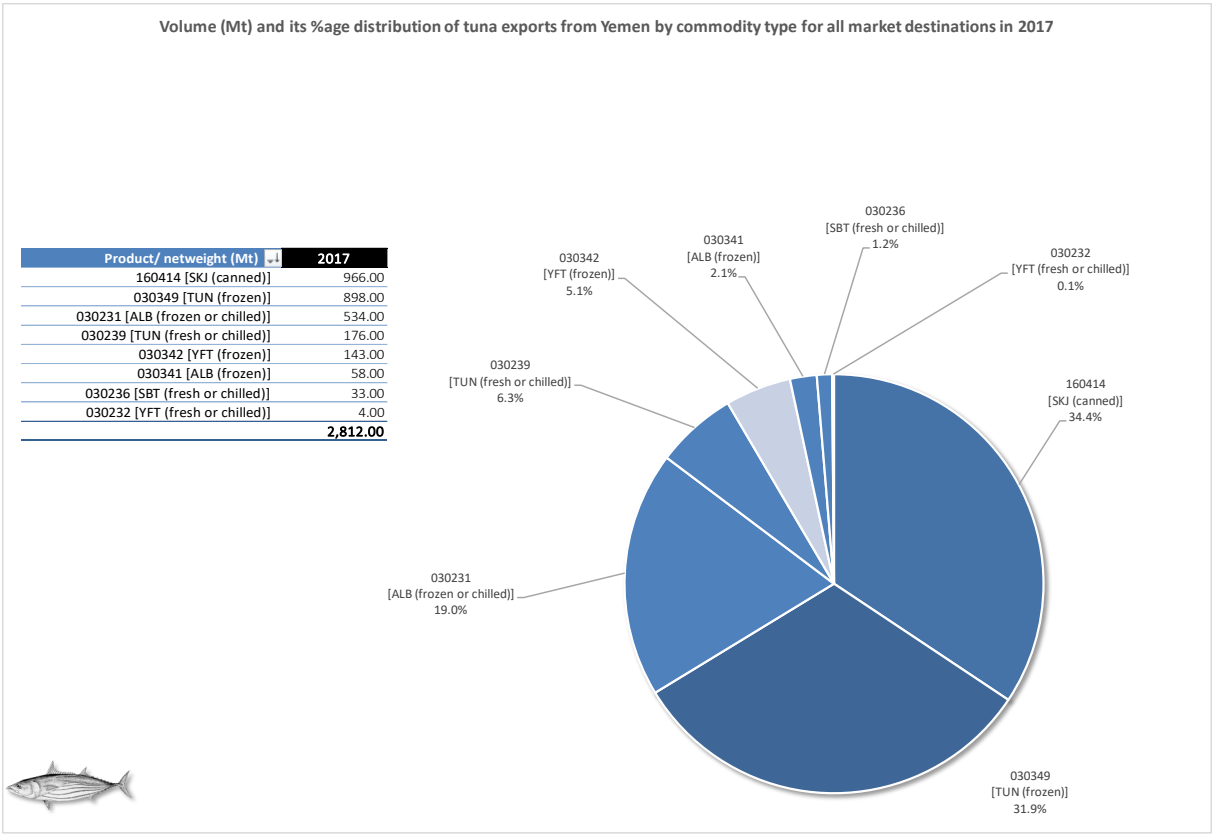


Figure 6-192: Share of tuna exports volume (% and metric tonnes) by product for Yemen in 2017. Source UN ComTrade (2019) and FAO (2019b)

Volume (Mt) of tuna exports from Yemen by commodity type and market destination in 2017

Netweight (Mt) Product/ Trading partner	Year 2017
030232 [YFT (fresh or chilled)]	**4.00**
Rest of the World	4.00
030236 [SBT (fresh or chilled)]	**33.00**
Rest of the World	33.00
030341 [ALB (frozen)]	**58.00**
Rest of the World	58.00
030342 [YFT (frozen)]	**143.00**
Rest of the World	143.00
030239 [TUN (fresh or chilled)]	**176.00**
Rest of the World	176.00
030231 [ALB (frozen or chilled)]	**534.00**
Rest of the World	534.00
030349 [TUN (frozen)]	**898.00**
Rest of the World	898.00
160414 [SKJ (canned)]	**966.00**
Rest of the World	966.00
Grand Total	**2,812.00**

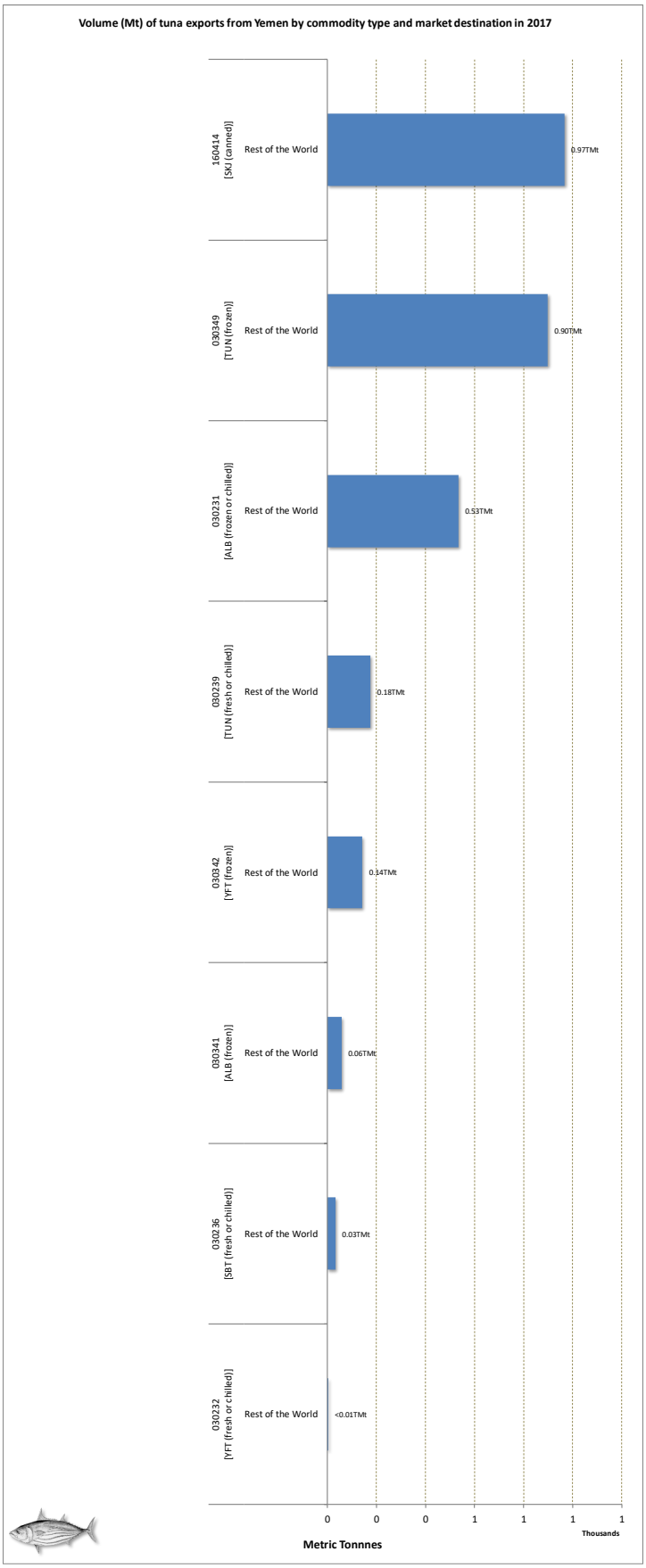


Figure 6-193: Tuna exports volume (Mt) for Yemen in 2017 by product and market destination. Source FAO (2019b)

6.12.4.2 Tuna exports value

All exports values are expressed c.i.f.



Value (million US$) and its %age distribution of tuna exports from Yemen for the Top 10 market destinations in 2017

Top 10 partners/ Value (US$)	2017
Rest of the World	US$6.50M
Grand Total	**US$6.50M**

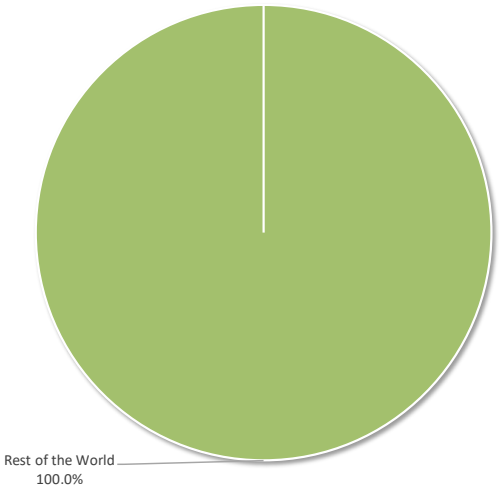


Figure 6-194: Share of tuna exports value (% and million USD) between the top 10 market destination for Yemen and for all products combined in 2017. Source UN ComTrade (2019) and FAO (2019b)

Value (million US$) and its %age distribution of tuna exports from Yemen by commodity type for all market destinations in 2017

Product/ Export value (US$)	2017
160414 [SKJ (canned)]	4,228,000
030349 [TUN (frozen)]	1,315,000
030231 [ALB (frozen or chilled)]	377,000
030342 [YFT (frozen)]	240,000
030239 [TUN (fresh or chilled)]	178,000
030236 [SBT (fresh or chilled)]	137,000
030341 [ALB (frozen)]	23,000
030232 [YFT (fresh or chilled)]	5,000
	6,503,000

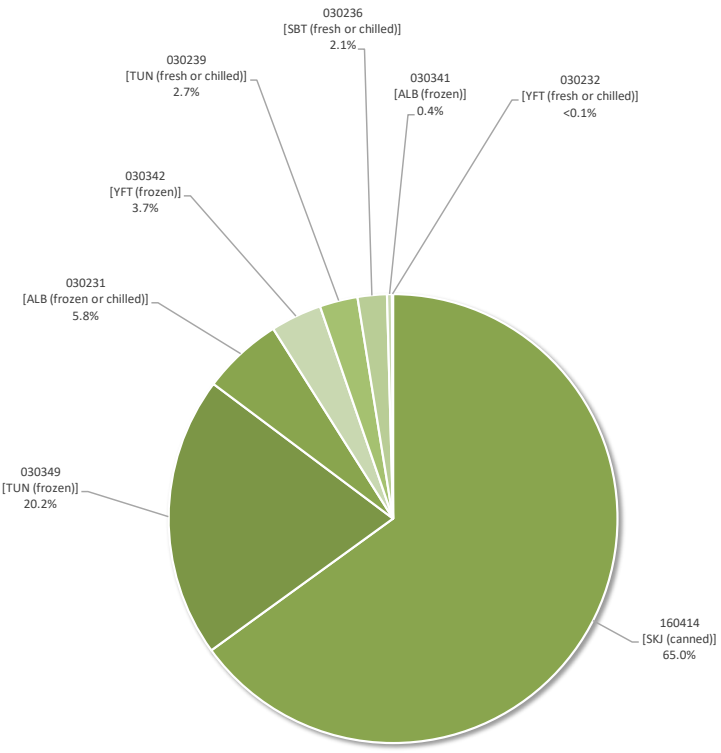




Figure 6-195: Share of tuna exports value (% and million USD) by product for Yemen in 2017. Source UN ComTrade (2019) and FAO (2019b)

Value ('000 US$) of tuna exports from Yemen by commodity type and market destination in 2017

Value (US$)	Year
Product/ Trading partner	2017
030232 [YFT (fresh or chilled)]	**5,000**
Rest of the World	5,000
030341 [ALB (frozen)]	**23,000**
Rest of the World	23,000
030236 [SBT (fresh or chilled)]	**137,000**
Rest of the World	137,000
030239 [TUN (fresh or chilled)]	**178,000**
Rest of the World	178,000
030342 [YFT (frozen)]	**240,000**
Rest of the World	240,000
030231 [ALB (frozen or chilled)]	**377,000**
Rest of the World	377,000
030349 [TUN (frozen)]	**1,315,000**
Rest of the World	1,315,000
160414 [SKJ (canned)]	**4,228,000**
Rest of the World	4,228,000
Grand Total	**6,503,000**

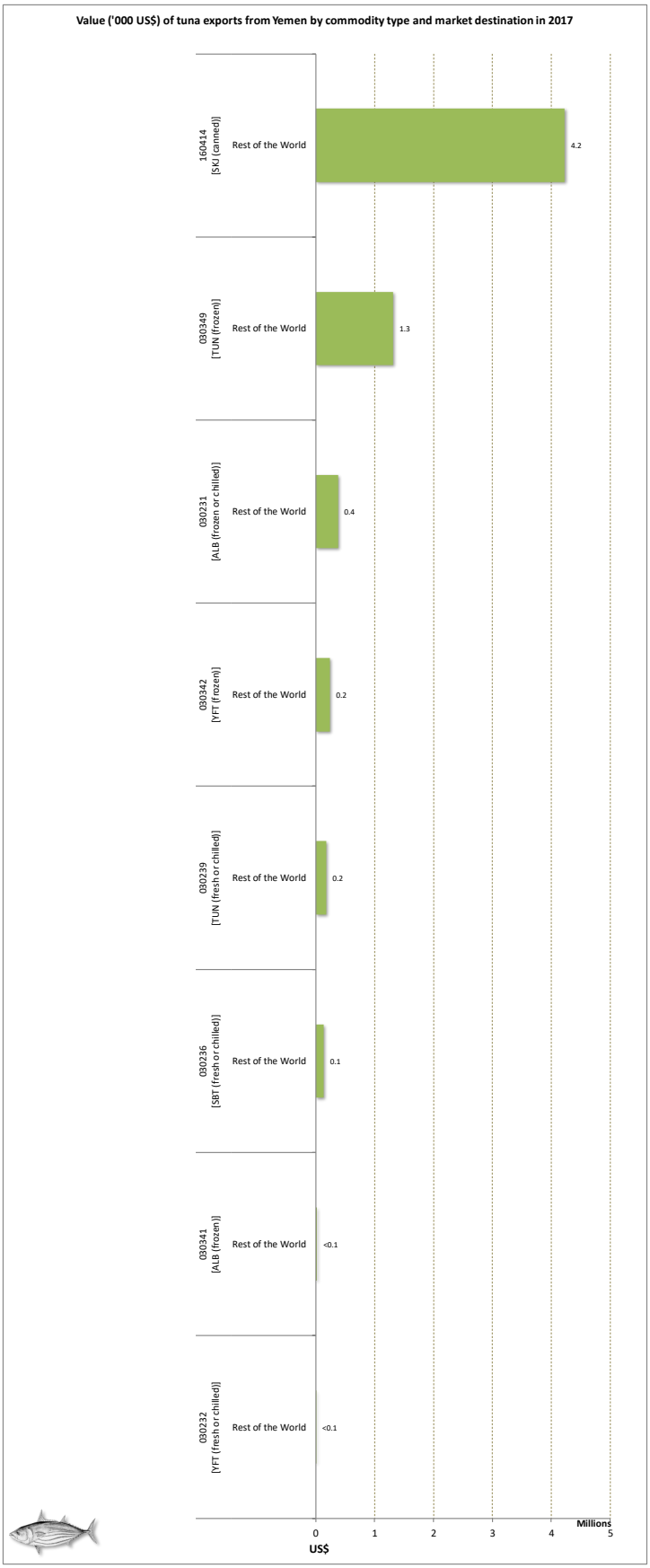


Figure 6-196: Tuna exports value (USD) for Yemen in 2017 by product and market destination. Source FAO (2019b)

6.12.4.3 Average prices of tuna exports

Average price (US$/ kg) of tuna exports from Yemen by commodity type and market destination in 2017

Average of Average price	Year
Product/ Trading partner	2017
030341 [ALB (frozen)]	**0.40**
Rest of the World	0.40
030231 [ALB (frozen or chilled)]	**0.71**
Rest of the World	0.71
030239 [TUN (fresh or chilled)]	**1.01**
Rest of the World	1.01
030232 [YFT (fresh or chilled)]	**1.25**
Rest of the World	1.25
030349 [TUN (frozen)]	**1.29**
Rest of the World	1.29
030342 [YFT (frozen)]	**1.68**
Rest of the World	1.68
030236 [SBT (fresh or chilled)]	**4.15**
Rest of the World	4.15
160414 [SKJ (canned)]	**4.38**
Rest of the World	4.38
Average	**1.80**



Figure 6-197: Average price of tuna exports (USD / kg) for Yemen in 2017 by product and market destination. Source FAO (2019b)

6.12.4.4 Exports tariff for main tuna products exported by Yemen

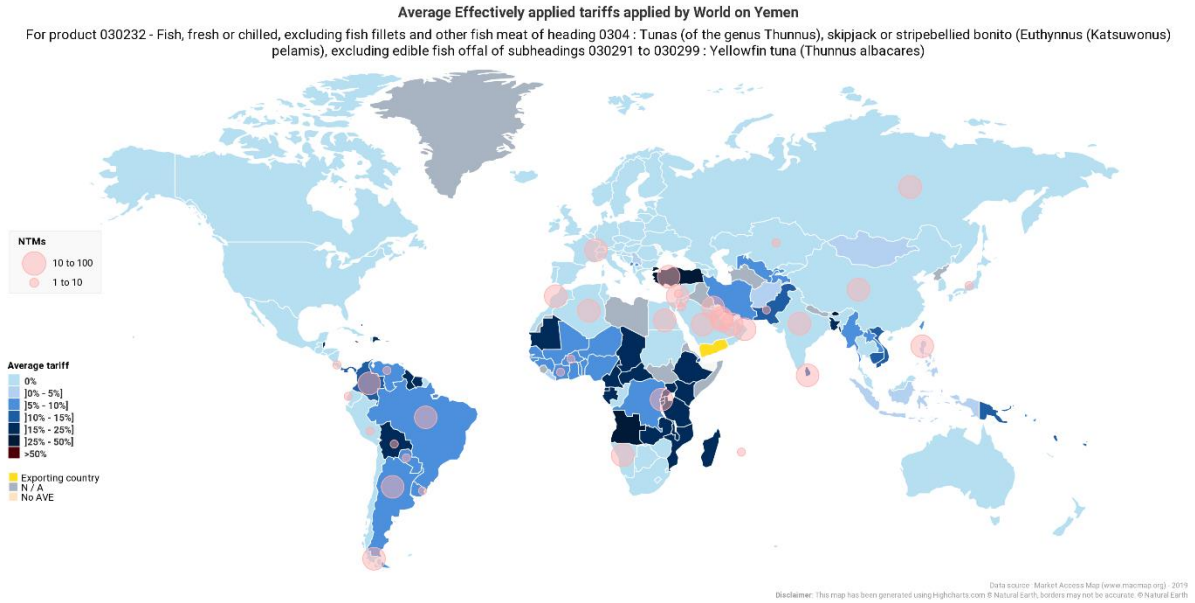


Figure 6-198: Tuna exports tariffs and NTMs faced by Yemen on the International markets for commodity: 30232 - Yellowfin tuna (fresh or chilled). Source: ITC (2019)

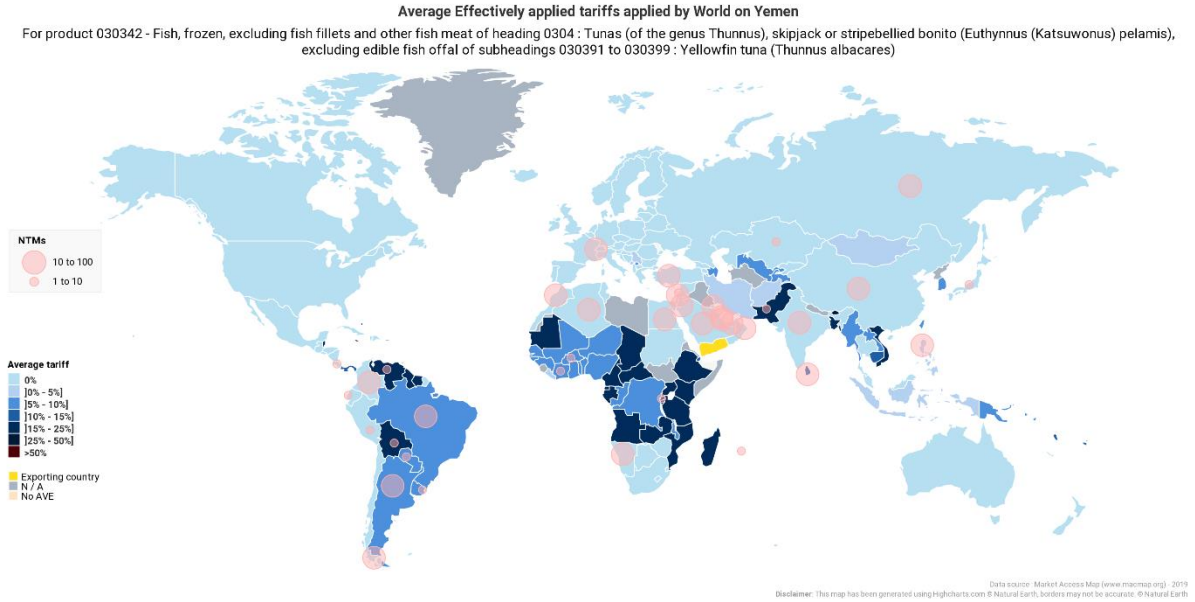


Figure 6-199: Tuna exports tariffs and NTMs faced by Yemen on the International markets for commodity: 30342 - Yellowfin tuna (frozen). Source: ITC (2019)

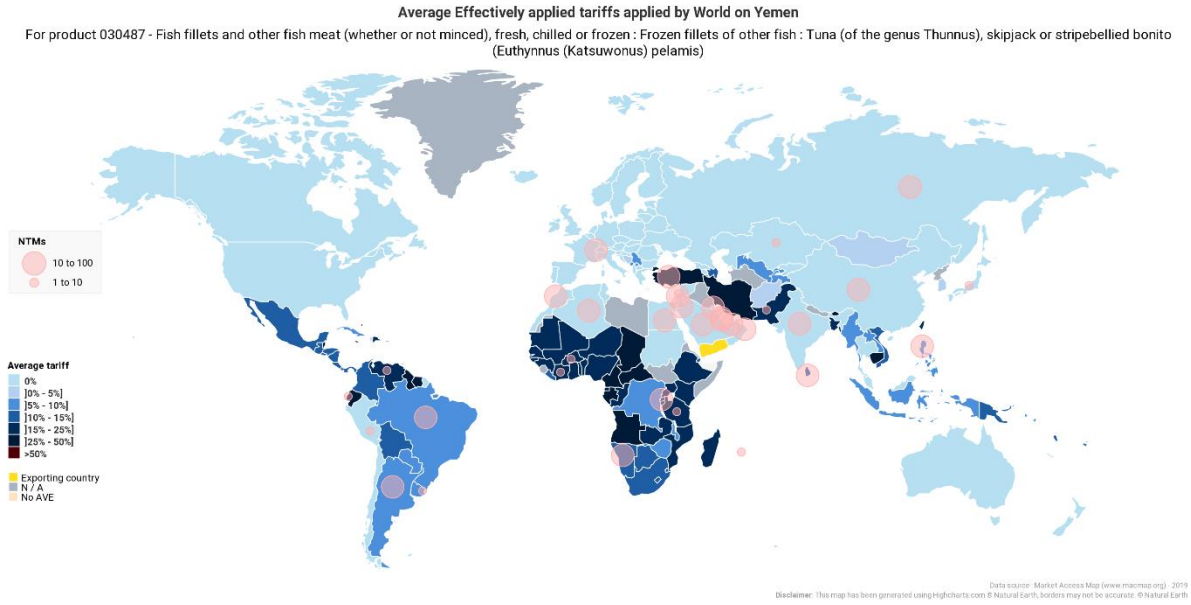


Figure 6-200: Tuna exports tariffs and NTMs faced by Yemen on the International markets for commodity: 30487 - Skipjack tuna (frozen fillets). Source: ITC (2019)

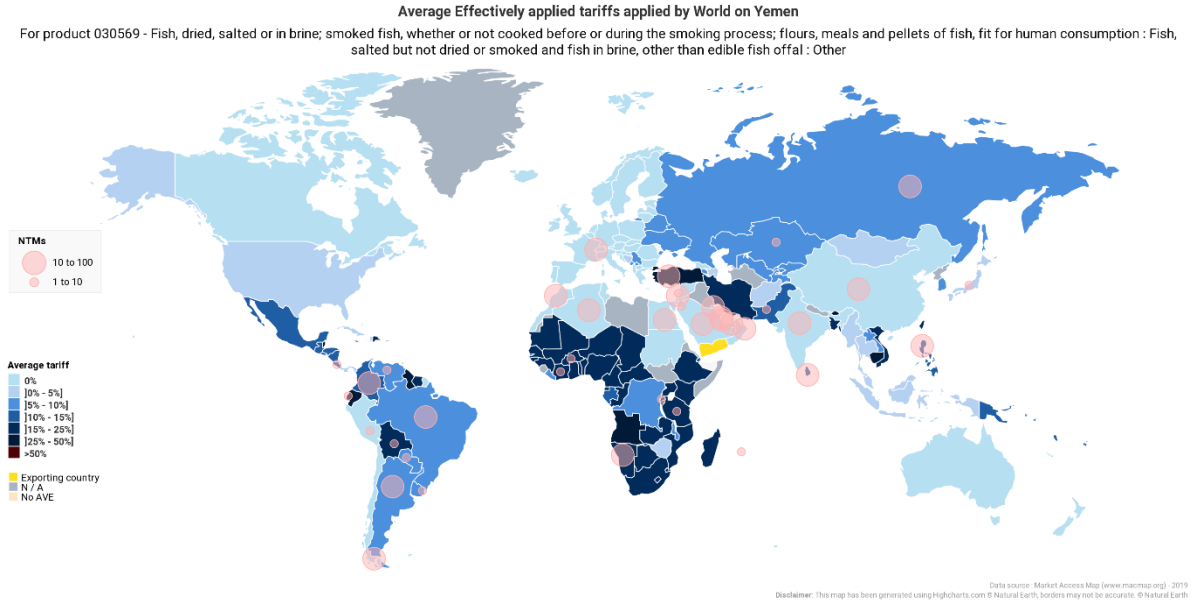


Figure 6-201: Tuna exports tariffs and NTMs faced by Yemen on the International markets for commodity: 30569 - Tunas nei (salted). Source: ITC (2019)

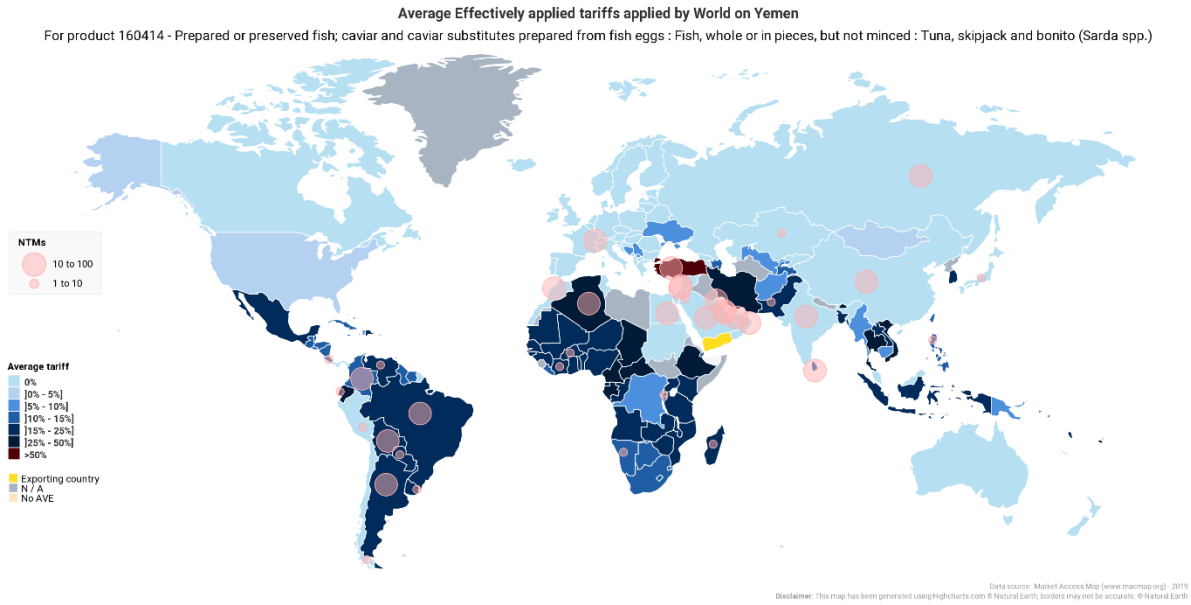


Figure 6-202: Tuna exports tariffs and NTMs faced by Yemen on the International markets for commodity: 160414 - Skipjack tuna (canned). Source: ITC (2019)

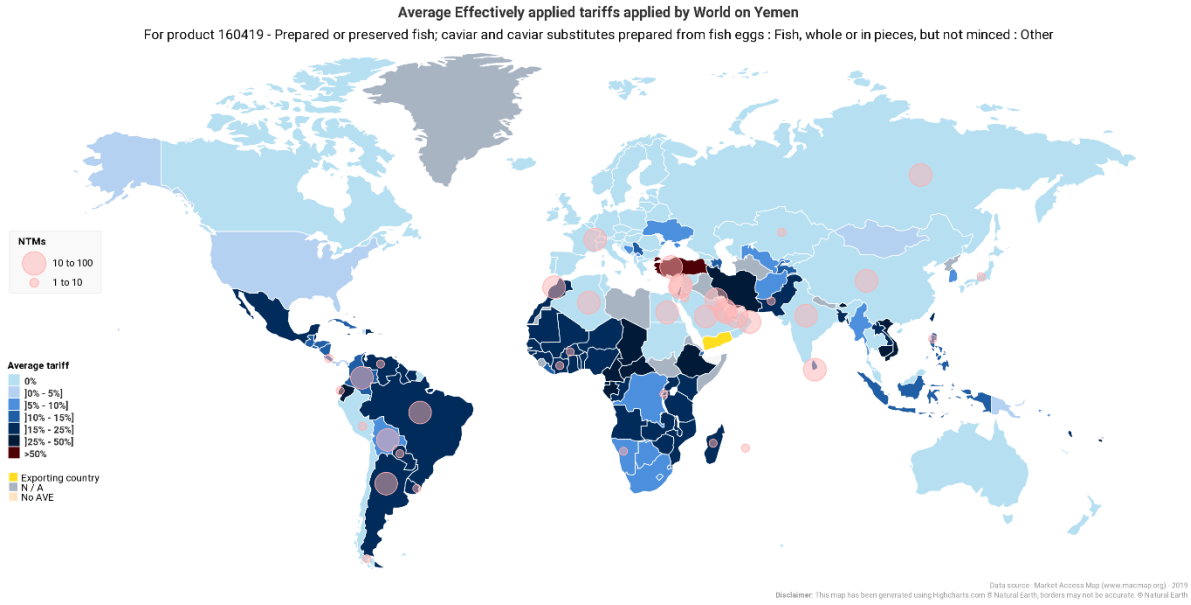


Figure 6-203: Tuna exports tariffs and NTMs faced by Yemen on the International markets for commodity: 160419 - Tunas nei (prep minced). Source: ITC (2019)

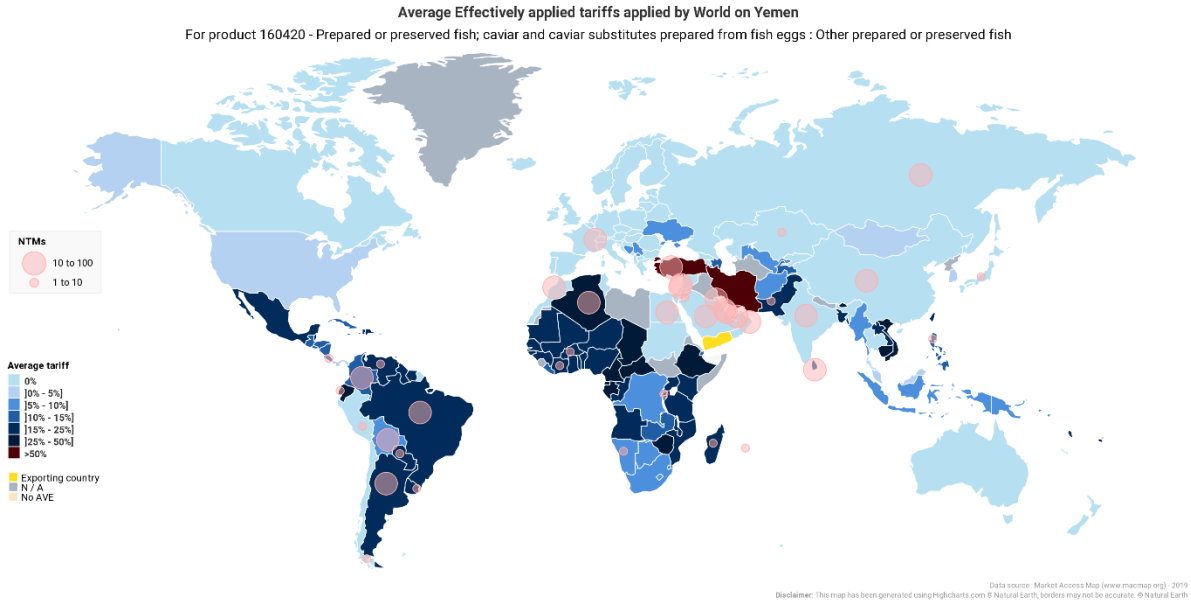


Figure 6-204: Tuna exports tariffs and NTMs faced by Yemen on the International markets for commodity: 160420 - Tunas nei (prep not minced). Source: ITC (2019)

7 CONTRIBUTION OF THE TUNA FISHERIES TO GDP

The contribution of fisheries to gross domestic product (GDP) is one of the most widely used indicators of its economic performance (UN, 2010). However, despite its constant use, there is no internationally established methodology or standards to assess fisheries contribution to GDP (Cai, Huang, & Leung, 2019).

Figure 7-1 below shows the geographic distribution of SWIOFC MS' GDP in current USD bn. We note that economies in Somalia and island nations such as the Comoros, Seychelles and in some extent, the Maldives are similar in range while, except for South Africa with a much greater GDP compared to its SWIOFC MS counterpart, Madagascar, Mauritius , Réunion and the rest of the coastal states exhibit GDPs in comparable ranges.

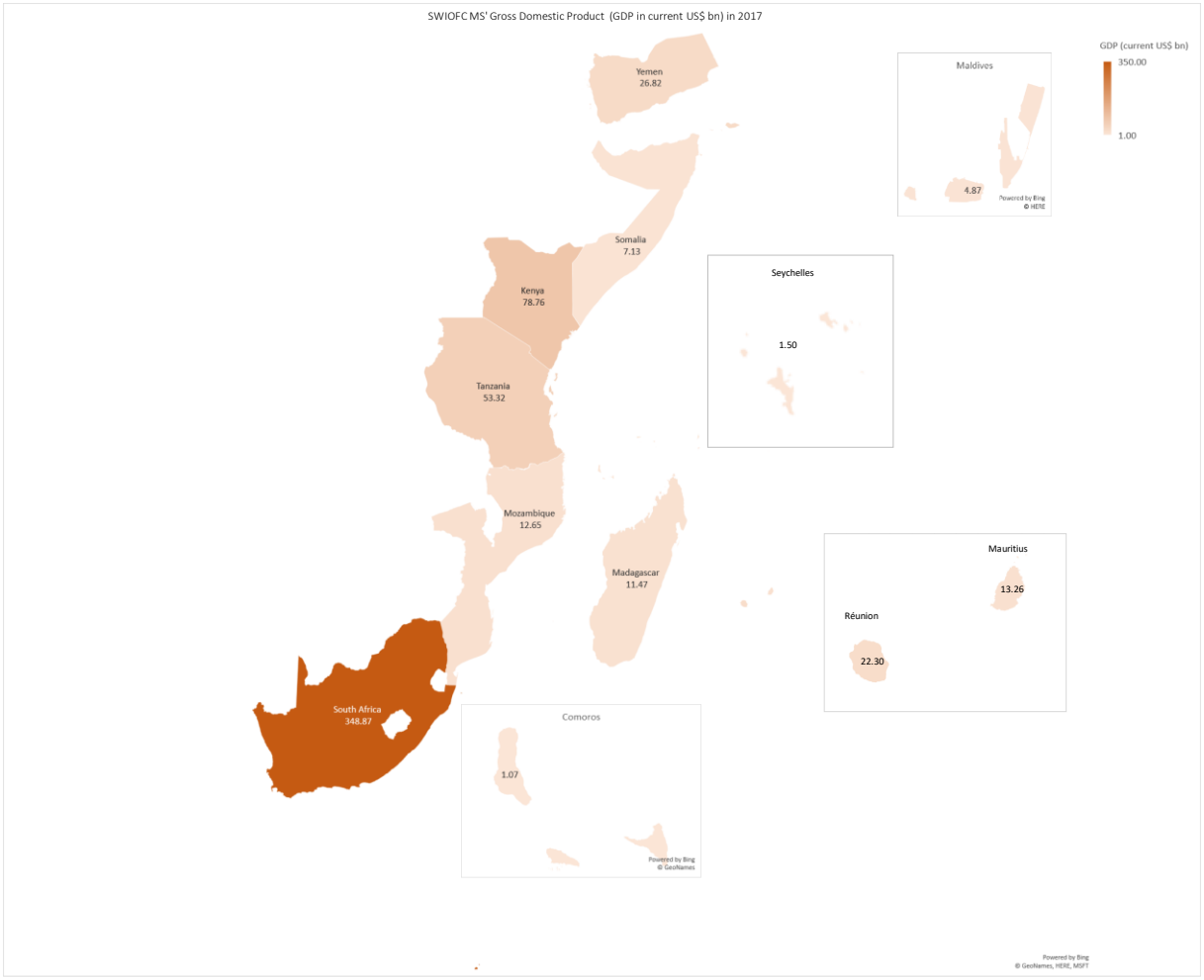


Figure 7-1: Spatial representation of the Gross National Product (GDP) in billion USD by SWIOFC MS in 2017. Source: World Bank, World Development Indicators (2019a) & EuroStats (2019).

One common measure widely available and often published with the country's profile is the contribution of Agricultural, Forestry and Fisheries to the GDP, however this might be misleading if we are only interested in the part the fisheries sector plays in the economic activities, especially tuna fisheries. It does indicate however the country's dependence to the primary sector.

For example Figure 7-2 indicate that Kenya's Agricultural, Forestry and Fisheries account for more than a third of the economy , however the part of fisheries is small since it is estimated to be less than 1% (de Graaf & Garibaldi, 2014). We would then assume that the Tuna contribution to the economy is far less than 1%. At the same time, the contribution of Agricultural, Forestry and Fisheries to the GDP might underestimate the direct and indirect contribution to fisheries and especially from the tuna fisheries sector. For example the contribution of Agricultural, Forestry and Fisheries to the Seychelles' GDP is only 1.9% while the contribution to fisheries was estimated at 30% by de Graaf & Garibaldi (2014) and the direct and indirect contribution of the tuna fishing industry to the Seychelles was estimated at 7% by Lallemand (2015) and 6% in this report using the 2017 data provided by the Ministry of Finance of Seychelles[11]

[11] From answers to the questionnaire provided by Jude Talma and Sheriffa Morel

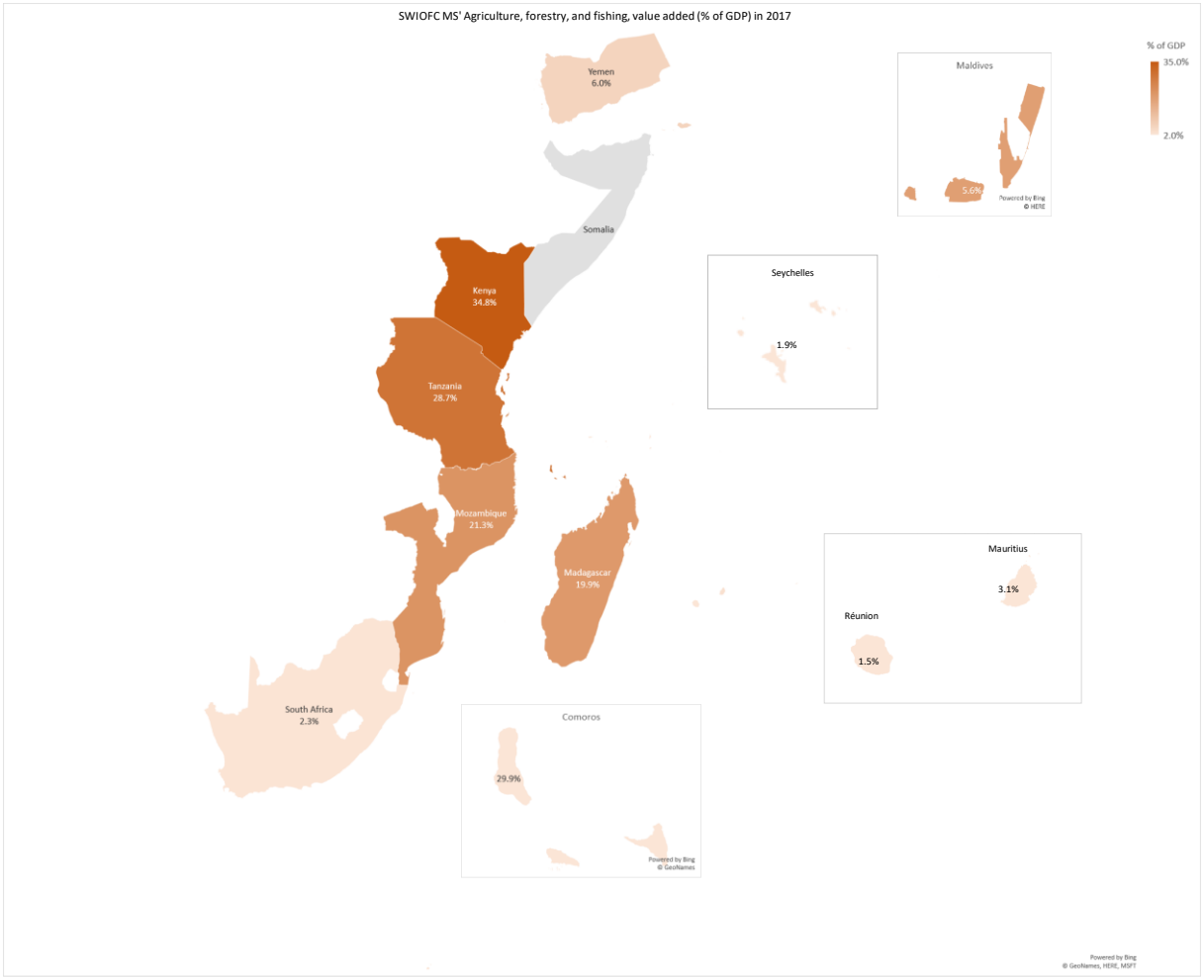


Figure 7-2: Spatial distribution of contribution of Agriculture, forestry, and fishing to GDP in SWIOFC MS in 2017 (i.e. value added as % of GDP)[12]. Source: World Bank, World Development Indicators (2019a) & EuroStats (2019)

In a recent report commissioned by IOTC and FAO, Macfayden & Defaux (2019) found that the availability of accurate and comprehensive data to determine the economic and social contribution of tuna fisheries in the Indian IOTC's Ocean to contracting parties is extremely limited.

Another recent FAO study by J. Cai et al. (2019) and titled "Understanding and measuring the contribution of aquaculture and fisheries to gross domestic product (GDP)" attempt to fill-in this gap by suggesting four approaches:

i. An input-output model: a matrix summarizes Intermediate inputs (purchases of raw materials,..) or consumption from the fisheries sector vis-à-vis other industries and final use (sales of outputs) in the fisheries market (local consumption, export, ..). In our case, the input-output table would include four key industries on the fish value chain: (i) fishing; (ii) building of fishing boats; (iii) fish processing; and (iv) fish marketing (transporters, storage services, wholesalers, retailers, etc.). For simplicity, other industries entering the fish value chain such as the restaurants, hotels and food catering industry, would be aggregated into the "rest of the economy". We note that a similar approach was used a decade ago by the McDermott Fairgray Group Ltd. to assess the contribution of New Zealand fisheries in the local economy

[12] Agriculture corresponds to ISIC divisions 1-5 and includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3 or 4.

(McDermott Fairgray Group Ltd., 2000). This report produced several multipliers which were quickly contradicted by the sector forcing the study to be re-evaluated and updated indicating the difficulty in producing correct multiplier estimates from such model.

ii. Direct gross value added (GVA) as a basic yet inadequate measure of fisheries contribution to gross domestic product (GDP): This the equivalent of calculating the GDP generated by fishing activities only.

iii. fisheries' indirect contribution to gross domestic product (GDP): this is done by decomposing the fishing sector's output into four components:
   a. direct GVA
   b. indirect GVA (through backward linkage)
   c. import content (direct and indirect import)
   d. double counting (that is counting twice the value of production from some processed output while the inputs used in that process was already accounted for upstream at an earlier stage of production as an output in the value chain).

This approach estimates fishing's indirect contribution to GDP through 4 types of linkages:

a. the sector's backward linkage
b. the sector's forward linkage to fish processing
c. fish marketing
d. fishing boat building

Figure 7-3 shows an example of deconstruction of the fishery's sector contribution to GDP describing the 4 types of linkages (doughnuts) from Cai, Huang, & Leung (2019)

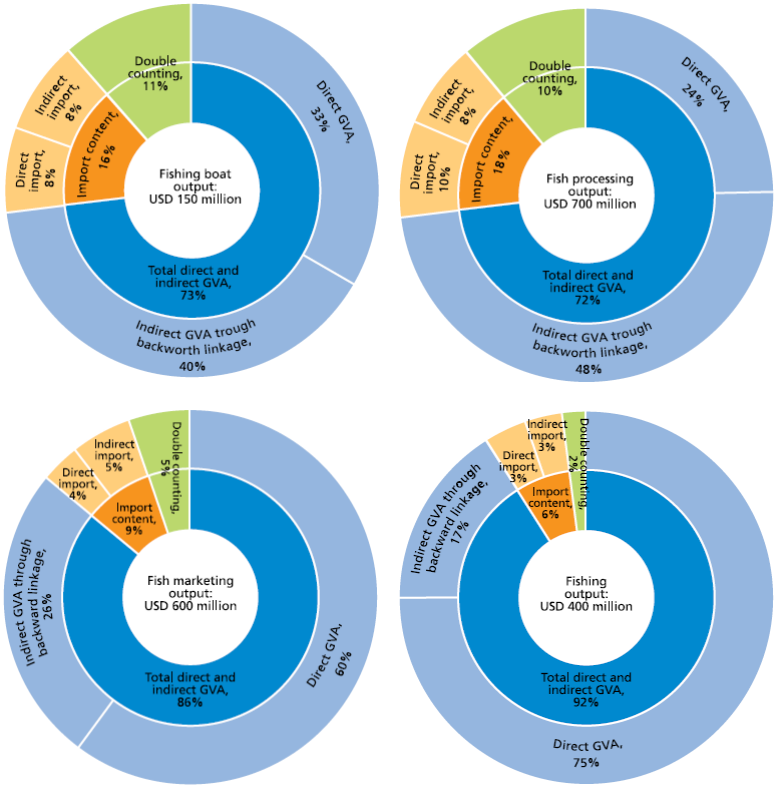


Figure 7-3: Example of decomposition of a fishing sector's output between harvesting (top left doughnut), processing (top right doughnut), marketing (bottom left doughnut) and finally retail/wholesale/export (bottom right doughnut). Source: (Cai, Huang, & Leung, 2019)

iv. Using a satellite account approach to measure fisheries' contribution to gross domestic

product (GDP): this is done by decomposing the fishing sector's output into four components: This approach is useful when input-output tables as described in "i." are not available for the country of interest or is available but includes implicitly fisheries under the heading "agriculture, forestry and fishing" sector. In this case, the contribution of fisheries to GDP can be measured by the GVA of the "extended fisheries sector" that is composed of key industries on the fish value chain. Such a satellite account approach was used to measure the value of African fisheries (de Graaf & Garibaldi, 2014), where the extended fisheries sector included fishing and fish processing. We later use a value chain approach combining harvesting, processing and the retail market to evaluate the gross value added – final use (GVA-FU) of the various tuna fishery segments in Tanzania (see Peacock, et al. (2018).

7.1 Seychelles Economic Dashboard

We present here a country specific economic dashboard based on the tool developped in 2016 for the Seychelles Fisheries Authority (SFA), Fisheries Economics Intelligence Unit (FEIU) in Seychelles (Figure 7-4). This tool was developped under an IOC-SmartFish initiatives designed to improve fisheries governance in Seychelles as part of the implementation of a regional fisheries strategy for the Eastern and Southern Africa and Indian Ocean region (ESA-IO region). The dashboard was meant to provide some technical support to promote the establishment of a Fisheries Economic Intelligence Unit (FEIU) within the Seychelles Fisheries Authority (SFA).

The FEIU tool's dashboards is based on an earlier economic model that was developed by the World Bank (The World Bank, 2011) which is based on the 'effects method'. This method allows for a valuation of the impact of the tuna industry on the entire economy in terms of the direct economic effects (Direct Value-Added – DVA) and indirect economic effects (Indirect Value-Added – IVA) of the tuna fisheries and related activities. This approach is similar to the 3rd approach "iii. fisheries' indirect contribution to gross domestic product (GDP)" described in Cai, Huang, & Leung (2019).

Value-added was mostly calculated by the difference between sales (turnover) and the intermediary consumption. The value-added generated by the tuna fleet licenced to fish in the Seychelles EEZ was also appraised in terms of the access rights that is, licence fees, plus fishing agreement revenues for the European Union (EU) fleet operating under the Fisheries Partnership Agreements (FPA).

DVA refers to value-added generated by all tuna fishing and processing activities taking place in Seychelles.

IVA refers to value-added generated by all the ancillary activities related to fishing and processing activities taking place in Seychelles. The IVA generated by the local suppliers and captured by the model is the IVA of first iteration.

By summing the DVA and the IVA of first iteration, the model can provide an estimate of the Primary Value-Added (PVA) generated by the tuna fisheries sector, and hence a contribution of the entire sector to the Seychelles economy.

The economic model also allows for an estimate of the sharing of PVA between Employees (workers), Companies and State.

Dashboard-Historical for 2017 (US Dollar)

Year **2017**

US Dollar | 1 US Dollar = 13.656 SCR

In 2017, the Tuna industry sector represented 4.02% of GDP (w/o transfer pricing) and 6.06% of GDP (w/ transfer pricing by IOT estimated as 50.8% of PVA based on 2009 data)

Sum of Annual Value Added	Country/ Tuna based Activity										
	France	Spain	Italy	Seychelles	Mayotte	Other	Any				Subtotal Added Value
Added value description	Purse Seiner	Purse Seiner	Purse Seiner	Purse Seiner	Purse Seiner	Purse Seiner	Industrial Longliner	Reefer Vessel	Supply Vessel	IOT Cannery	
Direct Added Value	**2,796,370**	**7,860,968**	**310,382**	**759,066**	**358,177**	**1,477,272**	**356,393**	**-**	**2,341,861**	**20,329,751**	**36,590,239**
Depreciation allowance for investment in Seychelles	-	-	-	-	-	-	-	-	-	8,461,529	8,461,529
Dividends paid to Govt of Seychelles	-	-	-	-	-	-	-	-	-	1,552,526	1,552,526
EU-Seychelles FPA for fisheries access by purse seiners fleet	1,255,141	3,406,810	179,306	-	-	-	-	-	-	-	4,841,257
EU-Seychelles FPA support for the sustainable development of the fisheries sector	824,382	2,237,609	117,769	-	-	-	-	-	-	-	3,179,761
Fishing license fees	498,343	1,388,562	-	500,636	228,622	1,273,643	356,393	-	-	-	4,246,199
Gross wages of national crew (or tax for absence of national crew)	218,504	827,986	13,307	258,431	129,556	203,628	-	-	2,341,861	9,485,026	13,478,299
Rebate paid by Govt of Seychelles to PUC (electricity, water…)	-	-	-	-	-	-	-	-	-	(4,927,594)	(4,927,594)
Spending of foreign workers in Seychelles (*)	-	-	-	-	-	-	-	-	-	5,758,263	5,758,263
Indirect Added Value	**2,186,482**	**10,302,485**	**8,493**	**3,338,045**	**1,438,297**	**1,749,895**	**9,042**	**462,039**	**1,974,621**	**6,595,964**	**28,065,363**
Crew accomodation	30,820	128,910	-	72,834	659	28,305	-	5,666	80,494	-	347,689
Fees and Port dues	119,268	214,310	-	96,168	80,986	21,147	832	267,233	89,688	-	889,632
Food supplies	72,092	161,370	8,493	70,160	68,667	26,515	-	2,880	79,944	-	490,121
Gas oil & fuel oil	1,070,158	4,701,501	-	1,483,918	516,903	982,501	7,424	46,348	836,706	249,993	9,895,453
Lease rental	-	-	-	-	-	-	-	-	-	1,133,546	1,133,546
Maritime agent fees	338,442	1,428,887	-	533,279	351,296	302,161	547	109,325	457,754	-	3,521,690
Other expenses	89,886	145,470	-	53,193	93,967	31,542	227	13,093	52,802	755,984	1,236,164
Raw materials for can processing	-	-	-	-	-	-	-	-	-	2,870,535	2,870,535
Repairs & Maintenance	78,118	296,857	-	97,440	46,527	33,402	12	2,682	349,213	253,959	1,158,211
Stevedoring Expenses	345,852	3,124,950	-	902,944	259,528	311,744	-	7,366	11,957	-	4,964,340
Transport	37,762	94,095	-	23,894	17,106	12,387	-	7,312	14,271	173,904	380,732
Utilities	4,085	6,134	-	4,214	2,658	191	-	135	1,792	1,158,042	1,177,251
Subtotal Added Value	**4,982,852**	**18,163,452**	**318,875**	**4,097,111**	**1,796,475**	**3,227,167**	**365,435**	**462,039**	**4,316,481**	**26,925,715**	**64,655,602**

Figure 7-4: FEIU Dashboard used to calculate Historical Primary Added value (partially updated for 2016 and 2017)

The FEIU tool is composed of several pivot tables and charts which are dynamically linked in ”real-time” to a database and as such, can be refreshed at any time to reflect data newly updated. The tool also comprises two economic dashboards, an historical-dashboard and a simulation dashboard. The historical dashboard gathers historical data which evolves as more data are being added to the database. The simulation dashboard is used to simulate scenarios under various economic conjectures (inflation, exchange rates) and fishing fleet composition (number of purse seiners by country). This kind of tool can easily be expanded to include additional economic indicators and other performance indicators which can be provided through the linked database

The tool also allow to simulate different econmic condition and pose the “what if?” question (Figure 7-5).

Dashboard-Simulation for 2013 (Seychelles Rupee)

2013 | Seychelles Rupee | 12.05 SCR/US$ | 15.94 SCR/€ | CPI 190 (100=2009)

default | default | default

12 French purseiners	14 Spanish purseiners	0 Italian purseiners	7 Seychellois purseiners	5 Mayotte purseiners	4 Other purseiners	134 industrial Longliners	19 Reefers	4 Supply vessels	1 Processing plant	All default
default	default	default	default	default	default	default	default	default	default	

Sum of Simulated Value Added	Country/ Tuna based Activity Type	France	Spain	Italy	Seychelles	Mayotte	Other	Any				Simulated subtotal Added Value
Added value description		Purse Seiner	Purse Seiner	Purse Seiner	Purse Seiner	Purse Seiner	Purse Seiner	Industrial Longliner	Reefer Vessel	Supply Vessel	IOT Cannery	
Direct Added Value		65,463,017	79,098,573	-	10,365,684	6,114,010	5,763,822	24,153,966	-	6,732,645	277,619,687	475,311,403
Depreciation allowance for investment in Seychelles		-	-	-	-	-	-	-	-	-	115,549,233	115,549,233
Dividends paid to Govt of Seychelles		-	-	-	-	-	-	-	-	-	21,201,036	21,201,036
EU-Seychelles FPA for fisheries access by purse seiners fleet		29,382,844	34,279,985	-	-	-	-	-	-	-	-	63,662,829
EU-Seychelles FPA support for the sustainable development of the fisheries se		19,298,791	22,515,256	-	-	-	-	-	-	-	-	41,814,047
Fishing license fees		11,666,206	13,971,980	-	6,836,596	3,902,522	4,969,332	24,153,966	-	-	-	65,500,603
Gross wages of national crew (or tax for absence of national crew)		5,115,175	8,331,352	-	3,529,087	2,211,488	794,489	-	-	6,732,645	129,525,936	156,240,173
Rebate paid by Govt of Seychelles to PUC (electricity, water...)		-	-	-	-	-	-	-	-	-	(67,290,403)	(67,290,403)
Spending of foreign workers in Seychelles (*)		-	-	-	-	-	-	-	-	-	78,633,885	78,633,885
Indirect Added Value		51,185,544	103,665,590	-	45,583,781	24,551,437	6,827,508	612,779	6,660,058	5,676,861	90,073,389	334,836,947
Crew accomodation		721,492	1,297,120	-	994,612	11,246	110,438	-	81,677	231,413	-	3,447,999
Fees and Port dues		2,792,064	2,156,426	-	1,313,249	1,382,415	82,510	56,389	3,852,022	257,846	-	11,892,920
Food supplies		1,687,673	1,623,736	-	958,089	1,172,139	103,451	-	41,518	229,831	-	5,816,437
Gas oil & fuel oil		25,052,399	47,307,414	-	20,264,143	8,823,432	3,833,390	503,141	668,084	2,405,456	3,413,867	112,271,325
Lease rental		-	-	-	-	-	-	-	-	-	15,479,516	15,479,516
Maritime agent fees		7,922,922	14,377,732	-	7,282,363	5,996,548	1,178,932	37,085	1,575,865	1,316,003	-	39,687,451
Other expenses		2,104,235	1,463,747	-	726,401	1,603,998	123,066	15,362	188,726	151,801	10,323,586	16,700,923
Raw materials for can processing		-	-	-	-	-	-	-	-	-	39,199,554	39,199,554
Repairs & Maintenance		1,828,742	2,987,031	-	1,330,627	794,205	130,324	802	38,659	1,003,957	3,468,028	11,582,376
Stevedoring Expenses		8,096,384	31,443,852	-	12,330,449	4,430,081	1,216,321	-	106,173	34,375	-	57,657,636
Transport		883,999	946,807	-	326,298	292,002	48,331	-	105,394	41,027	2,374,805	5,018,663
Utilities		95,633	61,726	-	57,550	45,370	744	-	1,940	5,151	15,814,032	16,082,146
	Simulated subtotal Added Value	116,648,560	182,764,163	-	55,949,465	30,665,447	12,591,330	24,766,745	6,660,058	12,409,505	367,693,076	810,148,349

Figure 7-5: FEIU Dashboard used to simulate Primary Added value

The FEIU dashboard provides the following indicators:

- Technical and commercial indicators
    - Tuna port activity indicators
    - Number of port calls of tuna boats (Port Authority)
    - Vessel expenses including consumption of gasoil and fuel oil (bunkering) and port fees
    - Quantity (corresponded volume) of containers imported and exported by the processing plant (IOT, Numbers of 20ft equivalent containers)
- Tuna processing activity indicators
    - Quantity/ composition/ value of raw material contracted with PS and imported
    - Quantity of canned tuna, fishmeal, fish oil, tuna loin (frozen) produced (Mt)
    - Export market (share of EU)
- Indicators to measure the local cannery competitiveness
    - Seychelles tuna cans exports volume (Mt), value (000 €) and price (€/kg) to the European Economic Community (EEC) and the Rest of the World (Others)
- Economic indicators
    - Budget revenue and expenditures
    - Contribution to Gross Domestic Product (GDP)
    - European Union Financial Contribution (through SFPA)
    - Licence fees receipts
    - Share of tuna fishing and related activities in port's activity (turnover, taxes)
    - trends in the Tuna fishing sector's direct (DVA), indirect (IVA) and primary (PVA) added value (Table 7-1)

Table 7-1: Summary tables showing trends in the Tuna fishing sector's direct (DVA), indirect (IVA) and primary (PVA) added value in Seychelles between 2009 and 2017

			2009	2010	2011	2012	2013	2016	2017	Trends
Direct added values (DVA)[1]	million SCR	DVA Total	363.87	334.07	393.55	465.34	453.13	500.31	498.34	
		% chge		-8.2%	+17.8%	+18.2%	-2.6%	+10.4%	-0.4%	
	million US$	DVA Total	26.76	27.83	32.09	34.36	37.61	37.56	36.49	
		% chge		+4.0%	+15.3%	+7.1%	+9.5%	-0.1%	-2.8%	
	as a % of annual PVA	% of PVA	62.1%	59.8%	61.6%	66.3%	58.8%	56.4%	56.5%	
		% chge		-3.7%	+3.0%	+7.7%	-11.4%	-4.0%	+0.1%	
Indirect added values (IVA)[1]	million SCR	IVA Total	221.77	224.53	245.60	236.36	317.78	386.00	383.26	
		% chge		+1.2%	+9.4%	-3.8%	+34.4%	+21.5%	-0.7%	
	million US$	IVA Total	16.31	18.71	20.03	17.45	26.38	28.98	28.07	
		% chge		+14.7%	+7.0%	-12.9%	+51.2%	+9.9%	-3.2%	
	as a % of annual PVA	% of PVA	37.9%	40.2%	38.4%	33.7%	41.2%	43.6%	43.5%	
		% chge		+6.1%	-4.4%	-12.3%	+22.4%	+5.7%	-0.2%	
Primary added values (PVA)[1]	million SCR	**PVA Total**	**585.63**	**558.60**	**639.15**	**701.70**	**770.90**	**886.31**	**881.60**	
		% chge		-4.6%	+14.4%	+9.8%	+9.9%	+15.0%	-0.5%	
	million US$	**PVA Total**	**43.07**	**46.54**	**52.11**	**51.81**	**63.99**	**66.54**	**64.56**	
		% chge		+8.1%	+12.0%	-0.6%	+23.5%	+4.0%	-3.0%	
Seychelles[2] GDP at current prices		million SCR	11,533.40	11,705.40	13,304.50	15,468.50	16,014.50	19,014.10	20,515.40	
		% chge		+1.5%	+13.7%	+16.3%	+3.5%	+18.7%	+7.9%	
PVA as a % of Seychelles GDP[1]		w/o transfer pricing	5.1%	4.8%	4.8%	4.5%	4.8%	4.7%	4.3%	
		w/ transfer pricing[3]	7.7%	7.2%	7.2%	6.8%	7.3%	7.0%	6.5%	
		% chge		-6.0%	+0.7%	-5.6%	+6.1%	-3.2%	-7.8%	
Exchange rate[2] SCR/ US$		SCR per US$	13.60	12.00	12.26	13.54	12.05	13.32	13.66	
		% chge		-11.8%	+2.2%	+10.4%	-11.0%	+10.5%	+2.5%	
GDP, implicit price deflator (IPD)[2]	All items	Index	192.40	184.30	194.10	219.50	217.70	225.50	233.20	
		% chge		-4.2%	+5.3%	+13.1%	-0.8%	+3.6%	+3.4%	
	Fish	Index	157.50	206.10	233.70	254.10	289.40	271.80	256.60	
		% chge		+30.9%	+13.4%	+8.7%	+13.9%	-6.1%	-5.6%	

[1] calculation based on both the updated SFA-FEIU database and data extrapolated from SFA-FEIU 2013 and the 2011 World Bank Model

[2] from the Annual National Accounts Statistics for Seychelles published by the National Bureau of Statistics

[3] transfer pricing by IOT estimated as 50.8% of PVA based on 2009 data (Word Bank, 2011)

More details on the FEIU Dashboard can be found in the Appendix in Section 10.2 below.

7.2 Value Chain Analysis Approach for Tanzania

The Tanzanian Value Chain Economic Model was developed under Microsoft Excel. The model originally presented the economics of twelve strands from five priority species value chain through a combined dashboard and simulation module; the approach used here is similar to the one used in investment decision making process where financial indicators such as Net Present Value (NPV), Internal Rate of Return (IRR) and breakeven points can be used to compare and contrast investment scenarios. The model can also be used for Management Strategy Evaluation (MSE) of the fisheries to ask the "what if?" and what are the impacts and economic implications of particular management decisions and/ or changes. In our case we can assess the contribution of the tuna industry sector in the Tanzanian economy by looking at the Value Added Centres along the value chain from the time of harvesting to the retail level or last point of sale.

The model was created by first transcribing in a tabular format the economic data collected in a field surveys for each tuna strand. The data thus collected constitute the model "default" values or status quo for the strands and were organised along the VC for each actor and according to their revenue and cost centres.

For each strand and actor, the model calculates annual and monthly revenues, costs, profit or loss, and overall capital investment, net present value, internal rate of return, breakeven catch (or production level) under 3 scenarios (pessimistic, optimistic and average also known as the "status quo" under the current situation). All the values are dynamic and can be modified by the user to simulate many conditions and under contrasted scenarios. This is useful if we want to gauge the potential impact on the economy of a management decision or new regulation affecting any node in the tuna value chain

Figure 7-6 and Figure 7-7 show examples of potential value chain structure in the fishing industry where both Industrial and Artisanal sectors coexist along the value chain.

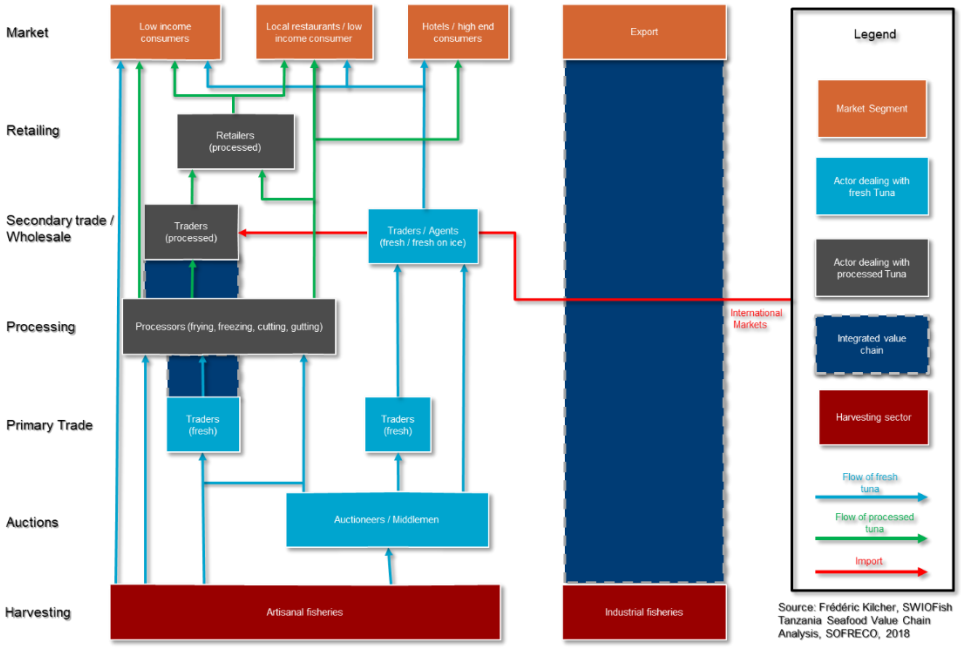


Figure 7-6: Example of Tuna and By-Catch Value Chains under 2 main sectors/ segments. (artisanal fisheries supplying the local market with fresh tuna and Industrial fisheries exporting all their catch as mainly frozen or canned)

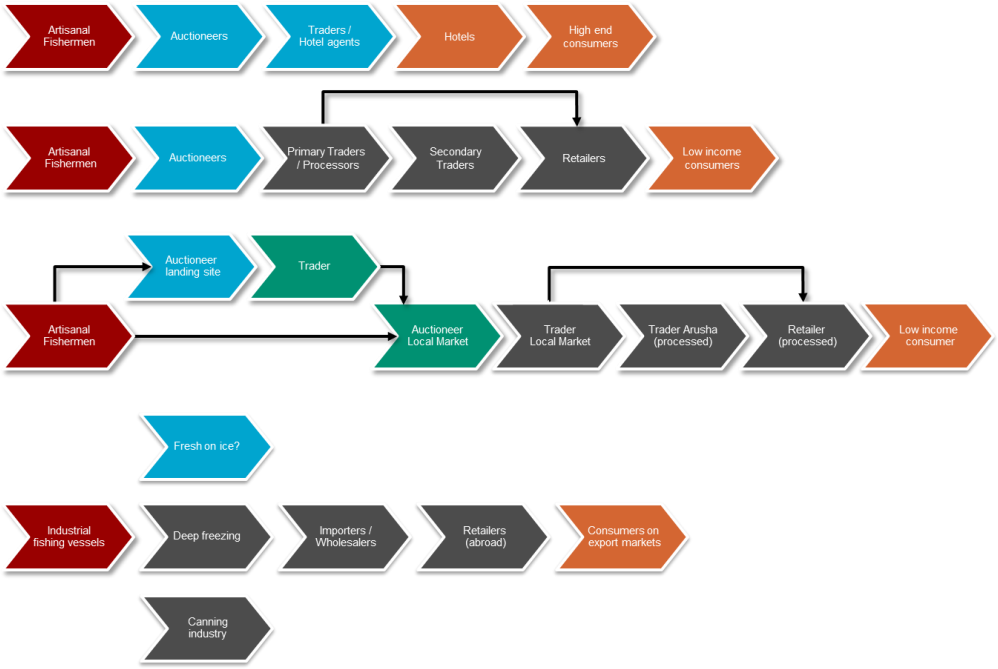


Figure 7-7: Main Segments of the Tuna and By-Catch Value Chain between the 2 sectors (Industrial and artisanal).

I the case of Tanzania's tuna value chain, we identified only 2 segments or strands and both in the artisanal sector. Tanzania currently has a minimal involvement with the licensed high seas fishery, but does have an artisanal fishery supplying both the prime and mid-low income sectors. Growing beach tourism and premium domestic markets are increasing demand as well as requiring the high quality that implies proper handling. (Peacock, et al., 2018).

Table 7-2: Key findings on the Tanzanian tuna value chain. Source Peacock, et al. (2018).

Aspect Value chain	Large pelagics -tuna
Production (ton/year)	14,000 tonnes
Percent of marine catch	16%
Growth in production/yr	+8% pa since 2008
Capture technology	Artisanal (semi-industrial)
Fishing gear used	Gill net, long &handlines
Fishing boats used Type, length & power source	Range of traditional wooden 5-10m boats sail, paddle & 5 to 60hp engine power
Processing	Gutting & steaking
Domestic market	Traditional & modern
Export	Minimal but potential
Fisher income TZS 000s per month	TZS 1,200-2,300 '000s per month
Trader income TZS 000s per month	TZS 1,500-1,900 '000s per month

A detailed description of the tuna value chain economic model and dashboard for Tanzania can be found in the Appendix (section 10.5).

8 CONCLUSION

Both dashboards produced and presented in this report (for Tanzania and Seychelles) can be used to conduct sensitivity analysis and ask the "what if questions". The main difference between the 2 approaches is that the Seychelles use extensive proprietary data from the various Ministries and fisheries department and can produce annual statistics on the state of the tuna fishing industry contribution to the Seychelles economy via the GDP to GVA ratio. That means a comprehensive data collection system following strict protocols: the backend of the dashboards is a relational database linked to the Excel workbook.

The approach used in the Tanzanian value Chain model first identifies specific strands or market segment in the fishing sub-sector of interest, in our case the tuna fishing industry sector. Once the market segments have been clearly identified, survey data are used to present representative actors along the segment's value chain which can be extended to represent the entire segment and by adding all the segments together, the initial production and final outputs for the entire tuna fishing industry by proxy.

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10 ANNEXES

10.1 Project's TORs

South West Indian Ocean Fisheries Governance and Shared Growth Program (SWIOFish Regional)

First South West Indian Ocean Fisheries Governance and Shared Growth Project (SWIOFish1)

Terms of Reference for the recruitment of a Consultant to undertake a study on Tuna Fisheries direct and indirect Contribution to GDP and wealth distribution patterns in the SWIOFC Member countries (Individual)

Assignment title	**Recruitment of a consultant to undertake a study on Tuna Fisheries direct and indirect contribution to GDP and wealth distribution patterns in the SWIOFC Member countries.**
Contract duration	**90 calendar days following the award of the contract**
Assignment location	**IOC HQ but with possibility of visit to SWIOFC HQ in Maputo**
Financed by	**The World Bank**

A. PROJECT BACKGROUND AND OBJECTIVES

The First South West Indian Ocean Fisheries Governance and Shared Growth Project, commonly known as SWIOFish 1, is a six-year project designed to improve the development and sustainable management of selected priority fisheries at the regional, national and community level of the member-states of the South West Indian Ocean Fisheries Commission (SWIOFC). It is funded mainly by the World Bank. While all these countries are benefiting from the regional intervention under the Component 1 of the Project, which is implemented by the Indian Ocean Commission (IOC), some of the states of the agglomeration namely, Tanzania, Comoros and Mozambique receive funding for targeted activities at the national and community level. Madagascar, Seychelles and Maldives are implementing their National SWIOFish Projects with the World Bank. Kenya and Mauritius are expected to follow suit.

The approach of the SWIOFish1 Component 1 is the enhancement of the Regional Cooperation and Collaboration among the SWIOFC member-states, which is an imperative to advance informed management and responsible governance of the shared marine fisheries resources and ecosystems of common interests. This component consists of two core activities which are interconnected. First, the implementation of a comprehensive and integrated capacity building strategy to empower the beneficiary countries in harnessing the full economic potentials from the shared fisheries resources. The action plan includes the operationalisation of coherent policy and institutional frameworks as well as harmonised Monitoring, Control and Surveillance tools, such as the Minimum Terms and Conditions (MTC) of access to the regional fisheries and the Regional Observers Programme to ensure the adequacy of available fisheries and compliance data for management purposes. Second, the strengthening of the regional institutional mechanisms and operational capacities of the SWIOFC to meet the aspirations of its member states, which is presently considering the establishment of a Regional Fisheries Framework Agreement to consolidate the various initiatives leading to the maximisation of the sustainable benefits to the resource-owners of the region. This SWIO Fisheries Framework Agreement (based on the Pacific Islands Forum Fisheries Agency, or FFA framework) will aim at strengthening the collective negotiation capacities of the member states in engaging with amongst others, the Indian Ocean Tuna Commission (IOTC), including a harmonised implementation of the conservation and management measures at the national and regional level.

In 2011, a Working Party for Collaboration and Cooperation in the Tuna Fisheries was established by the SWIOFC to follow up on the above-mentioned developments. Currently, draft protocols have been produced by the WWF and the African-Union Inter-Agency for Animal Resources (AU-IBAR) and are undergoing the process of consultative validation with the support of SWIOFish 1, IOC-SmartFish and the Regional Fisheries Surveillance Project (IOC-RFSP).

Overview of the SWIO Tuna Fisheries

The global tuna industry is multi-billion-dollar business, the Indian Ocean having the second largest world tuna fisheries after the Western Central Pacific Ocean. It accounts for approximately 1.2 million tonnes of tuna caught per year and consists of four main tuna species namely, Yellowfin, Skipjack, Albacore and Bigeye. The SWIO share of global tuna caught is about 450,000 tonnes and the breakdown is as follows: Industrial tuna fisheries (Purse seine: 300,000 tonnes and Longline: 115,000 tonnes and small-scale chilled tuna fisheries: 35,000 tonnes).

The purse seine or industrial surface tuna fishing activities in the SWIO basin are an extended arm of the European Union's and some Asian countries' such as Thailand's canned tuna value chains, supported by a new generation of Sustainable Fisheries Partnership Agreement (SFPA) between the European Union (EU) and African, Caribbean, and Pacific States. Surface (PS) tuna fisheries are highly localised around the equatorial zones and thus, the PS fleet is based in the region. The industrial tuna longline (TLL) fishing vessels mostly owned by SE Asian distant water fishing nations led by the Taiwanese fleet, are itinerant within the Indian Ocean and are even trans-oceanic. However, the larger long liners are not active in the SWIO water since they target larger and fatter tunas in the cooler waters of the Southern Hemisphere. Unlike the purse-seine fisheries, the large pelagic fisheries such as swordfish, billfishes and sharks are classified as targeted commercial species of the offshore TLL fishing boats owing to the growing market demands for these fishes and fish products. The catches of the offshore

TLL fishing fleets, other than skipjack, which is not a target species, are meant partly for canning, namely Albacore and for high–value direct consumption markets in the developed and emerging economies.

The small-scale chilled tuna fishery encompasses a wide range and types of fishing operations, from the coastal to semi-industrial fishing crafts of less than 24 metres long. While this segment is still nascent in the SWIO, it represents around 55% of the total catch of tuna in the Indian Ocean, which is harnessed by its surrounded northern and western coastal states. The sustainable and responsible development of the small-scale tuna value chains is sought as a viable strategic option for the appropriation of the regional tuna resources by the SWIO states.

Economic potentials of the SWIO tuna fisheries

The landed value tuna harvested in the SWIO basin is estimated at USD 1 billion and about USD 3 billion at end market price. The overall economic benefits derived by the ESA-IO countries is roughly estimated at USD 500 million, approximately 20% of its potential. Around 55% of the total catch is taken in the Exclusive Economic Zones (EEZ) of neighbouring coastal states and the remaining, from the high seas (also known as Areas Beyond National Jurisdiction or ABNJ). The purse seiners or the canned tuna value chains constitute the big chunk of the regional tuna industry and are intimately linked to preferential access to the European markets.

Presently three SWIO states (Madagascar, Mauritius and Seychelles) have entered into a Sustainable Fisheries Partnership Agreement (SFPA) with the EU. The EU also has a total of 9 dormant fisheries agreements, 2 of which were previously active with Comoros and Mozambique up to 2015 and 2016. These prototype fishing agreements are not based on market rationale since they provide for direct subsidies to the EU fleet and financial assistance for technical capacity building in the signatory countries. The financial compensation is meant for the harvest in the EEZ and precludes the ABNJ. While some of the coastal states in the region have denied access to foreign fishing vessels, others provide fee-based and/or SFPA access to fish in their waters.

South Korean, Mauritian, Iranian and Seychellois-flagged purse seiner fleets access the SWIO coastal states waters through bilateral fishing agreements.

The South East Asian TTL fleets access the SWIO coastal states waters under private licenses or agreements.

The total financial compensation received by SWIO countries for access of the EU fleet is approximately € 20 million per year, which is almost 10% of total landed value of the catch harvested in the EEZ of the coastal states. About 80 % of the tuna caught by the purse-seine fleets are processed into canned products and loins in the region, mainly in Seychelles, Mauritius and Madagascar.

Economic contribution though ancillary activities and the tuna processing activities requires an in-depth analysis as it is a proven fact that one of the SWIO countries not resource blessed is better off in doing sea food businesses across the value chain of the tuna industry at large due to its conducive business environment. In such country tuna operations in port double tuna processing on land value wise.

The largest tuna base of the South-East Asian TLL fleets is in Mauritius, where approximately 65,000 tonnes or nearly 60% of total catch in the Indian Ocean is discharged and/or transhipped annually. As indicated above, the tuna industry of the SWIO region is a multi-million-dollar industry, yet its real contribution to the ESA-IO countries and regional economies is still poorly documented. The significance of reliable economic indicators for informed policy-making and management strategies can hardly be denied when addressing the prospects and challenges of the sustainable management and responsible governance of the shared tuna resources. These renewable resources can be a game changer for the betterment of the livelihoods and wellbeing of the populations of the ESA-IO region.

The importance of fisheries in a country's economy is traditionally measured as the direct contribution of primary production activities to overall GDP. While national accounts measure the value added of primary production activities, any contributions of the sector extending beyond primary production, in particular through the seafood processing sector, are captured in the value added of other sectors, namely

manufacturing, trade, and services. Besides, it is generally recognized that the fisheries sector supports a plethora of economic activity in the service and manufacturing sectors, especially through seafood processing and seafood manufacturing activities, as well as through the hotel, restaurant and tourism sectors.

The fisheries value chains are generally composed of upstream logistics, fishing operations and downstream logistics; while the seafood value chain network is composed of production, marketing, distribution, import and export.

In the SWIOFC states, the value chains include the coastal artisanal tuna fisheries, semi-industrial tuna fisheries, industrial tuna fisheries, tuna processing operations, tuna transhipment and associated services, boat building, repairs, maintenance, dry docking, and others.

Objective of the Consultancy

The rationale behind this consultancy is to undertake a study on Tuna Fisheries direct and indirect contribution to GDP and wealth distribution patterns in the SWIOFC Member countries.

The consultant should develop and apply an appropriate methodology to estimate the impact of the tuna fisheries on GDP, human, natural, and produced capital; and net foreign assets. The methodology has to take into account not only primary production but also forward and backward linkages. For such calculation it is pertinent to understand the multiplier effect for which an input-output matrix of national accounts is needed.

The consultancy work consists of an Economic Impact Assessment of the regional tuna fisheries to determine their contribution to national and regional economies in terms of Turnover, Gross Value-Added or Gross Domestic Products, Employment and its distributional effects along the value chain and among the economic agents (individuals, households, firms, governments), Net Foreign Exchange Earnings and Economic Integration, including the value of Fisheries Agreements with DWFN by SWIOFC nations as well as private licenses, and other factors. The study should adopt a value-chain approach to examine the upstream and downstream operations of the key segments of the regional tuna industry to include the followings:

i) Financial revenue derived from sale of fishing rights to the DWFN fleets,
ii) Direct and indirect economic contribution to national and regional economies derived from DWFN fleets (i.e. Purse seiners, TLL and others), domesticated industrial tuna fishing fleets (i.e. Purse seiners, TLL and others) and small-scale fresh and chilled tuna fleets and value chains, including coastal FAD[13] fisheries, including through:
    a. Tuna landings, transhipment and containerization, onshore services and other ancillary services;
    b. Tuna processing and marketing operations;
    c. Any other relevant segments.

SPECIFIC TASKS

In keeping with objectives of the policy makers in relation to the sustainable management and governance of the regional tuna resources, the assignment will focus on the following interrelated tasks:

1. Submission of a detailed methodology to estimate the economic impact of the tuna fisheries on GDP, human, natural, and produced capital; and net foreign assets.
2. Obtain country data from the national accounts and other sources of the direct and indirect importance of tuna and ancillary activities.
3. Collect historical data in each SWIOFC's EEZ and on high seas on declared tuna and breakdown by species and prices, including the following:
    - For these data differentiate by industrial, semi-industrial and artisanal vessels by flag of origin.

[13] Fish Aggregating Devices

- For each country get estimates of tuna that goes into processing plants in situ, exports and re-exports.
- Estimate fishing effort of DWFN in each SWIOFC's EEZ and on high seas. Estimate per ton value of access fees. Estimate net value of tuna fisheries by EEZ.

4. Conduct an economic analysis of the key segments of the tuna value chain, comprising fishing, tuna base operations, processing and distribution/marketing, incorporating:
    - Ancillary activities integrating value chain analysis upstream and downstream - inputs, equipment port expenditure, crew expenditure and victualling; crew airfares, vessel repair. that these activities generate.
    - Country revenues generated by tuna vessels and associated activities: license and access fees, direct and indirect tax revenues from vessels, processing and other vessel expenditure liable to tax in country.
    - Estimate expenditure to obtain net forex benefits to the country.
5. To implement a preliminary Economic Impact Assessment of SWIO tuna Industry as per above tasks for the establishment of a baseline for a regional dashboard.
6. Any other works that may be necessary to perform the above tasks.

Data acquisition

The assignment will be carried out on the basis of existing tuna fisheries statistics and secondary economic data from national and regional sources (e.g. IOTC). Additional data will be collected through interviews, focus group discussions and expertise advice. Data reconstruction tools and techniques will be used to develop standardised business models, operating accounts, and cash flows for calculating the financial and economic impacts of the key segments of the industry, including direct and indirect local value-added (VA) and shares of domestic and exported VA, and distribution of the VA among the economic agents.

The institutional players and the representative of the tuna enterprises will be sensitised by the Consultant through visits, on the strategic importance of the study to ensure their cooperation. The confidentiality of the financial data shared by the tuna enterprises will be safeguarded. The consultant will be required to visit the main player of the tuna industry and the Regional Fisheries Management Organisation in the ESA-IO for consultation and data collection.

Duration of Assignment

The assignment will cover a period of 90 days to complete by April 15, 2019.

B. DELIVERABLES/SPECIFIC OUTPUTS EXPECTED FROM CONSULTANT

Inception Report

Within 20 working days from date of signature of the service contract, the consultant will submit an Inception Report unfolding the following:

i) Comments relevant to Terms of Reference
ii) Methodological frameworks of Economic Impact Assessment (including scoping the tuna industry, data requirements and acquisition strategy, mapping of key public and private stakeholders)
iii) Assumptions and Risks pertaining to availability and accessibility of financial/economic data
iv) Work Plan (including visit to some of the SWIO states)
v) Table of Content of the final EIA Report.

Final Report

A final report and annexes covering the areas discussed in the Terms of Reference.

C. SPECIAL TERMS AND CONDITIONS

Consultative Validation Workshop

At the completion of the assignment, the Project will consider the opportunity for organising a a regional consultative validation workshop for the presentation of the findings, conclusions and way forward to key stakeholders of the regional tuna industry. This event will be discussed and planned timely in collaboration with the consultant.

Qualifications

i) An advance degree (MSc or PhD) in Economics, Finance or related field.
ii) A minimum of 10 years of experience, working on value chains, Cost-Benefit, and Economic Impact Analysis and economic modelling allowing estimates of direct and indirect VA, domestic and exported VA and VA distribution among economic agents, along the value chain.
iii) Relevant experience in the fisheries sector. Experience in the tuna sector and in the ESA-IO region will be considered as advantages.
iv) Demonstrated effective skills in conducting analytical and research works
v) Demonstrated capacity to develop multidisciplinary and integrated approach across institutional boundaries
vi) Excellent verbal and written communication skills
vii) Fluency in English and French.

Starting Date
The proposed starting date is January 15, 2019.
Duration of work: Calendar 90 days
Schedule of Payments

- As defined in the contract with IOC

10.2 Meeting with SWIOFC delegates on April 25th 2019

On April 25th 2019, a presentation by the consultant was held in Cape Town, South Africa with the participation of the SWIOFC MS delegates (Table 10-1) who were meeting there for a workshop organised by the IOC, WWF and IPNLF.

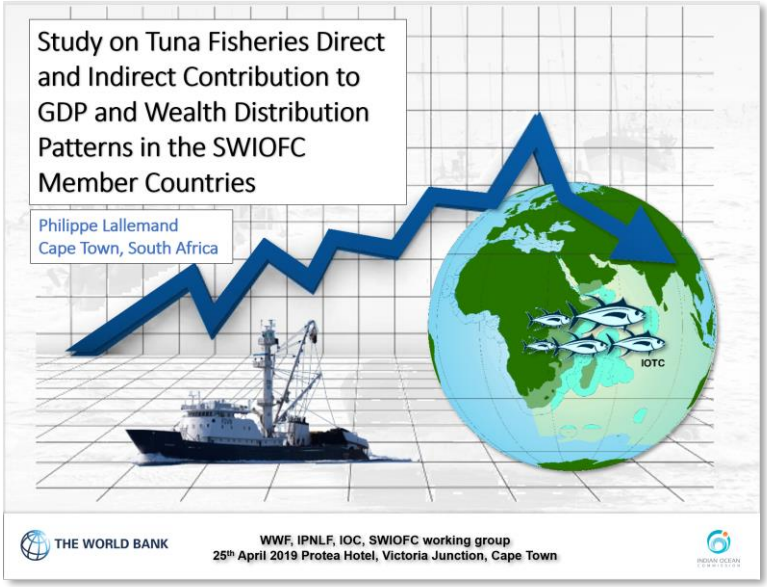
Table 10-1: List of the delegates present at the Cape Town meeting on April 25th 2019 and later contacted for the survey

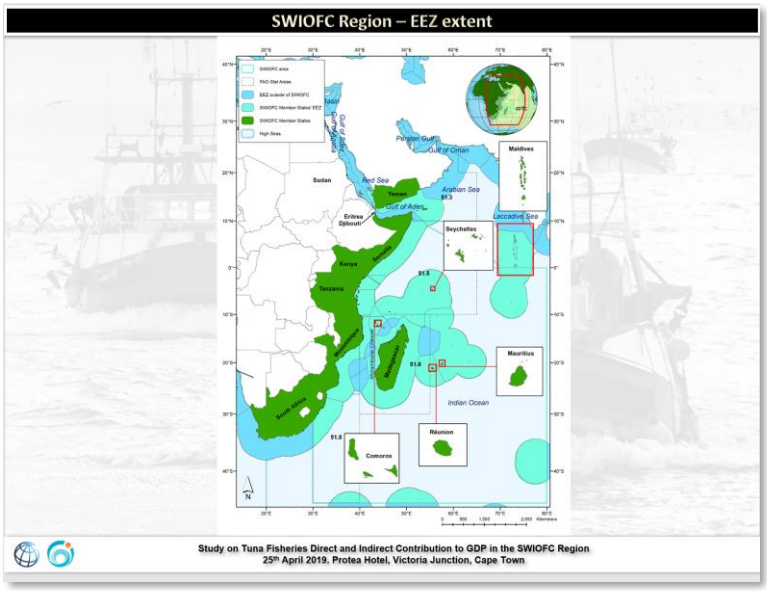
Name of the Delegate	Association with SWIOFC	Email
Mr Said Boina Hassan	Comores	dalaili@live.fr
Mrs Nassima Mmadi Issa	Comoros	dalaili@live.fr
Ms. Susan Wairimu Imende Ungadi	Kenya	susanimende@yahoo.com
Mr. Stephen Ndegwa	Kenya	ndegwafish@yahoo.com
Yacinthe Razafimandimby	Madagascar	ray_razya@yahoo.fr
Mr. Njaka Ratsimanarisoa	Madagascar	njakka@gmail.com
Dr. Mohamed Shiham Adam	Maldives	shiham.adam@fishagri.gov.mv
Ms. Maleeha Haleem	Maldives	maleeha.haleem@fishagri.gov.mv
Mr. V.K. Daby	Mauritius	vdaby@govmu.org
Mr. V. Degambur	Mauritius	ddegambur@govmu.org
Mr. Avelino Alfiado Munwane	Mozambique	avelinomunwane@gmail.com
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Mr. Vincent Gerald Lucas	Seychelles	vlucas@sfa.sc
Mr. Serge Roy Clarisse	Seychelles	rclarisse@gov.sc
Ms Naima Hussein Osman	Somalia	abshirow@mfmr.gov.so
Mr. Abdirahim Ibrahim Sheikheile	Somalia	sgunrahim@yahoo.com
Sekiwe Mbande	South Africa	SekiweM@daff.gov.za
Emmanuel Andrew Sweke	Tanzania	sea.sweman4@gmail.com
Mr. Magese Emmanuel Bulayi	Tanzania	emmabulayi@gmail.com
Daroomalingum MAUREE	IOC. Regional Project Coordinator SWIOFish 1	d.mauree@coi-ioc.org

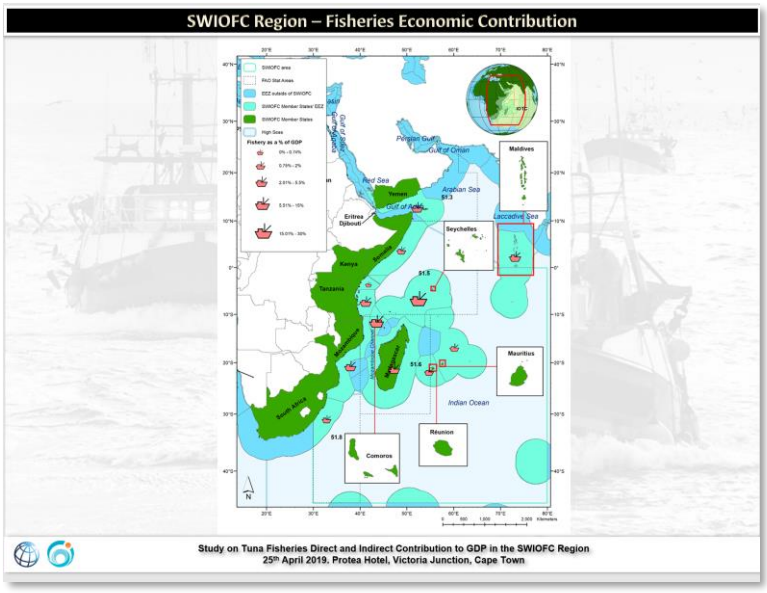
The objective of the presentation was to introduce the SWIOFC MS to the project's methodology as presented in the inception report and to showcase some of the potential outputs including country's specific dashboards similar to the one developed by the consultant in a previous IOC's commissioned project for the Seychelles tuna fishery sector.

This presentation was meant to trigger some interests and enthusiasm among the SWIOFC MS participants.

10.2.1 PowerPoint presentation made to the SWIOFC Delegates on April 25th 2019



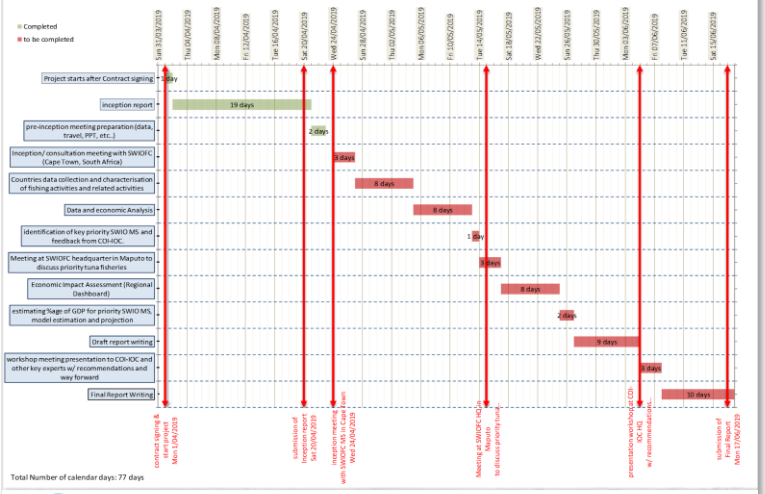




Project Framework

Assignment title	Recruitment of a consultant to undertake a study on TunaFisheries direct and indirect contribution to GDP and wealth distribution patterns in the SWIOFC Member countries.
Contract duration	90 (77) calendar days following the award of the contract
Assignment location	Capetown, IOC Hq but with possibility of visit to SWIOFC Hq in Maputo
Financed by	The World Bank

Project Tasks Schedule



Study on Tuna Fisheries Direct and Indirect Contribution to GDP in the SWIOFC Region
25th April 2019. Protea Hotel, Victoria Junction, Cape Town

Objective of the Consultancy

- **Develop and apply an appropriate methodology to estimate the impact of the tuna fisheries on GDP, human, natural, and produced capital; and net foreign assets.**
- **Through the methodology we should:**
  - Take into account the Primary Production
  - Take into account Forward and Backward Linkages
  - Develop where possible an input-output matrix of national accounts to estimate the multiplier effect
  - Take into account Turnover, Gross Value-Added Products, distributional effects on Employment along the value chain and among the economic agents (individuals, households, firms, governments), Net Foreign Exchange Earnings and Economic Integration, including the value of FAA as well as private licenses, and other factors

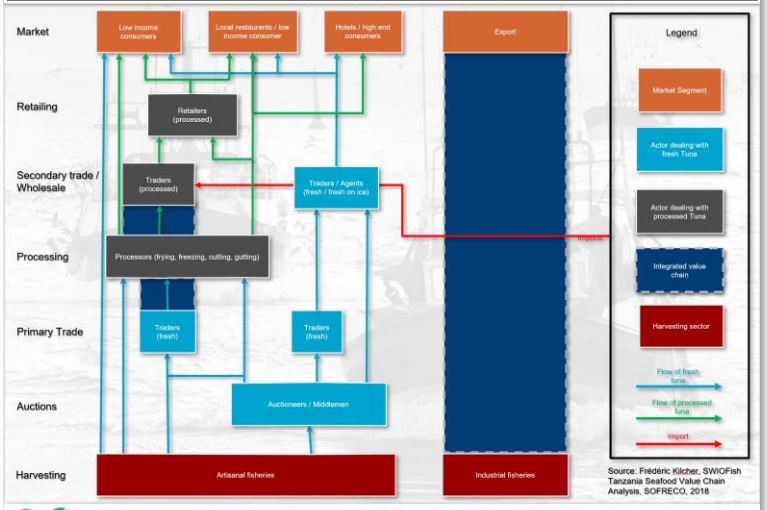
Study on Tuna Fisheries Direct and Indirect Contribution to GDP in the SWIOFC Region
25th April 2019. Protea Hotel, Victoria Junction, Cape Town

A Value Chain Approach

- **The study should adopt a value-chain approach to examine the upstream and downstream operations of the key segments of the regional tuna industry to include the following:**
  - Financial revenue derived from sale of fishing rights to the DWFN fleets,
  - Direct and indirect economic contribution to national and regional economies derived from the value chain through:
    - DWFN fleets (i.e. Purse seiners, TLL, PL, …)
    - Domestic semi-industrial tuna fishing fleets (i.e. Purse seiners, TLL, PL,…)
    - Small-scale fresh and chilled tuna fleets including coastal FAD fisheries
    - Tuna landings, transhipment and containerization, onshore services and other ancillary services
    - Tuna processing and marketing operations.
    - Any other relevant segments

Study on Tuna Fisheries Direct and Indirect Contribution to GDP in the SWIOFC Region
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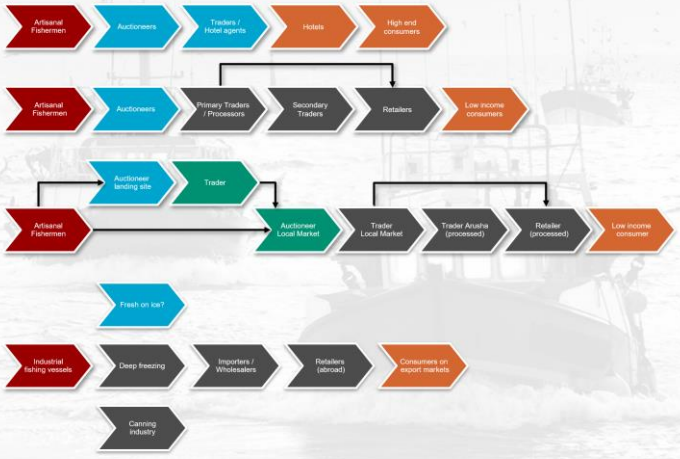
Tuna and By-Catch Value Chain



Source: Frédéric Kilcher, SWIOFish Tanzania Seafood Value Chain Analysis, SOFRECO, 2018

Study on Tuna Fisheries Direct and Indirect Contribution to GDP in the SWIOFC Region
25th April 2019. Protea Hotel, Victoria Junction, Cape Town

Main Strands of the Tuna and By-Catch Value Chain



Source: Frédéric Kilcher, SWIOFish Tanzania Seafood Value Chain Analysis, SOFRECO, 2018

Study on Tuna Fisheries Direct and Indirect Contribution to GDP in the SWIOFC Region
25th April 2019. Protea Hotel, Victoria Junction, Cape Town

Data need

- **Obtain country data from the national accounts and other sources of the direct and indirect importance of tuna and ancillary activities**
- **Collect historical data in each SWIOFC's EEZ and on high seas on declared tuna and breakdown by species and prices, including the following:**
  - For these data differentiate by industrial, semi-industrial and artisanal vessels by flag of origin,
  - For each country get estimates of tuna that goes into processing plants in situ, exports and re-exports.
  - Estimate fishing effort of DWFN in each SWIOFC's EEZ and on high seas. Estimate per ton value of access fees. Estimate net value of tuna fisheries by EEZ.

Study on Tuna Fisheries Direct and Indirect Contribution to GDP in the SWIOFC Region
25th April 2019. Protea Hotel, Victoria Junction, Cape Town

Economic Analysis

- **Conduct an economic analysis of the key segments of the tuna value chain, comprising fishing, tuna base operations, processing and distribution/ marketing, incorporating:**
  - Ancillary activities integrating value chain analysis upstream and downstream - inputs, equipment port expenditure, crew expenditure and victualling; crew airfares, vessel repairs, … that these activities generate
  - Country revenues generated by tuna vessels and associated activities such as:
    - license and access fees,
    - direct and indirect tax revenues from vessels,
    - processing and other vessel expenditure liable to tax in country.
  - Estimate expenditure to obtain net forex benefits to the country.

Study on Tuna Fisheries Direct and Indirect Contribution to GDP in the SWIOFC Region
25th April 2019. Protea Hotel, Victoria Junction, Cape Town

Regional dashboard.

Dashboard-Historical for 2013 (Seychelles Rupee)

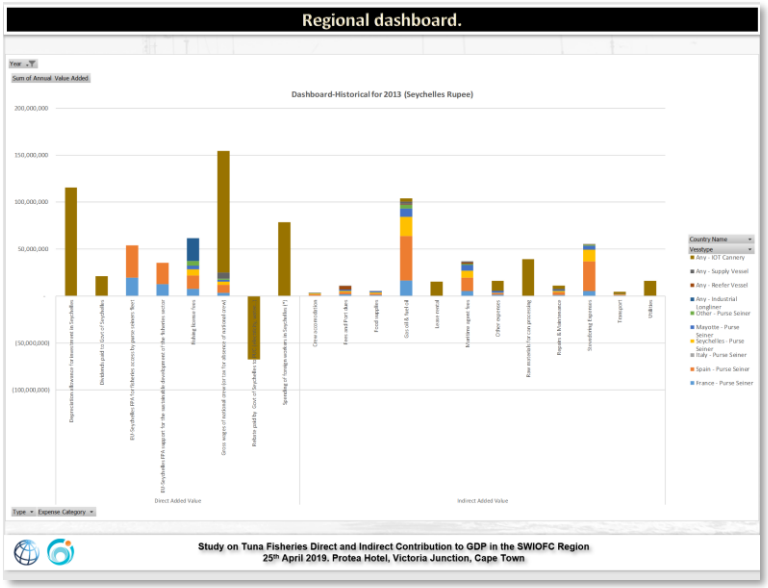
Year: 2013 — In 2013, the Tuna industry sector represented 4.44% of GDP (w/o transfer pricing) and 6.69% of GDP (w/ transfer pricing by IOT estimated as 50.8% of PVA based on 2009 data)

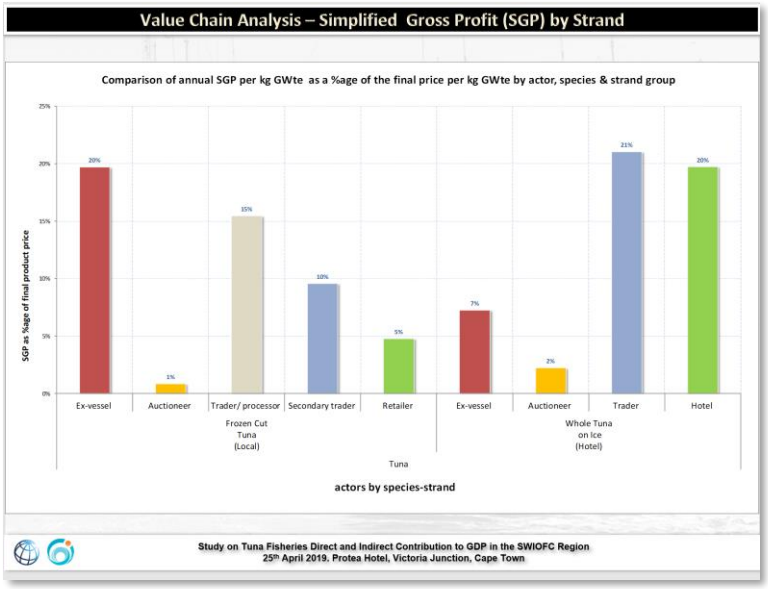
Seychelles Rupee

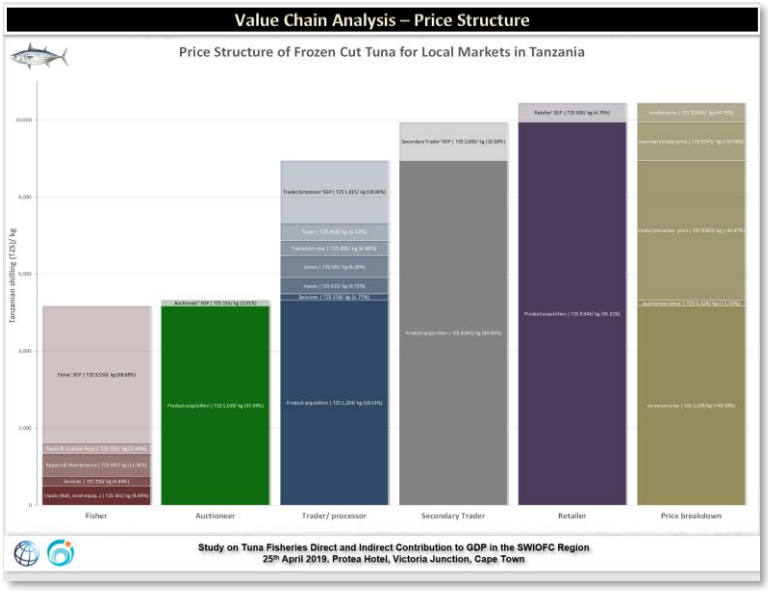
Sum of Annual Value Added

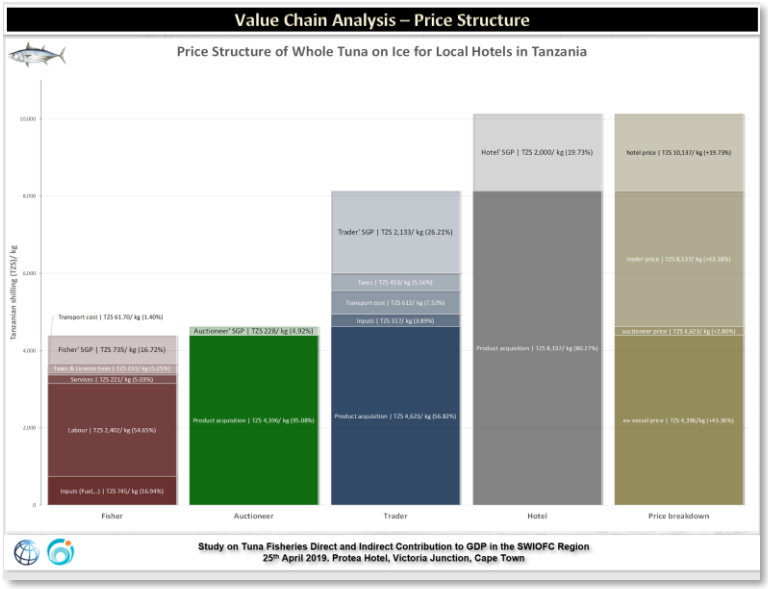
Added value description	Country/ Tuna based Activit - France	Spain	Italy	Seychelles	Mayotte	Other	Any				Subtotal Added Value
	Purse Seiner	Purse Seiner	Purse Seiner	Purse Seiner	Purse Seiner	Purse Seiner	Industrial Longliner	Reefer Vessel	Supply Vessel	IOT Cannery	
Direct Added Value	**43,642,011**	**79,098,573**	-	**10,365,684**	**6,114,010**	**5,763,822**	**24,153,966**	-	**6,732,645**	**277,619,687**	**453,490,397**
Depreciation allowance for investment in Seychelles	-	-	-	-	-	-	-	-	-	115,549,233	115,549,233
Dividends paid to Govt of Seychelles	-	-	-	-	-	-	-	-	-	21,201,036	21,201,036
EU-Seychelles FPA for fisheries access by purse seiners fleet	19,588,563	34,279,985	-	-	-	-	-	-	-	-	53,868,547
EU-Seychelles FPA support for the sustainable development of the fisheries sector	12,865,861	22,515,256	-	-	-	-	-	-	-	-	35,381,117
Fishing license fees	7,777,471	13,971,980	-	6,836,596	3,902,522	4,969,332	24,153,966	-	-	-	61,611,867
Gross wages of national crew (or tax for absence of national crew)	3,410,117	8,331,352	-	3,529,087	2,211,488	794,489	-	-	6,732,645	129,525,936	154,535,114
Rebate paid by Govt of Seychelles to PUC (electricity, water...)	-	-	-	-	-	-	-	-	-	(67,290,403)	(67,290,403)
Spending of foreign workers in Seychelles (*)	-	-	-	-	-	-	-	-	-	78,633,885	78,633,885
Indirect Added Value	**34,123,696**	**103,665,590**	-	**45,583,781**	**24,551,437**	**6,827,508**	**612,779**	**6,660,058**	**5,676,861**	**90,073,389**	**317,775,099**
Crew accomodation	480,995	1,297,120	-	994,612	11,246	110,438	-	81,677	231,413	-	3,207,502
Fees and Port dues	1,861,376	2,156,426	-	1,313,249	1,382,415	82,510	56,389	3,852,022	257,846	-	10,962,232
Food supplies	1,125,115	1,623,736	-	958,089	1,172,139	103,451	-	41,518	229,831	-	5,253,879
Gas oil & fuel oil	16,701,599	47,307,414	-	20,264,143	8,823,432	3,833,390	503,141	668,084	2,405,456	3,413,867	103,920,525
Lease rental	-	-	-	-	-	-	-	-	-	15,479,516	15,479,516
Maritime agent fees	5,281,948	14,377,732	-	7,282,363	5,996,548	1,178,932	37,085	1,575,865	1,316,003	-	37,046,476
Other expenses	1,402,823	1,463,747	-	726,401	1,603,998	123,066	15,362	188,726	151,801	10,323,586	15,999,511
Raw materials for can processing	-	-	-	-	-	-	-	-	-	39,199,554	39,199,554
Repairs & Maintenance	1,219,162	2,987,031	-	1,330,627	794,205	130,324	802	38,659	1,003,957	3,468,028	10,972,795
Stevedoring Expenses	5,397,589	31,443,852	-	12,330,449	4,430,081	1,216,321	-	106,173	34,375	-	54,958,842
Transport	589,333	946,807	-	326,298	292,002	48,331	-	105,394	41,027	2,374,805	4,723,997
Utilities	61,755	61,726	-	57,550	45,370	744	-	1,940	5,151	15,814,032	16,050,269
Subtotal Added Value	**77,765,707**	**182,764,163**	-	**55,949,465**	**30,665,447**	**12,591,330**	**24,766,745**	**6,660,058**	**12,409,505**	**367,693,076**	**771,265,496**

Study on Tuna Fisheries Direct and Indirect Contribution to GDP in the SWIOFC Region
25th April 2019. Protea Hotel, Victoria Junction, Cape Town


Regional dashboard.
Dashboard-Historical for 2013 (Seychelles Rupee)
Study on Tuna Fisheries Direct and Indirect Contribution to GDP in the SWIOFC Region
25th April 2019. Protea Hotel, Victoria Junction, Cape Town


Value Chain Analysis – Simplified Gross Profit (SGP) by Strand
Comparison of annual SGP per kg GWte as a %age of the final price per kg GWte by actor, species & strand group
SGP as %age of final product price
Ex-vessel
Auctioneer
Trader/ processor
Secondary trader
Retailer
Ex-vessel
Auctioneer
Trader
Hotel
Frozen Cut Tuna (Local)
Whole Tuna on Ice (Hotel)
Tuna
actors by species-strand
Study on Tuna Fisheries Direct and Indirect Contribution to GDP in the SWIOFC Region
25th April 2019. Protea Hotel, Victoria Junction, Cape Town


Value Chain Analysis – Price Structure
Price Structure of Frozen Cut Tuna for Local Markets in Tanzania
Tanzanian shilling (TZS)/ kg
Fisher
Auctioneer
Trader/ processor
Secondary Trader
Retailer
Price breakdown
Study on Tuna Fisheries Direct and Indirect Contribution to GDP in the SWIOFC Region
25th April 2019. Protea Hotel, Victoria Junction, Cape Town





As a heads up, following the presentation, the SWIOFC MS were informed that a questionnaire would follow, requesting their contribution to produce some data related to the tuna fishery sector in their country.

10.2.2 Questionnaires sent to the SWIOFC MS Delegates

On May 3rd 2019, an email was sent to all SWIOFC delegates present at the Cape Town workshop; the email's attachments included the project's inception report, the PowerPoint presentation from the Cape Town meeting and a MS Word document requesting information regarding the economic contribution of the tuna fishery sector in their country laid out in bullet points format and organised by thematic.

A first questionnaire was sent on May 3rd 2019 with a cover letter and a 3 page "bullet points" questionnaire

10.2.2.1 First questionnaire sent to the SWIOFC MS delegates

Dr. Philippe Lallemand
Cape Town, South Africa
Phone +27 76 656 0459
Email Philippe.d.Lallemand@gmail.com

For: Information request relevant to the project "Tuna Fisheries Direct And Indirect Contribution To GDP And Wealth Distribution Patterns In The SWIOFC Member Countries"

To: SWIOFC Delegates

Date: May 3rd 2019

Dear delegate,

The World Bank, through IOC, contracted me to undertake a study on Tuna Fisheries direct and indirect contribution to GDP and wealth distribution patterns in the SWIOFC Member countries. This project falls under the South West Indian Ocean Fisheries Governance and Shared Growth Program (SWIOFish1 Regional).

On April 25th 2019, during a meeting in Cape Town organized by WWF and IPNLF, the Regional Coordinator of the SWIOFish1 project invited me on behalf of IOC and SWIOFC to present to the SWIOFC delegates the project and the methodology I intend to use as well as the data needed to conduct this consultancy. I am attaching to this information request an updated version of the PowerPoint I used during my presentation as well as the project's inception report where you will find, among others, more information on the methodology, data need and ToR.

Although a fair amount of data required for this project can be accessed online, I am counting on your cooperation to "fill-in" the gap where possible and gather some of the information related to your country which I identified as potentially proprietary or unobtainable through the normal channels. I will need this information to conduct my analysis which, when completed, will only cover those SWIOFC member states for which I was able to gather enough data. Note that it is very important that your data submission and any feedback you may wish to provide be received by the end of May, date after which any information collected will not be included in the analysis.

I am listing below the data organised by category and I await your precious inputs..

Thank you very much for your cooperation,

Dr. Philippe Lallemand, IOC Consultant

DATA NEEDED FOR YOUR COUNTRY

Please provide the actual data and/ or list all the potential government or institution websites in your country where the following data might be freely accessible online (alternatively provide guest username/ password needed to access relevant URL).

1 National accounts data

a. Gross domestic product by expenditures (GDP)
b. Output (production), gross value added and fixed assets by Manufacturing industry (singling out the fisheries sector if possible)
c. Value added by Manufacturing industry (singling out the fisheries sector if possible)
d. Historical Average Annual Exchange rates (local currency vs. US dollars and Euro)

2 Infrastructure and Employment Data

The value of capital invested should be brought back to an annual depreciation allowance of the corresponding investment.

a. **Infrastructure and productive capital invested in the Tuna industry**
   i. Number, names, capacity to accommodate vessels/ crafts and geographic location of landing areas involved in tuna harvesting
   ii. Number, names and geographic location of companies involved in harvesting tuna including for each:
      - Industrial and Semi-industrial fleet size and location (number of vessels, value, vessel characteristics, fishing method types,..) this includes fishing vessels, reefers, tenders, …
      - Artisanal and small scale fleet size and location (number of crafts, value, craft characteristics, fishing method types,..)
      - Number, value and general location of Fisheries Aggregating Devices used (FADs)
   iii. Number, names, capacity, market destinations and geographic location of companies involved in processing tuna (number of plants and location, ..) Value
   iv. Number and location of cold chambers at landing sites
   v. Number, names and geographic location of points of sale of Tuna caught locally (markets, shops, Hotels, Restaurants, etc…)
   vi. Number and location of containers used in the trade of Tuna (imports for local processing or exports to international retail markets and/ or processors)
   vii. Any other relevant onshore services
   viii. Any interest paid to the government from a Tuna related investment (e.g. bond or loan annual repayment)

b. **Employment data**
   i. Fisheries sector Employment data (number of people and wage paid by technical skill, gender, nationality if possible): differentiate for the tuna sector only if possible otherwise estimated %age tuna sector contribution and lastly if nothing else is available, for all wild marine fisheries combined.
      - harvesting sector (skipper, crew) by company
      - Port/ harbour workers/ staff (agent, admin, security, fuel pump handling)
      - Stevedoring (loading, unloading)
      - Containers handling (related to Tuna)

      - Building, Repairs and maintenance of vessels and infrastructure related to the Tuna sector
      - Tuna processing sector number by plants
      - Trade/ Marketing sector
   ii. Government Fisheries department (state and federal) and Institutional employment data
      - MCS (% allocated to tuna if available)
      - Fisheries management (and % allocated to tuna if available)
      - Fisheries research (and % allocated to tuna if available)
      - Any other relevant departments (development initiatives, …)
      - Academic (Maritime Institute, etc…)

3 Domestic and DWFN Tuna Fishing Vessels Access Fees

a. Domestic fleet access fees
   i. Licence fees paid by the domestic fleet to be able to catch tuna (fee schedule, catch and/ or effort limit if any, vessel size, method, gears, spatial restriction)
   ii. Port/ landing access fees
   iii. Vessel/ craft registration fees (incl. vessel survey, safety and auditing)
b. Fisheries Access Agreement with foreign flag vessels
   i. Direct and indirect Financial revenue derived from the sale of fishing rights to the DWFN fleets
   ii. List all active Sustainable Fisheries Access Agreements (SFPA) with the EU to catch Tuna in your country: agreement's dates valid from and to, values and terms of the agreement and any collateral benefits (financial supports towards infrastructure, fisheries management, research, MCS, …
   iii. List of all other Fisheries Access Agreements (FAA) with a third country
   iv. List any private/ joint venture Tuna fisheries access agreements with 3rd parties.

4 Subsidies to the Tuna sector

This section will be considered as an opportunity cost to generating value from the Tuna industry.

a. Subsidies on Utilities related to the Tuna fishing industry
   i. Electricity rebate
   ii. Water rebate
   iii. Fuel rebate
b. Tax rebate
   i. Property tax rebate
   ii. Revenue tax rebate
   iii. Any other tax rebate

5 Other Indirect Economic Impact of the Tuna Industry

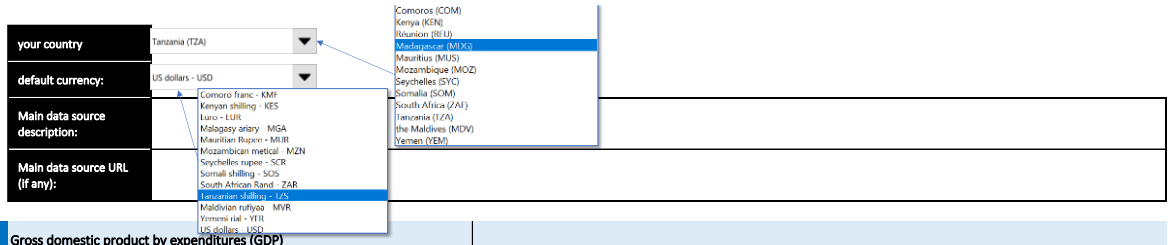
a. Crew accommodation expenditures
b. Incidental Fees and Port dues other than annual fees.
c. Food supplies to crew
d. Gas oil & fuel oil consumption for vessels, plants, cold chambers, ice machines,……
e. Lease rental for buildings/ infrastructure (plants, cold chambers,…)

f. Maritime agent fees
g. Other expenses related indirectly to the Tuna fishing industry
h. Raw materials used for tuna processing (e.g. cans)
i. Repairs & Maintenance expenses for vessels, plants, cold chambers. Ice machines,..
j. Stevedoring Expenses to load/ unload tuna fishing vessels, containers, reefers
k. Transport to and from tuna fishing vessels, reefers, …
l. Utilities (electricity, water, natural gas,…) for vessels (shore-to-ship power: cold-ironing), plants, cold storage, ice machines,..

10.2.3 Second Questionnaire

A second questionnaire was sent on July 23rd 2019 and was this time developed in Microsoft Excel to facilitate the SWIOFC delegates contribution to the data.

10.2.3.1 National Account Statistics



National Account Statistics

Gross domestic product by expenditures (GDP)

Reporting year	Statistic (US dollars - USD)	Currency if different from USD (3 digit ISO code)	source (if different from section default)
2017			

2012
2013
2014
2015
2016
2017
2018
2019

Output (production), Gross value added and fixed assets by manufacturing industry

Reporting year	Statistic (US dollars - USD)	Currency if different from USD (3 digit ISO code)	source (if different from section default)

Gross value added in Fishing and Aquaculture

Reporting year	Statistic (US dollars - USD)	Currency if different from USD (3 digit ISO code)	source (if different from section default)

Historical Average Annual Exchange rates vs. US dollar

Reporting year	Statistic (US dollars - USD)	source (if different from section default)

Historical Average Annual Exchange rates vs. Euro

Reporting year	Statistic (US dollars - USD)	source (if different from section default)

Estimated percentage Tuna sector contribution (if available) to the economy (% GDP)

Reporting year	%age	source (if different from section default)

Contribution of all wild marine fisheries to the economy (%GDP)

Reporting year	%age	source (if different from section default)

Others National account statistics

Reporting year	Statistic (US dollars - USD)	source (if different from section default)

10.2.3.2 Infrastructure and productive capital invested in the Tuna industry

your country	Comoros (COM)
default currency:	Comoro franc - KMF
Main data source description:	
Main data source URL (if any):	

Infrastructure and productive capital invested in the Tuna industry

Number, names, capacity to accommodate vessels/ crafts and geographic location of main landing areas involved in tuna harvesting

Landing area Name	Landing location	Landing type	Capacity to accommodate vessels/crafts
		Total capacity (# of vessels)	0

Number, names and geographic location of the main companies involved in harvesting tuna

			Number of vessels owned/ operated by the company			
Company Name	Geographic location	Main market destinations	Small crafts	semi-industrial	Purse Seiners	Long Liners
		Total # of vessels	0	0	0	0

Industrial tuna harvesting fleet

Vessel type	Fishing method type	Number of vessels	Capacity (tonnes)	Estimated fleet capital value (Comoro franc - KMF)
Total		0	0	0

Semi-industrial tuna harvesting fleet

Vessel type	Fishing method type	Number of vessels	Capacity (tonnes)	Estimated fleet capital value (Comoro franc - KMF)
Total		0	0	0

Artisanal/ small scale tuna harvesting fleet

Vessel type	Fishing method type	Number of vessels	Capacity (tonnes)	Estimated fleet capital value (Comoro franc - KMF)
Total		0	0	0

Number, names, capacity, market destinations and geographic location of the main companies involved in processing tuna

Company Name	Geographic location	Number of plants	Overall plants Capacity (tonnes)	Main Market destinations	Number of vessels owned/ operated
Total		0	0	0	0

Number and location of cold chambers at landing sites

Cold chambers Location	Number of cold chambers	Capacity (cubic meter)
Total	0	0

Infrastructure and productive capital invested in the Tuna industry

Number, names and geographic location of points of sale of Tuna caught locally

Point of sales Name	Type	Location	
		Total	0

Containers used for the Tuna trade

	Annual number of containers by trade flow	
Location	Imports of Tuna	Exports of Tuna
Total	0	0

Annual interest and principal paid to the government from a Tuna related investment

	Amount (Comoro franc - KMF)	
Type	Interests	Principals
Bond		
Loan annual repayment		
Others		
Total	0	0

10.2.3.3 Employment in the Fishing Industry

your country	Comoros (COM)
default currency:	Comoro franc - KMF
Main data source description:	
Main data source URL (if any):	

Employment in the Fishing Industry

Harvesting sector

		Number employed				Average annual wage (Comoro franc - KMF)		
Company Name	Location	Skipper	Crew	Others	Total	Skipper	Crew	Others
					0			
					0			
					0			
					0			
					0			
					0			
					0			
					0			
Total/ average		0	0	0	0	0	0	0

Port/Harbour workers

		Number employed						Average annual wage (Comoro franc - KMF)				
Port Name	Location	Agent	Administrator	Security	Fuel pump handling	Other	Total	Agent	Administrator	Security	Fuel pump handling	Other
							0					
							0					
							0					
							0					
							0					
							0					
							0					
							0					
Total/ average		0	0	0	0	0	0	0	0	0	0	0

Stevedoring country wide (related to Tuna)

Activity	Number employed	Average annual wage (Comoro franc - KMF)
Loading vessels		
Unloading vessels		
Total/ average	0	0

Containers handling country wide (related to Tuna)

Activity	Number employed	Average annual wage (Comoro franc - KMF)
Loading containers		
Unloading containers		
Total/ average	0	0

Buildings, Repairs and Maintenance of vessels and infrastructure related to the Tuna sector

Description	Location	Number employed	Average annual wage (Comoro franc - KMF)
Total		0	0

Tuna processing sector

			Number employed			Average annual wage (Comoro franc - KMF)	
Plant Name	Location	Capacity (tons processed/year)	Male	Female	Total	Male	Female
					0		
					0		
					0		
					0		
					0		
					0		
					0		
					0		
Total			0	0	0	0	0

Trade/ Marketing sector

	Number employed			Annual wage (Comoro franc - KMF/ year)	
Occupation	Male	Female	Total	Male	Female
Sales			0		
Management			0		
Admin			0		
Other			0		
Total	0	0	0	0	0

Employment in the Fishing Industry

Fishing Sector as a whole

sub-sector	Occupation	Number employed			Annual wage (Comoro franc - KMF/ year)	
		Male	Female	Total	Male	Female
artisanal	Crew			0		
	Captains/ skippers			0		
	Others			0		
semi-industrial	Crew			0		
	Captains/ skippers			0		
	Others			0		
industrial	Crew			0		
	Captains/ skippers			0		
	Others			0		
processing	workers			0		
	management/ engineers			0		
	Others			0		
other related activities	workers			0		
	management/ engineers			0		
	Others			0		
	Total	0	0	0	0	0

10.2.3.4 Government Fisheries department (state and federal) and Institutional employment data

your country	Comoros (COM)
default currency:	Comoro franc - KMF
Main data source description:	
Main data source URL (if any):	

Government Fisheries department (state and federal) and institutional employment data

Monitoring Control and Surveillance (MCS) Employment

		County level employment			Federal level employment			
Cost Center/ agency (name, description, location)	Geographic location	Male	Female	Total	Male	Female	Total	% allocated to Tuna
				0			0	
				0			0	
				0			0	
				0			0	
				0			0	
				0			0	
				0			0	
Total		0	0	0	0	0	0	

Fisheries management employment

		County level employment			Federal level employment			
Cost Center/ agency (name, description, location)	Geographic location	Male	Female	Total	Male	Female	Total	% allocated to Tuna
				0			0	
				0			0	
				0			0	
				0			0	
				0			0	
				0			0	
				0			0	
Total		0	0	0	0	0	0	

Other Institutional employment

		County level employment			Federal level employment			
Cost Center/ agency (name, description, location)	Geographic location	Male	Female	Total	Male	Female	Total	% allocated to Tuna
				0			0	
				0			0	
				0			0	
				0			0	
				0			0	
				0			0	
				0			0	
Total		0	0	0	0	0	0	

Fisheries research employment

		County level employment			Federal level employment			
Cost Center/ agency (name, description, location)	Geographic location	Male	Female	Total	Male	Female	Total	% allocated to Tuna
				0			0	
				0			0	
				0			0	
				0			0	
				0			0	
				0			0	
				0			0	
Total		0	0	0	0	0	0	

Any other relevant departments (development initiatives, outreach, ...)

		County level employment			Federal level employment			
Cost Center/ agency (name, description, location)	Geographic location	Male	Female	Total	Male	Female	Total	% allocated to Tuna
				0			0	
				0			0	
				0			0	
				0			0	
				0			0	
				0			0	
				0			0	
Total		0	0	0	0	0	0	

Academic (Maritime Institute, etc...)

		employment			
Institution Name	Geographic location	Male	Female	Total	% allocated to Tuna
				0	
				0	
				0	
				0	
				0	
				0	
				0	
Total		0	0	0	

10.2.3.5 Domestic and DWFN Tuna Fishing Vessels Access Fees

your country	Comoros (COM)
default currency:	Comoro franc - KMF
Main data source description:	
Main data source URL (if any):	

Domestic and DWFN Tuna Fishing Vessels Access Fees

Domestic fleet access fees to tuna fishing: licence fees

Fishing method/ vessel type	restriction (catch, effort, vessel size, area, seasonal, ..)	fee schedule description	licence fee (Comoro franc - KMF)
Purse Seiners			
Long Liners			
Others			
		Total	0

Domestic fleet access fees to tuna fishing: Port/ landing access fees

Location/ name	Vessel types affected	fee schedule description	access fee (Comoro franc - KMF)
		Total	0

Domestic fleet access fees to tuna fishing: Vessel/ craft registration fees (incl. vessel survey, safety and auditing)

registration type	service type	registration fee (Comoro franc - KMF)
Industrial fishing vessels for fishing and related activities	Inspections by qualified fish inspectors	
Industrial fishing vessels for fishing and related activities	Safety standards from Maritime Authority	
Semi-industrial fishing vessels for fishing and related activities	Inspections by qualified fish inspectors and safety standards from Maritime Authority	
Artisanal/small scale registered by County	Inspections by qualified fish inspectors and safety standards from Maritime Authority	
Others		
	Total	0

Fisheries Access Agreement (FAA) with foreign flag vessels other than EU flagged vessels autorizing them to catch Tuna in Kenya EEZ

DWFN name	method of fishing covered by the agreement	FAA type (duration, description, restrictions, ..)	Number of vessels covered by the FAA	access fee (Comoro franc - KMF)	Other financial contributions (Comoro franc - KMF)
		Total	0	0	0

Sustainable Fisheries Partnership Agreement (SFPA) with EU flagged vessels

EU country name	method of fishing covered by the SFPA	Number of vessels covered by the SFPA	SFPA access type (duration, description, restrictions, ..)	access fee (Comoro franc - KMF)	Other financial contributions (Comoro franc - KMF)
		Total	0	0	0

Other Fisheries Partnership Agreement (FPA) with third parties (e.g. joint ventures, private-public arrangement,...)

Third party name	method of fishing covered by the FPA	Number of vessels covered by the FPA	FPA access type (duration, description, restrictions, ..)	access fee (Comoro franc - KMF)	Other financial contributions (Comoro franc - KMF)
		Total	0	0	0

10.2.3.6 Subsidies to the Tuna sector

your country	Comoros (COM)
default currency:	Comoro franc - KMF
Main data source description:	
Main data source URL (if any):	

Subsidies to the Tuna sector

Subsidies on Utilities related to the Tuna fishing industry

subsidies type	subsidies (Comoro franc - KMF)
Electricity rebate	
Water rebate	
Fuel rebate	
Other rebate	
Total subsidies on utilities	0

Tax rebate	rebate (Comoro franc - KMF)
Property tax rebate	
Revenue tax rebate	
Any other tax rebate	
Total tax rebate	0

10.2.3.7 Other Indirect Economic Impact of the Tuna Industry

your country	Comoros (COM)
default currency:	Comoro franc - KMF
Main data source description:	
Main data source URL (if any):	

Other Indirect Economic Impact of the Tuna Industry

Crew accommodation expenditures

Item	Annual amount (Comoro franc - KMF)
Private accommodation arranged by the tuna fishing companies	

Incidental Fees and Port dues other than annual fees

Fees/Dues	Annual amount (Comoro franc - KMF)
Port charges for industrial tuna fishing vessels	

Food supplies to crew

Food Item	Annual amount (Comoro franc - KMF)
Purchased from the market	

Gas oil & fuel oil consumption for vessels, plants, cold chambers, ice machines, ...

Cost center	Annual gas oil consumption (Litres)	Annual gas amount (Comoro franc - KMF)	Annual fuel oil consumption (Litres)	Annual fuel oil Amount (Comoro franc - KMF)
Vessels			-	
Plants				
Cold chambers				
Ice machines				
Others				
Total	0	0	0	0

Lease rental for buildings/ infrastructure (plants, cold chambers,...)

Cost center	Lease rental Amount (Comoro franc - KMF)
Plants	
Cold chambers	
Others	
Total	0

Maritime agent fees

Agent	Fee Amount (Comoro franc - KMF)
Total	0

Other expenses related indirectly to the Tuna fishing industry

Cost center	Cost (Comoro franc - KMF)
Total	0

Raw materials used for tuna processing (e.g. cans)

Cost center	Cost (Comoro franc - KMF)
Total	0

Repairs & Maintenance expenses for vessels, plants, cold chambers. Ice machines,..

Item (Repairs)	Cost (Comoro franc - KMF)
Vessels – there are specialized firms offering this in the market	
Plants - there are specialized firms offering this in the market	
Cold chambers - there are specialized firms offering this in the market	
Ice machines - there are specialized firms offering this in the market	
Other	
Total	0

Other Indirect Economic Impact of the Tuna Industry

Stevedoring Expenses to load/ unload tuna fishing vessels, containers, reefers

Cost center	Loading expenses (Comoro franc - KMF)	Unloading expenses (Comoro franc - KMF)
Vessel		
Container		
Reefer		
Other		
Total	0	0

Transport to and from tuna fishing vessels, reefers, ...

Cost center	Transport cost TO (Comoro franc - KMF)	Transport cost FROM (Comoro franc - KMF)
Vessel		
Reefer		
Other		
Total	0	0

Utilities (electricity, water, natural gas,...) for vessels (shore-to-ship power: cold-ironing), plants, cold storage, ice machines,..

Cost center	Electricity cost (Comoro franc - KMF)	Water cost (Comoro franc - KMF)	Natural gas cost (Comoro franc - KMF)
Vessel			
Plants			
Cold storage			
Ice machines			
Other			
Total	0	0	0

10.3 Example of an input-output matrix that could be used to estimate the contribution of tuna fisheries to a country's GDP.

This method of a three-industry sector follows Cai, Huang, & Leung (2019) and was adapted to suits the tuna fishing industry (i.e. we omitted to include Aquaculture in the table). The 3 sectors of relevance are harvesting, processing and marketing. This matrix (recreated in MS Excel) could easily be applied to the tuna industry granted the data were available.

Table 10-2: Example of input-output matrix summarizing the contribution of fisheries to GDP: the case of the three-industry sectors (harvesting, processing and marketing) based on Cai, Huang, & Leung (2019)

Row No.	column No.	1	2	3	4	5	6
	Industry	**Fish harvesting + backward linkage**	**Fish processing + backward linkage**	**Fish marketing + backward linkage**	**three-industry sector: "fishing harvesting + fish processing + fish marketing" Basic (fish harvesting + fish processing + fish marketing + backward linkage)**	**Basic + linkage to fishing boat**	**Extended fisheries sector**
	Value (million USD)						
1	**Direct GVA**	**300.00**	**170.00**	**360.00**	**830.00**	**830.00**	
2	Fish harvesting	300.00			300.00	300.00	
3	Fish processing		170.00		170.00	170.00	
4	Fish marketing			360.00	360.00	360.00	
5	**Indirect GVA**	**67.35**	**283.14**	**155.68**	**379.69**	**456.03**	**880.00**
6	Fish harvesting		124.31	0.13			300.00
7	Building of fishing boats	-	-	-	-	34.97	50.00
8	Fish processing	0.06		0.11			170.00
9	Fish marketing	1.31	20.09				360.00
10	Rest of the economy	65.98	138.74	155.44	379.69	421.06	
11	**Total (direct and indirect) GVA**	**367.35**	**453.14**	**515.68**	**1,209.69**	**1,286.03**	**880.00**
	Percentage of GDP (%)						
12	**Direct contribution**	**0.60%**	**0.34%**	**0.72%**	**1.66%**	**1.66%**	
13	Fish harvesting	0.60%			0.60%	0.60%	
14	Fish processing		0.34%		0.34%	0.34%	
15	Fish marketing			0.72%	0.72%	0.72%	
16	**Indirect contribution**	**0.13%**	**0.57%**	**0.31%**	**0.76%**	**0.91%**	**1.76%**
17	Fish harvesting		0.25%	0.00%			0.60%
18	Building of fishing boats	0.00%	0.00%	0.00%	0.00%	0.07%	0.10%
19	Fish processing	0.00%		0.00%			0.34%
20	Fish marketing	0.00%	0.04%				0.72%
21	Rest of the economy	0.13%	0.28%	0.31%	0.76%	0.84%	
22	**Total (direct and indirect) contribution**	**0.73%**	**0.91%**	**1.03%**	**2.42%**	**2.57%**	**1.76%**
	GVA ratio (equal to GVA divided by output)						
23	**Output**	**400.00**	**700.00**	**600.00**	**2,200.00**		
24	**Total direct and indirect GVA ratio**	**91.8%**	**64.7%**	**85.9%**	**55.0%**		
25	Direct GVA ratio	75.0%	24.3%	60.0%	37.7%		
26	Indirect GVA ratio	16.8%	40.4%	25.9%	17.3%		
	GVA multiplier (equal to indirect GVA divided by direct GVA)						
28	**GVA multiplier**	**22.5%**	**166.6%**	**43.2%**	**45.7%**	**54.9%**	

Note: Assuming a Gross Domestic Product of US$ 5 bn

10.4 The Seychelles Economic Dashboard

This tool was developed in 2016 for the Fisheries Economics Intelligence Unit (FEIU) in Seychelles. The FEIU tool "FEIU.xlsm" was programmed in Microsoft Excel 2013 and make extensive use of VBA Macros. The VBA macros generate the custom menus and submenus, some features of the dashboards and ensure that the FEIU tool is correctly linked to a MS Access database where the raw data are stored (Lallemand, 2015).

10.4.1 Primary Added Values calculation

The FEIU tool's dashboards (see Table 10-3) uses the same economic model that was developed by the World Bank (2011) which is based on the 'effects method'. This method allows for a valuation of the impact of the tuna industry on the entire economy in terms of the direct economic effects (Direct Value-Added – DVA) and indirect economic effects (Indirect Value-Added – IVA) of the tuna fisheries and related activities.

Value-added was mostly calculated by the difference between sales (turnover) and the intermediary consumption. The value-added generated by the tuna fleet licenced to fish in the Seychelles EEZ was also appraised in terms of the access rights that is, licence fees, plus fishing agreement revenues for the European Union (EU) fleet operating under the Sustainable Fisheries Partnership Agreements (SFPA).

DVA refers to value-added generated by all tuna fishing and processing activities taking place in Seychelles.

IVA refers to value-added generated by all the ancillary activities related to fishing and processing activities taking place in Seychelles. The IVA generated by the local suppliers and captured by the model is the IVA of first iteration.

By summing the DVA and the IVA of first iteration, the model can provide an estimate of the Primary Value-Added (PVA) generated by the tuna fisheries sector, and hence a contribution of the entire sector to the Seychelles economy.

The economic model also allows for an estimate of the sharing of PVA between Employees (workers), Companies and State.

The newly-developed FEIU tool used the same approach as the one used by the World Bank in 2011 to derived DVA, IVA and PVA.

Table 10-3 2013 Primary Added value calculation for the Seychelles industrial Tuna industry

Dashboard-Historical for 2013 (Seychelles Rupee)

In 2013, the Tuna industry sector represented 4.46% of GDP (w/o transfer pricing) and 6.69% of GDP (w/ transfer pricing by IOT estimated as 50.8% of PVA based on 2009 data)

Year: 2013

Seychelles Rupee

Sum of Annual Value Added

Added value description	Country/ Tuna based Activity	France	Spain	Italy	Seychelles	Mayotte	Other	Any				Primary Added Value
		Purse Seiner	Purse Seiner	Purse Seiner	Purse Seiner	Purse Seiner	Purse Seiner	Industrial Longliner	Reefer Vessel	Supply Vessel	IOT Cannery	
⊟ Direct Added Value		43,642,011	78,737,167	-	10,365,684	6,114,010	5,763,822	24,153,966	-	6,732,645	290,805,382	466,314,686
Depreciation allowance for investment in Seychelles		-	-	-	-	-	-	-	-	-	115,545,646	115,545,646
Dividends paid to Govt of Seychelles		-	-	-	-	-	-	-	-	-	21,201,036	21,201,036
EU-Seychelles FPA for fisheries access by purse seiners fleet		19,588,563	34,279,985	-	-	-	-	-	-	-	-	53,868,547
EU-Seychelles FPA support for the sustainable development of the fisheries sector		12,865,861	22,515,256	-	-	-	-	-	-	-	-	35,381,117
Fishing license fees		7,777,471	13,610,574	-	6,836,596	3,902,522	4,969,332	24,153,966	-	-	-	61,250,461
Gross wages of national crew (or tax for absence of national crew)		3,410,117	8,331,352	-	3,529,087	2,211,488	794,489	-	-	6,732,645	129,525,936	154,535,114
Rebate paid by Govt of Seychelles to PUC (electricity, water...)		-	-	-	-	-	-	-	-	-	(54,101,122)	(54,101,122)
Spending of foreign workers in Seychelles (*)		-	-	-	-	-	-	-	-	-	78,633,885	78,633,885
⊟ Indirect Added Value		32,924,917	101,553,458	-	43,815,121	23,291,112	6,693,774	590,223	5,014,296	4,777,913	90,073,389	308,734,201
Crew accomodation		33,670	90,798	-	69,623	12,114	7,731	-	5,717	16,199	-	235,852
Fees and Port dues		1,116,826	1,293,855	-	787,949	829,449	49,506	33,833	2,311,213	154,708	-	6,577,339
Food supplies		1,125,115	1,623,736	-	684,350	468,856	103,451	-	41,518	402,204	-	4,449,229
Gas oil & fuel oil		16,701,599	47,307,414	-	20,264,143	8,823,432	3,833,390	503,141	668,084	2,405,456	3,413,867	103,920,525
Lease rental		-	-	-	-	-	-	-	-	-	15,479,516	15,479,516
Maritime agent fees		5,281,948	14,377,732	-	7,282,363	5,996,548	1,178,932	37,085	1,575,865	1,316,003	-	37,046,476
Other expenses		1,395,920	1,420,507	-	681,769	1,599,054	222,786	15,362	188,726	151,801	10,323,586	15,999,511
Raw materials for can processing		-	-	-	-	-	-	-	-	-	39,199,554	39,199,554
Repairs & Maintenance		1,219,162	2,987,031	-	1,330,627	794,205	32,581	802	9,665	250,989	3,468,028	10,093,090
Stevedoring Expenses		5,397,589	31,443,852	-	12,330,449	4,430,081	1,216,321	-	106,173	34,375	-	54,958,842
Transport		589,333	946,807	-	326,298	292,002	48,331	-	105,394	41,027	2,374,805	4,723,997
Utilities		63,755	61,726	-	57,550	45,370	744	-	1,940	5,151	15,814,032	16,050,269
	Primary Added Value	76,566,928	180,290,625	-	54,180,804	29,405,122	12,457,595	24,744,189	5,014,296	11,510,558	380,878,770	775,048,887

Table 10-4 2017 Primary Added value calculation for the Seychelles industrial Tuna industry

Dashboard-Historical for 2017 (Seychelles Rupee)

Year 2017

Seychelles Rupee

In 2017, the Tuna industry sector represented 4.30% of GDP (w/o transfer pricing) and 6.48% of GDP (w/ transfer pricing by IOT estimated as 50.8% of PVA based on 2009 data)

Sum of Annual Value Added

Added value description	Country/ Tuna based Activity	France	Spain	Italy	Seychelles	Mayotte	Other	Any				Subtotal Added Value
		Purse Seiner	Purse Seiner	Purse Seiner	Purse Seiner	Purse Seiner	Purse Seiner	Industrial Longliner	Reefer Vessel	Supply Vessel	IOT Cannery	
Direct Added Value		**37,984,879**	**106,610,627**	**4,144,353**	**10,365,684**	**4,650,762**	**20,121,335**	**4,866,844**	-	**31,980,062**	**277,619,687**	**498,344,233**
Depreciation allowance for investment in Seychelles		-	-	-	-	-	-	-	-	-	115,549,233	115,549,233
Dividends paid to Govt of Seychelles		-	-	-	-	-	-	-	-	-	21,201,036	21,201,036
EU-Seychelles FPA for fisheries access by purse seiners fleet		17,139,992	46,522,836	2,448,570	-	-	-	-	-	-	-	66,111,399
EU-Seychelles FPA support for the sustainable development of the fisheries sector		11,257,628	30,556,419	1,608,233	-	-	-	-	-	-	-	43,422,280
Fishing license fees		6,805,287	18,961,973	-	6,836,596	3,122,018	17,392,663	4,866,844	-	-	-	57,985,380
Gross wages of national crew (or tax for absence of national crew)		2,781,971	10,569,399	87,550	3,529,087	1,528,745	2,728,673	-	-	31,980,062	129,525,936	182,731,423
Rebate paid by Govt of Seychelles to PUC (electricity, water...)		-	-	-	-	-	-	-	-	-	(67,290,403)	(67,290,403)
Spending of foreign workers in Seychelles (*)		-	-	-	-	-	-	-	-	-	78,633,885	78,633,885
Indirect Added Value		**29,858,234**	**140,689,015**	**115,981**	**45,583,781**	**19,641,149**	**23,896,279**	**123,470**	**6,309,529**	**26,965,088**	**90,073,389**	**383,255,916**
Crew accomodation		420,870	1,760,376	-	994,612	8,997	386,535	-	77,379	1,099,213	-	4,747,982
Fees and Port dues		1,628,704	2,926,578	-	1,313,249	1,105,932	288,783	11,362	3,649,284	1,224,768	-	12,148,660
Food supplies		984,476	2,203,641	115,981	958,089	937,711	362,079	-	39,332	1,091,695	-	6,693,006
Gas oil & fuel oil		14,613,899	64,202,919	-	20,264,143	7,058,745	13,416,864	101,379	632,922	11,425,916	3,413,867	135,130,654
Lease rental		-	-	-	-	-	-	-	-	-	15,479,516	15,479,516
Maritime agent fees		4,621,705	19,512,636	-	7,282,363	4,797,238	4,126,263	7,472	1,492,925	6,251,013	-	48,091,616
Other expenses		1,227,470	1,986,514	-	726,401	1,283,199	430,732	3,095	178,793	721,056	10,323,586	16,880,847
Raw materials for can processing		-	-	-	-	-	-	-	-	-	39,199,554	39,199,554
Repairs & Maintenance		1,066,766	4,053,828	-	1,330,627	635,364	456,133	162	36,624	4,768,798	3,468,028	15,816,330
Stevedoring Expenses		4,722,891	42,673,799	-	12,330,449	3,544,065	4,257,125	-	100,585	163,283	-	67,792,197
Transport		515,666	1,284,952	-	326,298	233,602	169,160	-	99,847	194,879	2,374,805	5,199,208
Utilities		55,786	83,771	-	57,550	36,296	2,604	-	1,838	24,468	15,814,032	16,076,345
	Subtotal Added Value	**67,843,112**	**247,299,642**	**4,260,334**	**55,949,465**	**24,291,912**	**44,017,614**	**4,990,314**	**6,309,529**	**58,945,150**	**367,693,076**	**881,600,149**

10.4.2 Key Indicators and trends relevant to the Tuna industry

Pivot tables and pivot charts were used to produce summaries of the various indicators and trends relevant to the Tuna fishing industry as suggested by the World Bank (2011) and Breuil (2014). The pivot tables and charts are dynamically link to the FEIU database reflecting the latest information available. For most pivot tables there is a corresponding pivot chart.

Following Breuil (2014), the following categories of indicators relevant to the tuna fishing activity were produced in the FEIU tool:

1. Technical and environmental indicators on tuna fishing activity,
    a. Quantity/composition of tuna caught in the IO area (see Table 10-5 and Table 10-6)
    b. Quantity/composition of tuna caught in the Seychelles EEZ (see Table 10-7 and Table 10-8)
    c. Fishing effort of tuna fleet in Seychelles EEZ in number of fishing days and number of hooks (see Table 10-9)
    d. Status of the tuna fish stocks for the tuna main species (yellowfin, skipjack, big-eye, albacore) (see Table 10-10)
    e. Catch and catch's representativeness for each big pelagic species' group (Indian Ocean catches / global catches (FAO), Seychelles EEZ catches/ Indian Ocean catches) (see Table 10-6 and Table 10-8)
2. Technical and commercial indicators in Port Victoria,
    a. Tuna port activity indicators
        i. Quantity/composition of tuna landed and transhipped in Port Victoria (see Table 10-11)
        ii. Number of port calls of tuna boats (see Table 10-12)
        iii. Tuna flow by port call (see Table 10-12)
        iv. Vessel expenses including consumption of gasoil and fuel oil and port fees (Error! Reference source not found. to Table 10-13)
        v. Quantity (corresponded volume) of containers imported and exported by IOT see Table 10-14)
    b. Tuna processing activity indicators
        i. Quantity/composition/value of raw material contracted with PS and imported (see Table 10-15)
        ii. Quantity/value of canned tuna (see Table 10-16)
        iii. Quantity/value of fishmeal (see Table 10-16)
        iv. Quantity/value of fish oil (see Table 10-16)
        v. Quantity/value of tuna loin (see Table 10-16)
        vi. Export market (share of EU) (see Table 10-17)
    c. Indicators to measure the local cannery competitiveness
        i. Seychelles tuna cans exports volume (tons), value (000 €) and price (€/ kg) (see Table 10-18)
        ii. EU tuna cans imports volume (tons), value (000 €) and price (€/ kg)[14]
        iii. EU tuna cans imports from Seychelles, volume (tons), value (000 €) and price (€/ kg))[15]
        iv. Seychelles volume representativeness[16]
3. Economic indicators,
    a. Estimated PVA (see Error! Reference source not found.)
    b. Budget revenue (see Error! Reference source not found., Error! Reference source not found., Error! Reference source not found., Error! Reference source not found.)
    c. Employment[17]

[14] There was no data available on EU Tuna cans global imports in this version of the FEIU database (this will hopefully be resolved in the present analysis for each SWIOFC MS using data from FAO FistatJ, ITC and UN Comtrade)

[15] There was no data available on EU Tuna cans imports from Seychelles in this version of the FEIU database (this will hopefully be resolved in the present analysis for each SWIOFC MS using data from FAO FistatJ, ITC and UN Comtrade)

[16] There was no data available on Seychelles volume representativeness (share of Tuna cans imported from Seychelles) in this version of the FEIU database (this will hopefully be resolved in the present analysis for each SWIOFC MS using data from FAO FistatJ, ITC and UN Comtrade)

[17] There is no data available on employment in the Seychelles tuna fishing industry in the current version of the FEIU database (at the time of writing), although the table exists, it is empty.

d. International fish trade[18]
e. Share of tuna fishing and related activities in port's activity (turnover, taxes) (see **Error! Reference source not found.**)

10.4.3 Technical and environmental indicators on tuna fishing activity

Table 10-5 Tuna caught (Mt) in the IOTC area by vessel type and country between 2009 and 2013

Catch (Mt)	Country																
Fishery type	France	Spain	Seychelles	Taiwan	China	Australia	Korea, South	Japan	Thailand	Reunion	Portugal	Not Elsewhere included	South Africa	Oman	Maldives	Mauritius	India	Grand Total
2009	**139,020**	**115,252**	**76,574**	**58,512**	**4,506**	**7,600**		**5,562**	**11,084**	**2,170**	**1,131**	**6,068**	**843**	**1,874**		**108**	**8**	**430,313**
Industrial Longliner		3,306	8,234	58,512	4,506	443				2,170	1,131		843	1,874		108	8	81,136
Purse Seiner	139,020	111,946	68,339			7,158		5,562	11,084			6,068						349,177
2010	**130,910**	**133,631**	**82,155**	**60,463**	**8,068**	**5,088**	**1,331**	**2,055**		**2,253**	**2,098**					**336**	**9**	**428,397**
Industrial Longliner		3,116	6,368	60,463	8,068	456	1,331			2,253	2,098					336	9	84,499
Purse Seiner	130,910	130,514	75,787			4,632		2,055										343,898
2011	**139,008**	**133,538**	**70,974**	**60,545**	**2,207**	**4,569**	**1,512**	**3,157**	**372**	**2,515**	**1,989**		**1,501**			**89**	**8**	**421,985**
Industrial Longliner		3,191	7,762	60,545	2,207	260	1,512		372	2,515	1,989		1,501			89	8	81,953
Purse Seiner	139,008	130,347	63,211			4,309		3,157										340,032
2012	**132,313**	**113,001**	**63,317**	**72,428**	**5,321**	**4,907**	**2,710**	**2,205**	**468**	**1,892**	**1,531**		**1,246**		**33**	**36**	**8**	**401,416**
Industrial Longliner		4,396	12,379	72,428	5,321	415			468	1,892	1,531		1,246		33	36	8	100,153
Purse Seiner	132,313	108,605	50,938			4,492	2,710	2,205										301,263
2013	**131,479**	**146,982**	**68,097**	**59,737**	**7,538**	**4,562**	**12,246**	**1,153**	**342**	**1,822**	**2,349**		**1,081**		**1,199**	**68**		**438,654**
Industrial Longliner			10,773	59,737	7,538	352			342	1,822	2,349		1,081		1,199	68		85,260
Purse Seiner	131,479	146,982	57,324			4,211	12,246	1,153										353,394

[18] There is no table referring to international trade in the current version of the FEIU database

Source: IOTC

Table 10-6 Tuna caught (Mt) in the IOTC area by species, vessel type and country between 2009 and 2013

Catch (Mt) / Fishery type	Australia	China	France	India	Japan	Korea, South	Maldives	Mauritius	Not Elsewhere included	Oman	Portugal	Reunion	Seychelles	South Africa	Spain	Taiwan	Thailand	IOTC Area of Competence	Grand Total
2009	**5,264**	**3,503**	**139,020**	**3**	**5,562**			**1**	**6,068**	**903**	**42**	**1,156**	**73,405**	**315**	**111,946**	**34,717**	**10,966**	**392,872**	**785,743**
Albacore																			
Industrial Longliner	20	389						0			2	524	318	24		4,477		5,754	11,507
Purse Seiner			590						35				10		52			687	1,374
Bigeye tuna																			
Industrial Longliner	61	2,661		0				1				350	4,108	195		24,697		32,074	64,147
Purse Seiner			13,821		1,571				615				6,821		11,781		2,310	36,920	73,840
Frigate and bullet tunas																			
Purse Seiner													22		31			52	104
Skipjack tuna																			
Industrial Longliner	0			0							0					1		1	3
Purse Seiner	855		69,850		3,434				3,643				40,156		66,570		7,532	192,041	384,082
Southern bluefin tuna																			
Industrial Longliner													111	17		547		675	1,351
Purse Seiner	4,316																	4,316	8,632
Yellowfin tuna																			
Industrial Longliner	12	453		3				0		903	40	282	528	79		4,995		7,295	14,590
Purse Seiner			54,759		557				1,775				21,330		33,511		1,124	113,056	226,112
2010	**3,766**	**6,642**	**130,910**	**3**	**2,055**	**1,271**		**24**			**126**	**954**	**80,264**		**130,514**	**38,289**		**394,819**	**789,638**
Albacore																			
Industrial Longliner	19	4,749				295		8			18	389	624			13,049		19,151	38,303
Purse Seiner			126										14		130			271	541
Bigeye tuna																			
Industrial Longliner	65	1,397				132		5			22	312	3,288			14,591		19,813	39,626
Purse Seiner			10,064		606								6,616		10,022			27,308	54,616
Frigate and bullet tunas																			
Purse Seiner			23										12		23			58	116
Skipjack tuna																			
Industrial Longliner	0			0		1					2					13		16	32
Purse Seiner			59,035		1,102								43,830		75,131			179,097	358,195
Southern bluefin tuna																			
Industrial Longliner						457							0			860		1,317	2,634
Purse Seiner	3,660																	3,660	7,321
Yellowfin tuna																			
Industrial Longliner	22	496		3		386		11			84	253	566			9,775		11,595	23,190
Purse Seiner			61,663		347								25,314		45,209			132,532	265,065
2011	**3,979**	**1,844**	**139,008**	**2**	**3,157**	**1,363**		**36**			**110**	**1,031**	**69,035**	**458**	**130,347**	**37,764**	**351**	**388,485**	**776,970**
Albacore																			
Industrial Longliner	6	1,413				430		8			9	301	491	39		10,536	11	13,245	26,490
Purse Seiner			1,151										29		121			1,300	2,600
Bigeye tuna																			
Industrial Longliner	50	239		0		183		11			79	386	4,104	218		17,257	248	22,775	45,549
Purse Seiner			11,332		1,130								5,005		10,702			28,169	56,338
Frigate and bullet tunas																			
Purse Seiner													13		22			35	69
Skipjack tuna																			
Industrial Longliner	0			0		1					1			0		11		13	26
Purse Seiner			57,618		1,675								32,990		67,247			159,529	319,059
Southern bluefin tuna																			
Industrial Longliner						584								14		438		1,036	2,071
Purse Seiner	3,909																	3,909	7,818
Yellowfin tuna																			
Industrial Longliner	14	191		2		165		16			21	344	1,229	187		9,523	92	11,784	23,569
Purse Seiner			68,908		352								25,174		52,256			146,690	293,381
2012	**4,695**	**4,777**	**132,313**	**4**	**2,205**	**2,710**	**28**	**14**			**44**	**852**	**60,502**	**537**	**108,605**	**51,422**	**425**	**369,134**	**738,268**
Albacore																			
Industrial Longliner	13	1,835					0	6			14	311	31	28		7,545	3	9,785	19,570
Purse Seiner			1,542										148		378			2,067	4,135
Bigeye tuna																			
Industrial Longliner	167	2,405		0			23	3			21	312	8,508	262		33,551	341	45,593	91,187
Purse Seiner			10,230		536	260							3,928		7,589			22,542	45,084
Frigate and bullet tunas																			
Purse Seiner													1		1			2	5
Skipjack tuna																			
Industrial Longliner	0			2												10		12	25
Purse Seiner	0		34,239		1,437	1,261							19,641		42,892			99,471	198,941
Southern bluefin tuna																			
Industrial Longliner														46		470		515	1,031
Purse Seiner	4,492																	4,492	8,983
Yellowfin tuna																			
Industrial Longliner	23	538		2			5	6			8	229	1,025	202		9,846	81	11,965	23,930
Purse Seiner			86,303		232	1,189							27,220		57,745			172,689	345,377
2013	**4,356**	**6,243**	**131,479**		**1,153**	**12,246**	**983**	**35**			**114**	**872**	**64,429**	**376**	**146,982**	**33,184**	**283**	**402,735**	**805,470**
Albacore																			
Industrial Longliner	15	1,011					3	6			9	315	249	26		5,806	2	7,443	14,886
Purse Seiner			662										49		117			828	1,656
Bigeye tuna																			
Industrial Longliner	90	4,310					864	17			74	313	5,684	162		19,074	224	30,815	61,629
Purse Seiner			14,029		197	1,205							5,045		13,880			34,355	68,711
Frigate and bullet tunas																			
Purse Seiner													2					2	4
Skipjack tuna																			
Industrial Longliner	0						0									22		23	46
Purse Seiner	1		43,764		861	8,605							25,997		64,632			143,860	287,721
Southern bluefin tuna																			
Industrial Longliner	0													12		986		998	1,997
Purse Seiner	4,210																	4,210	8,420
Yellowfin tuna																			
Industrial Longliner	40	922					116	11			31	243	1,172	176		7,295	56	10,062	20,124
Purse Seiner			73,023		95	2,437							26,231		68,352			170,139	340,277

Source: IOTC

Table 10-7 Tuna caught (Mt) in the Seychelles EEZ by species, vessel type and country between 2009 and 2013

Catch (Mt) / Fishery type	Seychelles	Spain	France	Mayotte	Taiwan	Korea, South	Thailand	Italy	China	Japan	Philippines	Oman	Mauritius	Tanzania, United Republic of	Belize	Grand Total
2009	**339,531**	**12,482**	**10,466**	**2,567**	**841**	**13**	**967**	**943**	**144**	**688**	**3**	**24**				**368,667**
Industrial Longliner	794				841	13			144	688	3	24				2,506
Purse Seiner	9,722	12,482	10,466	2,567			967	943								37,146
Semi Industrial Longliner	329,015															329,015
2010	**306,071**	**28,227**	**13,442**	**5,205**	**1,642**		**-**					**66**			**29**	**354,683**
Industrial Longliner	629				1,642							66			29	2,367
Purse Seiner	10,592	28,227	13,442	5,205			-									57,465
Semi Industrial Longliner	294,850															294,850
2011	**251,540**	**26,804**	**13,274**	**6,086**	**550**						**8**	**32**				**298,295**
Industrial Longliner	748				550						8	32				1,338
Purse Seiner	13,103	26,804	13,274	6,086												59,268
Semi Industrial Longliner	237,689															237,689
2012	**282,936**	**22,635**	**12,621**	**11,578**	**6,542**	**396**			**180**	**134**	**479**	**80**		**52**		**337,633**
Industrial Longliner	1,821				6,542				180	134	479	80		52		9,287
Purse Seiner	10,301	22,635	12,621	11,578		396										57,531
Semi Industrial Longliner	270,814															270,814
2013	**271,533**	**14,554**	**8,119**	**5,994**	**3,559**	**580**			**556**	**21**	**118**	**23**	**207**	**57**		**305,320**
Industrial Longliner	2,725				3,559				556	21	118	23		57		7,059
Purse Seiner	6,647	14,554	8,119	5,994		580							207			36,101
Semi Industrial Longliner	262,160															262,160

Source: IOTC, SFA

Table 10-8 Tuna caught (Mt) in the Seychelles EEZ by species, vessel type and country between 2009 and 2013

Catch (Mt) / Fishery type	Country: Belize	China	France	Italy	Japan	Korea, South	Mauritius	Mayotte	Oman	Philippines	Seychelles	Spain	Taiwan	Tanzania, United Republic of	Thailand	Grand Total
2009		**100**	**10,466**	**943**	**492**	**10**		**2,567**	**18**	**1**	**10,531**	**12,482**	**685**		**967**	**39,262**
Albacore																
Industrial Longliner		2			28					0	8		12			51
Purse Seiner			44	35							1				2	81
Bigeye tuna																
Industrial Longliner		68			231	4			15	0	559		586			1,463
Purse Seiner			1,410	107				281			1,192	1,536			152	4,678
Semi Industrial Longliner											59					59
Frigate and bullet tunas																
Purse Seiner											5	2				7
Skipjack tuna																
Purse Seiner			4,280	415				714			4,603	7,159			620	17,790
Yellowfin tuna																
Industrial Longliner		30			233	5			3	0	115		87			475
Purse Seiner			4,732	386				1,572			3,921	3,785			193	14,589
Semi Industrial Longliner											68					68
2010	**27**		**13,442**					**5,205**	**54**		**11,209**	**28,227**	**1,360**			**59,523**
Albacore																
Industrial Longliner	2								2		24		64			92
Purse Seiner								5				37				42
Semi Industrial Longliner											0					0
Bigeye tuna																
Industrial Longliner	23								46		430		1,013			1,512
Purse Seiner			973					433			876	2,314				4,596
Semi Industrial Longliner											26					26
Frigate and bullet tunas																
Purse Seiner			2									13				15
Skipjack tuna																
Purse Seiner			4,681					1,782			4,928	14,442				25,833
Tunas nei																
Purse Seiner			3													3
Yellowfin tuna																
Industrial Longliner	2								6		79		283			369
Purse Seiner			7,783					2,984			4,788	11,421				26,976
Semi Industrial Longliner											58					58
2011			**13,274**					**6,086**	**24**	**6**	**13,791**	**26,804**	**455**			**60,441**
Albacore																
Industrial Longliner									1		2		2			5
Purse Seiner			30					13				13				55
Bigeye tuna																
Industrial Longliner									18	5	380		296			698
Purse Seiner			1,190					409			1,069	2,088				4,756
Semi Industrial Longliner											23					23
Frigate and bullet tunas																
Purse Seiner												6				6
Skipjack tuna																
Purse Seiner			4,728					1,923			5,917	11,555				24,122
Yellowfin tuna																
Industrial Longliner									5	2	236		157			400
Purse Seiner			7,327					3,742			6,118	13,142				30,329
Semi Industrial Longliner											46					46
2012		**149**	**12,621**		**115**	**396**		**11,578**	**52**	**382**	**11,928**	**22,635**	**5,028**	**46**		**64,931**
Albacore																
Industrial Longliner		1			0				0	1	4		15			21
Purse Seiner			176					53			13	11				253
Bigeye tuna																
Industrial Longliner		115			97				34	333	1,345		4,033	41		5,997
Purse Seiner			703			31		786			878	1,299				3,697
Semi Industrial Longliner											38					38
Skipjack tuna																
Industrial Longliner											0		0			1
Purse Seiner			2,532			237		2,157			2,703	6,870				14,500
Tunas nei																
Purse Seiner			5													5
Yellowfin tuna																
Industrial Longliner		34			18				19	49	193		979	5		1,296
Purse Seiner			9,205			128		8,582			6,707	14,455				39,076
Semi Industrial Longliner											47					47
2013		**397**	**8,119**		**14**	**580**	**207**	**5,994**	**16**	**89**	**9,081**	**14,554**	**2,716**	**44**		**41,809**
Albacore																
Industrial Longliner		2			0				0		13		13	0		28
Purse Seiner			140					8				13				161
Bigeye tuna																
Industrial Longliner		318			12				8	70	1,970		2,216	36		4,629
Purse Seiner			869			56	20	703			646	1,410				3,704
Semi Industrial Longliner											24					24
Skipjack tuna																
Industrial Longliner										0	0		0			0
Purse Seiner			2,014			318	113	1,701			3,045	6,529				13,719
Tunas nei																
Purse Seiner			35					54								89
Yellowfin tuna																
Industrial Longliner		77			1				8	19	372		487	8		972
Purse Seiner			5,061			205	74	3,528			2,957	6,602				18,427
Semi Industrial Longliner											55					55

Source IOTC, SFA

Table 10-9 Fishing effort of tuna fleet in Seychelles EEZ in number of fishing days and number of hooks

Effort (hooks or days) / Fishery type	Country: Taiwan	Seychelles	China	Japan	Philippines	Oman	Tanzania, United Republic of	Belize	Korea, South	Spain	France	Mayotte	Thailand	Italy	Mauritius	Grand Total
2009																
Industrial Longliner	2,228,089	1,828,619	502,032	1,997,204	10,424	72,000			67,719							6,706,087
Purse Seiner		500								668	666	146	137	76		2,194
Semi Industrial Longliner		481,668														481,668
2010																
Industrial Longliner	3,768,442	1,440,901				132,350		73,600								5,415,293
Purse Seiner		453								949	702	246	1			2,350
Semi Industrial Longliner		506,334														506,334
2011																
Industrial Longliner	1,079,301	1,227,086			18,000	82,850										2,407,237
Purse Seiner		640								1,022	768	366				2,797
Semi Industrial Longliner		287,938														287,938
2012																
Industrial Longliner	11,536,190	2,531,528	460,360	241,525	772,265	142,694	90,000									15,774,562
Purse Seiner		596							26	1,195	810	512				3,138
Semi Industrial Longliner		330,466														330,466
2013																
Industrial Longliner	7,815,734	4,720,859	1,539,570	55,280	239,984	37,440	138,000									14,546,867
Purse Seiner		320							78	808	637	380			25	2,247
Semi Industrial Longliner		398,770														398,770

Source: SFA

Table 10-10 Status of the tuna fish stocks (Mt) on tuna main species (yellowfin, skipjack, big-eye, albacore).

Harvest Control Value / Species / Lower limit / Upper Limi / Fishery type	Albacore	Bigeye tuna	Black marlin	Blue marlin	Skipjack tuna	Striped marlin	Yellowfin tuna	Grand Total
	31100	98500	6278	8023	359000	3539	290000	
	35600	207000	11793	12400	598000	4578	453000	
2013	**33,300**	**132,000**	**8,605**	**11,690**	**478,000**	**4,408**	**344,000**	**1,012,003**
Stock Not Overfished								
MSY								
80%CI	33,300			11,690				44,990
95%CI					478,000			478,000
Median of Plausible model		132,000						132,000
Multifan-CL							344,000	344,000
Stock Overfished/ Over-exploited								
MSY								
80%CI						4,408		4,408
Uncertain								
MSY								
80%CI			8,605					8,605

Source: IOTC

10.4.4 Technical and commercial indicators in Port Victoria

10.4.4.1 Tuna port activity indicators

Table 10-11 Quantity/composition of tuna landed and transhipped in Port Victoria (SFA) between 2009 and 2013 (Mt)

Volume (Mt)	Country								
Transfer type	Spain	Seychelles	France	Mayotte	Korea, South	Thailand	Italy	Mauritius	Grand Total
2009	**91,681**	**57,011**	**40,861**	**10,921**		**7,464**	**5,193**		**213,130**
Landing	**21,611**	**16,087**	**12,095**	**4,197**			**2,275**		**56,266**
Albacore	1		168	1			6		176
Bigeye tuna	1,773	1,279	961	313			170		4,496
Skipjack tuna	10,584	9,961	7,322	2,670			1,357		31,893
Tunas nei	1,949	1,441							3,389
Yellowfin tuna	7,305	3,407	3,644	1,214			742		16,312
Transhipment	**70,069**	**40,924**	**28,766**	**6,723**		**7,464**	**2,918**		**156,864**
Albacore	16	8	33				24		80
Bigeye tuna	3,831	401	1,252	291			154		5,928
Skipjack tuna	18,749	1,802	15,563	3,454		2,455	2,007		44,029
Tunas nei	34,892	37,493				5,009			77,394
Yellowfin tuna	12,582	1,220	11,918	2,979			733		29,433
2010	**106,406**	**65,408**	**43,538**	**11,752**					**227,104**
Landing	**22,980**	**22,875**	**15,601**	**4,524**					**65,980**
Albacore	8	1	21	6					36
Bigeye tuna	997	851	982	315					3,145
Skipjack tuna	7,145	5,940	8,585	2,284					23,954
Tunas nei	10,301	13,364							23,666
Yellowfin tuna	4,528	2,718	6,014	1,919					15,179
Transhipment	**83,426**	**42,533**	**27,937**	**7,228**					**161,124**
Albacore	2		3						6
Bigeye tuna	2,073	109	1,289	365					3,836
Skipjack tuna	10,376	947	15,706	4,099					31,128
Tunas nei	61,758	41,136							102,894
Yellowfin tuna	9,217	342	10,938	2,764					23,261
2011	**115,676**	**53,367**	**35,968**	**8,903**					**213,915**
Landing	**32,338**	**15,549**	**10,512**	**3,969**					**62,368**
Albacore	5		109	42					156
Bigeye tuna			456	267					723
Skipjack tuna			6,757	2,349					9,106
Tunas nei	31,983	15,549							47,532
Yellowfin tuna	350		3,189	1,311					4,850
Transhipment	**83,338**	**37,818**	**25,457**	**4,935**					**151,547**
Albacore			50	14					64
Bigeye tuna	26		1,625	227					1,878
Frigate tuna	4								4
Skipjack tuna	399	108	10,666	2,313					13,487
Tunas nei	82,819	37,522							120,341
Yellowfin tuna	91	187	13,114	2,380					15,773
2012	**95,966**	**46,180**	**27,269**	**14,374**	**2,707**				**186,496**
Landing	**31,974**	**15,896**	**9,560**	**6,793**					**64,222**
Albacore			310	57					367
Bigeye tuna			445	526					971
Skipjack tuna			6,022	2,799					8,821
Tunas nei	31,974	15,896							47,869
Yellowfin tuna			2,784	3,411					6,195
Transhipment	**63,993**	**30,284**	**17,708**	**7,581**	**2,707**				**122,273**
Albacore			1	16					18
Bigeye tuna			1,026	608					1,634
Skipjack tuna			4,548	1,743					6,291
Tunas nei	63,993	30,284			2,707				96,984
Yellowfin tuna			12,133	5,213					17,346
2013	**131,467**	**49,288**	**29,705**	**16,463**	**6,109**			**318**	**233,352**
Landing	**30,796**	**19,766**	**11,937**	**7,341**					**69,840**
Albacore			144	28					171
Bigeye tuna	22	73	725	634					1,454
Skipjack tuna	164	311	5,302	2,466					8,242
Tunas nei	30,477	19,049							49,526
Yellowfin tuna	133	332	5,766	4,214					10,446
Transhipment	**100,672**	**29,523**	**17,768**	**9,122**	**6,109**			**318**	**163,512**
Albacore			11	1					12
Bigeye tuna	144		1,091	422				7	1,664
Skipjack tuna	258		7,261	3,365				66	10,950
Tunas nei	99,608	29,523			6,109				135,240
Yellowfin tuna	662		9,405	5,334				245	15,646

Source: SFA

Table 10-12 Number of port calls of tuna boats (Port Authority)

# of Port Calls / Vessel Type	Spain	Seychelles	France	Mayotte	Taiwan	Panama	Netherlands	Thailand	China	Mauritius	Unknown	Korea, South	Italy	Philippines	Iran	Netherlands Antilles	Vanuatu	Belize	Indonesia	Oman	Kiribati	Japan	United Arab Emirates	Bahamas, The	Cambodia	Malta	Tanzania, United Republic of	Grand Total
2009	**141**	**109**	**89**	**19**		**19**	**8**	**25**			**5**		**11**		**2**	**5**		**2**				**1**						**436**
Industrial Longliner	2																					1						3
Purse Seiner	120	78	89	19				23					11		2													342
Reefer Vessel	4					19	8				5							2										38
Supply Vessel	15	31						2								5												53
2010	**156**	**112**	**89**	**25**		**13**	**7**	**4**			**3**																	**409**
Purse Seiner	136	78	89	25				4																				332
Reefer Vessel	5					13	7				3																	28
Supply Vessel	15	34																										49
2011	**159**	**95**	**82**	**18**		**11**	**4**								**2**													**371**
Purse Seiner	136	77	82	18											2													315
Reefer Vessel	6					11	4																					21
Supply Vessel	17	18																										35
2012	**182**	**129**	**61**	**38**	**88**	**10**	**11**	**6**	**6**	**8**	**6**	**1**		**8**	**3**		**3**	**1**	**1**	**2**				**1**			**1**	**566**
Industrial Longliner		23			88				6					8				1	1	2							1	130
Purse Seiner	147	81	61	38							1				3													331
Reefer Vessel	5					10	11	6		8	5	1					3							1				50
Supply Vessel	30	25																										55
2013	**182**	**100**	**77**	**47**	**55**	**10**	**11**		**19**	**13**	**3**	**14**		**2**	**1**		**1**		**2**	**1**	**2**	**1**	**2**	**1**	**1**	**1**		**546**
Industrial Longliner		9			55				19					2					2	1		1						89
Purse Seiner	150	67	77	47						4	1	13			1													360
Reefer Vessel	2					10	11			9	2	1					1				2		2	1	1	1		43
Supply Vessel	30	24																										54

Source: Seychelles Ports Authority (SPA)

Source: SFA and Seychelles Ports Authority (SPA)

Source: SFA and Seychelles Ports Authority (SPA)

Table 10-13 Vessel expenses including consumption of gasoil and fuel oil (bunkering) and port fees in 2013 (SCR)

Expenses type	EEC				National	Others	Grand Total
	Spain	France	Netherlands	Italy	Seychelles		
2013	**790,274,999**	**267,088,789**	**3,994,824**		**349,370,974**	**222,562,009**	**1,633,291,593**
Industrial Longliner							
Agency Charges						37,085	37,085
Bunkering					3,735,897	3,451,828	7,187,725
Medical Expenses						2,163	2,163
Other Expenses						59,286	59,286
Port Charges						56,389	56,389
Shipchandling						3,209	3,209
Purse Seiner							
Agency Charges	14,377,732	5,255,727			7,282,363	7,168,550	34,084,372
Bunkering	675,820,196	238,594,275			289,487,759	180,811,736	1,384,713,966
Custom Fees	50,548	298,934			44,955	316,108	710,544
Engineering Services	6,206,495	39,623			3,302,917	64,989	9,614,023
Fish Purchase		1,812,770				663,120	2,475,890
Fleet Personnel	56,806	1,029,054				830,105	1,915,965
Garbage	771,578	769,426			243,991	489,806	2,274,801
Hotel Accomodation	1,167,041	356,563			727,704	268,328	2,519,637
Marine Brokerage		26,221				6,931	33,151
Medical Expenses	276,711	44,224			152,242	83,677	556,853
OffHourent	130,078	124,431			266,908	15,169	536,586
Other Expenses	4,290,842	3,298,265			2,173,550	5,519,275	15,281,932
Other Labour Cost		15,030				21,901	36,930
Port Charges	2,105,878	1,562,443			1,268,294	1,148,817	6,085,431
Postage & Courier	1,114,474	413,390			401,282	599,303	2,528,450
Shipchandling	5,684,823	3,807,969			2,019,592	2,412,052	13,924,436
Stevedoring Expenses	52,406,420	8,995,982			20,550,748	9,410,671	91,363,822
Telephone	172,961	27,614			178,529	20,984	400,088
Transport	946,807	589,333			326,298	340,334	2,202,771
Utilities		27,515			475,386	86,616	589,517
Reefer Vessel							
Agency Charges			530,792			1,044,218	1,575,010
Bunkering	3,485,377		971,674			5,087,007	9,544,057
Custom Fees			51,301			3,426	54,727
Engineering Services						38,659	38,659
Garbage			5,565			18,680	24,245
Hotel Accomodation			81,677				81,677
Marine Brokerage			707			148	855
Medical Expenses			1,640			6,884	8,524
Other Expenses			727,336			6,329	733,665
Port Charges			1,359,951			2,437,344	3,797,295
Postage & Courier						2,338	2,338
Stevedoring Expenses			176,198			757	176,956
Telephone			8,137			2,241	10,378
Transport			79,845			25,549	105,394
Supply Vessel							
Agency Charges	843,185				472,818		1,316,003
Bunkering	19,252,409				15,111,246		34,363,656
Custom Fees	2,137				6,324		8,461
Engineering Services	208,952				131,076		340,028
Garbage	23,714				40,357		64,071
Hotel Accomodation	98,292				127,270		225,562
Medical Expenses	13,060				3,987		17,047
OffHourent	5,851						5,851
Other Expenses	164,470				280,874		445,344
Port Charges	128,352				121,033		249,385
Postage & Courier	66,140				66,592		132,732
Shipchandling	308,443				355,487		663,929
Stevedoring Expenses	57,292						57,292
Telephone	10,234				1,848		12,082
Transport	27,700				13,327		41,027
Utilities					319		319

Source: SFA and Seychelles Ports Authority (SPA)

Table 10-14 Quantity (corresponded volume) of containers imported and exported by IOT (Numbers of 20ft equivalent containers)

Number of containers (20ft equiv.) movement by year	containers status Empty	full	Transhipment	Grand Total
2009	**12,224**	**19,853**	**3,781**	**35,858**
in	1,396	14,845	1,880	18,121
out	10,828	5,008	1,901	17,737
2010	**14,471**	**22,947**	**589**	**38,007**
in	1,558	17,068	282	18,908
out	12,913	5,879	307	19,099
2011	**15,679**	**23,452**	**794**	**39,925**
in	1,918	17,575	414	19,907
out	13,761	5,877	380	20,018
2012	**13,364**	**23,461**	**1,581**	**38,406**
in	1,287	17,178	787	19,252
out	12,077	6,283	794	19,154
2013	**15,056**	**25,982**	**365**	**41,403**
in	2,280	18,230	177	20,687
out	12,776	7,752	188	20,716

Source: Seychelles Ports Authority (SPA)

10.4.4.2 Tuna processing activity indicators

Table 10-15 Quantity/ composition/ value of raw material contracted with PS and imported

product type	Volume (Mt)	Value (SCR)
2009	**70,404**	**1,107,459,581**
Fresh or Chilled	**0**	**2,167**
Tunas nei	0	2,167
Frozen	**70,404**	**1,107,457,414**
Albacore	7	2,407,369
Tunas nei	70,201	1,083,842,665
Yellowfin tuna	196	21,207,380
2010	**69,652**	**1,137,567,537**
Fresh or Chilled	**382**	**10,809,684**
Albacore	351	10,599,769
Tunas nei	1	5,485
Yellowfin tuna	30	204,430
Frozen	**69,270**	**1,126,757,853**
Albacore	15	506,041
Southern bluefin tuna	79	2,294,486
Tunas nei	69,176	1,123,784,078
Yellowfin tuna	0	173,249
2011	**69,634**	**1,620,034,965**
Fresh or Chilled	**0**	**14,633**
Tunas nei	0	14,633
Frozen	**69,634**	**1,620,020,332**
Albacore	227	9,583,408
Skipjack tuna	150	4,742,256
Tunas nei	68,756	1,586,987,095
Yellowfin tuna	501	18,707,573
2012	**68,307**	**2,146,898,347**
Fresh or Chilled	**1**	**269,077**
Tunas nei	1	269,077
Frozen	**68,306**	**2,146,629,270**
Tunas nei	68,306	2,146,629,270
2013	**79,370**	**2,211,176,379**
Fresh or Chilled	**2**	**326,650**
Southern bluefin tuna	0	22,134
Tunas nei	2	304,516
Frozen	**79,368**	**2,210,849,729**
Tunas nei	79,368	2,210,849,729

Source: SFA

Table 10-16 Quantity of canned tuna, fishmeal, fish oil, tuna loin (frozen) produced (Mt)

Volume (Mt)	Country: Seychelles
Fishery	
2009	**113,486**
Industrial Longline Fishery	**8,329**
Frozen	8,329
Purse Seine Fishery	**105,157**
Canned	30,824
Fish Meal	5,168
Fish Oil & Fat	826
Frozen	68,339
2010	**121,361**
Industrial Longline Fishery	**6,659**
Frozen	6,659
Purse Seine Fishery	**114,703**
Canned	30,338
Fish Meal	7,663
Fish Oil & Fat	915
Frozen	75,787
2011	**108,682**
Industrial Longline Fishery	**7,566**
Frozen	7,566
Purse Seine Fishery	**101,117**
Canned	30,152
Fish Meal	6,986
Fish Oil & Fat	767
Frozen	63,212
2012	**104,501**
Industrial Longline Fishery	**14,695**
Frozen	14,695
Purse Seine Fishery	**89,806**
Canned	31,400
Fish Meal	6,597
Fish Oil & Fat	871
Frozen	50,938
2013	**113,604**
Industrial Longline Fishery	**11,426**
Frozen	11,426
Purse Seine Fishery	**102,178**
Canned	36,826
Fish Meal	7,337
Fish Oil & Fat	691
Frozen	57,324

Source: SFA

Table 10-17 Export market (share of EU) in SCR

Value (SCR) / product type	Country: EEC	Others	Grand Total	Share of EU
2009	**2,931,067,142**	**93,516,455**	**3,024,583,597**	**96.91%**
IOT Canning Factory	**2,927,106,308**	**93,046,812**	**3,020,153,120**	**96.92%**
Canned	*2,914,132,111*	*59,898,519*	*2,974,030,630*	*97.99%*
Fish Oil & Fat	*12,974,197*	*33,148,293*	*46,122,490*	*28.13%*
Local Processing Plant	**3,960,834**	**469,643**	**4,430,477**	**89.40%**
Fresh on Ice	*3,016,066*	*409,311*	*3,425,377*	*88.05%*
Frozen	480	32,462	32,943	1.46%
Others	944,288	27,870	972,157	97.13%
2010	**2,351,883,197**	**74,134,751**	**2,426,017,947**	**96.94%**
IOT Canning Factory	**2,349,886,206**	**73,532,156**	**2,423,418,362**	**96.97%**
Canned	*2,334,530,775*	*47,959,539*	*2,382,490,313*	*97.99%*
Fish Oil & Fat	*15,355,431*	*25,572,617*	*40,928,048*	*37.52%*
Local Processing Plant	**1,996,991**	**602,595**	**2,599,585**	**76.82%**
Fresh on Ice	*1,329,133*	*218,297*	*1,547,430*	*85.89%*
Others	667,858	384,298	1,052,156	63.48%
2011	**2,996,357,888**	**39,201,064**	**3,035,558,953**	**98.71%**
IOT Canning Factory	**2,995,395,119**	**38,256,245**	**3,033,651,363**	**98.74%**
Canned	*2,993,762,923*	*7,508,963*	*3,001,271,886*	*99.75%*
Fish Oil & Fat	*1,632,196*	*30,747,282*	*32,379,477*	*5.04%*
Local Processing Plant	**962,770**	**944,820**	**1,907,589**	**50.47%**
Fresh on Ice	*326,217*	*8,910*	*335,127*	*97.34%*
Others	636,553	935,910	1,572,462	40.48%
2012	**3,413,386,644**	**58,938,856**	**3,472,325,500**	**98.30%**
IOT Canning Factory	**3,410,356,071**	**57,724,556**	**3,468,080,627**	**98.34%**
Canned	*3,409,718,135*	*15,074,493*	*3,424,792,628*	*99.56%*
Fish Oil & Fat	*637,935*	*42,650,064*	*43,287,999*	*1.47%*
Local Processing Plant	**3,030,574**	**1,214,300**	**4,244,874**	**71.39%**
Fresh on Ice	*2,527,678*	*288,118*	*2,815,796*	*89.77%*
Others	502,896	926,181	1,429,078	35.19%
2013	**4,234,647,853**	**72,572,131**	**4,307,219,985**	**98.32%**
IOT Canning Factory	**4,233,634,695**	**70,947,830**	**4,304,582,525**	**98.35%**
Canned	*4,233,265,201*	*33,012,237*	*4,266,277,439*	*99.23%*
Fish Oil & Fat	*369,493*	*37,935,593*	*38,305,086*	*0.96%*
Local Processing Plant	**1,013,159**	**1,624,301**	**2,637,460**	**38.41%**
Fresh on Ice	*609,187*	*653,319*	*1,262,505*	*48.25%*
Frozen	403,972	970,982	1,374,954	29.38%

Source: SFA

10.4.4.3 Indicators to measure the local cannery competitiveness

Table 10-18 Seychelles tuna cans exports volume (Mt), value (000 €) and price (€/kg) to the European Economic Community (EEC) and the Rest of the World (Others)

	EEC			Others			Value ('000 €)	Volume (Mt)	Average price (€/kg)
	Value ('000 €)	Volume (Mt)	Average price (€/kg)	Value ('000 €)	Volume (Mt)	Average price (€/kg)			
2009	155,774	28,181.87	5.53	3,202	541.01	5.92	158,976	28,722.88	5.53
2010	147,076	28,427.47	5.17	3,021	587.69	5.14	150,098	29,015.16	5.17
2011	175,827	31,211.09	5.63	441	72.24	6.10	176,268	31,283.34	5.63
2012	195,994	31,131.74	6.30	866	138.63	6.25	196,861	31,270.37	6.30
2013	265,618	36,455.69	7.29	2,071	307.58	6.73	267,689	36,763.27	7.28

Source: SFA, IOT

10.5 The Tanzanian Value Chain Economic Model

The Tanzanian Value Chain Economic Model was developed under Microsoft Excel. The model presents the economics of twelve strands from five priority species value chain through a combined dashboard and simulation module; this approach is similar to the one used in investment decision making process where financial indicators such as Net Present Value (NPV), Internal Rate of Return (IRR) and breakeven points can be used to compare and contrast investment scenarios. The model can also be used for Management Strategy Evaluation (MSE) of the fisheries to ask the "what if?" and what are the impacts and economic implications of particular management decisions and/ or changes. The model was created by first transcribing in a tabular format the economic data collected in the field surveys for each strand. The data thus collected constitute the model "default" values for the strands and are organised along the VC for each actor and according to their revenue and cost centres.
For each strand and actor, the model calculates annual and monthly revenues, costs, profit or loss, and overall capital investment, net present value, internal rate of return, breakeven catch (or production level) under 3 scenarios (pessimistic, optimistic and average also known as the "status quo" under the current situation). All the values are dynamic and can be modified by the user to simulate many conditions and under contrasted scenarios (See Lallemand (2018) and Peacock, et al. (2018)).

10.5.1 The model's Tuna strands

There is a dashboard for each of the twelve strands organized by species and product type. Each dashboard is linked to its own simulation module where assumptions can be made on various economic and financial parameters affecting the economics of the value chain, the default value being the original data collected during the field survey.
The strands simulated in the model are organised by species and product types and are, the tuna strand is as follow:

- Tuna
    - Frozen cut tuna (local markets)
    - Whole tuna on ice (hotels)

Then, for each tuna strand, a dashboard can be accessed to assess the current situation (or average scenario) which might be modified at will by changing some or all the economic parameters from the simulation portion of the module. Along with the average scenario, 2 other scenarios are also available, an optimist and pessimist one. There are 2 parameters affecting the high (optimist) and low (pessimist) scenarios, one is affecting the investment parameters of the model, the other is affecting the catch level. Those 2 parameters can be accessed and changed by the user through a slider.

10.5.2 The model's scenarios

The model can simulate an average, an optimist (max value) and a pessimistic (min value) scenarios for each Tuna strand. All 3 scenarios are shown graphically and simultaneously in high-low-average boxes. When using in conjunction with the current (or default value), the average scenario corresponds to the "Status Quo" situation.

10.5.3 The strands' module

Each strand is represented by a module composed of 3 sections:

1. A simulation section
2. A dashboard section
3. A succinct financial indicators section.

The following tables and figures in sections 10.5.3.1 through 10.5.4 represent the economic breakdown within each of the value chain for the 2 strands (segment) identified in the Tanzanian tuna

industry sector.

10.5.3.1 Strand module's simulation section

The simulation section as shown in Table 10-19 and Table 10-21is composed of:

1. The price perceived by each actor along the VC expressed in one of five possible currencies per kg of product GWte and netweight.
2. the yield produced by each actor along the VC and used to calculate the green weight equivalent (GWte) values
3. and for each cost corresponding to each actor along the strand's VC,
   3.1. the simulation parameter expressed as a positive or negative percentage change of the default value and activated by a slider
   3.2. the cost expressed as a percentage of the actor's total cost
   3.3. the cost expressed as a percentage of the actor's price received
   3.4. the nominal cost value expressed in one of five possible currencies per kg of product net weight
   3.5. the nominal cost value expressed in one of five possible currencies per kg of product GWte (i.e. by taking into account the agent's product yield)
   3.6. the cost expressed as a percentage of the final product's net weight price down the chain.
   3.7. the cost expressed as a percentage of the final product's GWte price down the chain.
4. A graph summarising the Strand's VC price structure (Figure 10-1)

10.5.3.1.1 "Frozen cut tuna" strand

Table 10-19: "Frozen cut tuna" strand's simulation section of the model.

	Price change %age	Tanzanian shilling TZS /kg	U.S. Dollar US$/ kg	Mozambican metical MZN /kg	Seychelles rupee SCR/ kg	Euro €/ kg
Ex-vessel price	0%	TZS 5,169.00/Kg	US$ 2.24/Kg	MZN 138.54/Kg	SCR 30.65/Kg	€ 1.98/Kg
Auctioneer price	0%	TZS 5,324.00/Kg	US$ 2.31/Kg	MZN 142.69/Kg	SCR 31.57/Kg	€ 2.04/Kg
Trader/ processor price	0%	TZS 8,943.00/Kg	US$ 3.88/Kg	MZN 239.69/Kg	SCR 53.03/Kg	€ 3.43/Kg
		TZS 5,186.94/Kg GWte	*US$ 2.25/Kg GWte*	*MZN 139.02/Kg GWte*	*SCR 30.76/Kg GWte*	*€ 1.99/Kg GWte*
Secondary trader price	0%	TZS 9,943.00/Kg	US$ 4.31/Kg	MZN 266.49/Kg	SCR 58.97/Kg	€ 3.81/Kg
Retailer price	0%	TZS 10,443.00/Kg	US$ 4.53/Kg	MZN 279.89/Kg	SCR 61.93/Kg	€ 4.00/Kg

ex-vessel yield	*100.00%*
Auctioneer yield	*100.00%*
Trader/ processor yield	*58.00%*
Secondary trader yield	*58.00%*
Retailer yield	*58.00%*

Tanzanian shilling (TZS)

		Cost Change %age	as a %age of actor's total cost	as a %age of price perceived by the actor	nominal value TZS/ kg netweight	nominal value TZS/ kg GWte	as a %age of the final product price netweight	as a %age of the final product price GWte
Fisher	Inputs (Bait, small equipment..)	0%	30.95%	9.69%	501.00	501.00	4.80%	2.78%
	Others	0%	-	-	-	-	-	-
	Services	0%	15.44%	4.84%	250.00	250.00	2.39%	1.39%
	Packaging cost	0%	-	-	-	-	-	-
	Repairs & Maintenance	0%	36.26%	11.36%	587.00	587.00	5.62%	3.26%
	Transport cost	0%	-	-	-	-	-	-
	Taxes & Licence Fees	0%	17.36%	5.44%	281.00	281.00	2.69%	1.56%
	Total cost to the fisher		**100.00%**	**31.32%**	**1,619.00**	**1,619.00**	**15.50%**	**8.99%**
	Fisher's SGP			68.68%	*3,550.00*	*3,550.00*	33.99%	19.72%
	Ex-vessel price		**168.68%**	**100.00%**	***5,169.00***	***5,169.00***	**49.50%**	**28.71%**
Auctioneer	Product acquisition	0%	100.00%	97.09%	5,169.00	5,169.00	49.50%	28.71%
	Inputs	0%	-	-	-	-	-	-
	Labour cost	0%	-	-	-	-	-	-
	Packaging cost	0%	-	-	-	-	-	-
	Losses	0%	-	-	-	-	-	-
	Transport cost	0%	-	-	-	-	-	-
	Taxes	0%	-	-	-	-	-	-
	Total cost to the auctioneer excl. product acquisition		-	-	-	-	-	-
	Total cost to the auctioneer		**100.00%**	**97.09%**	**5,169.00**	**5,169.00**	**49.50%**	**28.71%**
	Auctioneer's SGP			2.91%	*155.00*	*155.00*	1.48%	0.86%
	Price paid to the auctioneer		**102.91%**	**100.00%**	***5,324.00***	***5,324.00***	**59.53%**	**29.57%**
Trader/ Processor	Product acquisition	0%	72.65%	59.53%	5,324.00	3,087.92	50.98%	17.15%
	Services	0%	2.16%	1.77%	158.00	91.64	1.51%	0.51%
	Labour cost	0%	-	-	-	-	-	-
	Inputs	0%	5.76%	4.72%	422.00	244.76	4.04%	1.36%
	Losses	0%	7.71%	6.32%	565.00	327.70	5.41%	1.82%
	Transport cost	0%	5.47%	4.48%	401.00	232.58	3.84%	1.29%
	Taxes	0%	6.25%	5.12%	458.00	265.64	4.39%	1.48%
	Total cost to the trader/ processor excl. product acquisition		**27.35%**	**22.41%**	**2,004.00**	**1,162.32**	**19.19%**	**6.46%**
	Total cost to the trader/ processor		**100.00%**	**81.94%**	**7,328.00**	**4,250.24**	**70.17%**	**23.61%**
	Trader/ Processor 's SGP			18.06%	*1,615.00*	*936.70*	18.06%	6.07%
	Price paid to the trader/ processor		**118.06%**	**100.00%**	***8,943.00***	***5,186.94***	**88.23%**	**29.68%**
Secondary Trader	Product acquisition	0%	100.00%	89.94%	8,943.00	5,186.94	85.64%	28.81%
	Maintenance	0%	-	-	-	-	-	-
	Labour cost	0%	-	-	-	-	-	-
	Inputs	0%	-	-	-	-	-	-
	Losses	0%	-	-	-	-	-	-
	Transport cost	0%	-	-	-	-	-	-
	Taxes	0%	-	-	-	-	-	-
	Total cost to the secondary trader excl. product acquisition		-	-	-	-	-	-
	Total cost to the secondary trader		**100.00%**	**89.94%**	**8,943.00**	**5,186.94**	**85.64%**	**28.81%**
	Secondary Trader's SGP			10.06%	*1,000.00*	*580.00*	10.06%	3.38%
	Price paid to the secondary trader		**110.06%**	**100.00%**	***9,943.00***	***5,766.94***	**95.69%**	**32.19%**
Retailer	Product acquisition	0%	100.00%	95.21%	9,943.00	5,766.94	95.21%	32.03%
	Maintenance	0%	-	-	-	-	-	-
	Labour cost	0%	-	-	-	-	-	-
	Inputs	0%	-	-	-	-	-	-
	Losses	0%	-	-	-	-	-	-
	Transport cost	0%	-	-	-	-	-	-
	Taxes	0%	-	-	-	-	-	-
	Total cost to the retailer excl. product acquisition		-	-	-	-	-	-
	Total cost to the retailer		**100.00%**	**95.21%**	**9,943.00**	**5,766.94**	**95.21%**	**32.03%**
	Retailer's SGP			4.79%	*500.00*	*290.00*	4.79%	1.61%
	Price paid to the retailer		**104.79%**	**100.00%**	***10,443.00***	***6,056.94***	**100.00%**	**33.64%**

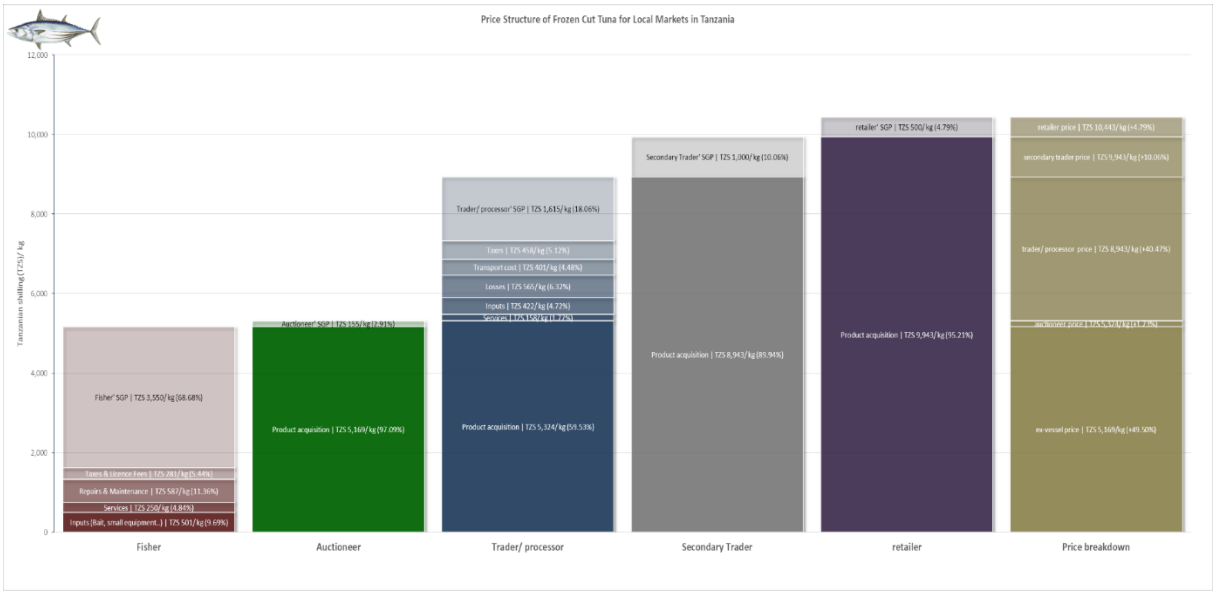


Figure 10-1: "Frozen cut tuna" strand's price structure in Tanzania

10.5.3.1.2 "Whole tuna on ice" strand

Table 10-20: "Whole tuna on ice" strand's simulation section of the model.



	Price change %age	Tanzanian shilling TZS /kg	U.S. Dollar US$/ kg	Mozambican metical MZN /kg	Seychelles rupee SCR/ kg	Euro €/ kg
Ex-vessel price	0%	TZS 4,395.70/Kg	US$ 1.91/Kg	MZN 117.17/Kg	SCR 26.13/Kg	€ 1.72/Kg
Auctioneer price	0%	TZS 4,623.20/Kg	US$ 2.01/Kg	MZN 123.24/Kg	SCR 27.48/Kg	€ 1.81/Kg
Trader price	0%	TZS 8,137.28/Kg	US$ 3.53/Kg	MZN 216.91/Kg	SCR 48.37/Kg	€ 3.18/Kg
		TZS 8,137.28/Kg GWte	*US$ 3.53/Kg GWte*	*MZN 216.91/Kg GWte*	*SCR 48.37/Kg GWte*	*€ 3.18/Kg GWte*
Hotel price	0%	TZS 10,137.28/Kg	US$ 4.40/Kg	MZN 270.22/Kg	SCR 60.26/Kg	€ 3.96/Kg

ex-vessel yield	*100.00%*
Auctioneer yield	*100.00%*
Trader yield	*100.00%*
Hotel yield	*100.00%*

Tanzanian shilling (TZS)

		Cost Change %age	as a %age of actor's total cost	as a %age of price perceived by the actor	nominal value TZS/ kg netweight	nominal value TZS/ kg GWte	as a %age of the final product price netweight	as a %age of the final product price GWte
Inputs (Fuel,..)		0%	20.35%	16.94%	744.80	744.80	7.35%	7.35%
Labour		0%	65.62%	54.65%	2,402.20	2,402.20	23.70%	23.70%
Services		0%	6.05%	5.03%	221.30	221.30	2.18%	2.18%
Packaging cost		0%	-	-	-	-	-	-
Repairs & Maintenance		0%	-	-	-	-	-	-
Transport cost		0%	1.69%	1.40%	61.70	61.70	0.61%	0.61%
Taxes & Licence Fees		0%	6.30%	5.25%	230.80	230.80	2.28%	2.28%
	Total cost to the fisher		**100.00%**	**83.28%**	**3,660.80**	**3,660.80**	**36.11%**	**36.11%**
	Fisher's SGP			16.72%	*734.90*	*734.90*	7.25%	7.25%
	Ex-vessel price		**116.72%**	**100.00%**	***4,395.70***	***4,395.70***	**43.36%**	**43.36%**
Auctioneer	Product acquisition	0%	100.00%	95.08%	4,395.70	4,395.70	43.36%	43.36%
	Inputs	0%	-	-	-	-	-	-
	Labour cost	0%	-	-	-	-	-	-
	Packaging cost	0%	-	-	-	-	-	-
	Losses	0%	-	-	-	-	-	-
	Transport cost	0%	-	-	-	-	-	-
	Taxes	0%	-	-	-	-	-	-
	Total cost to the auctioneer excl. product acquisition		-	-	-	-	-	-
	Total cost to the auctioneer		**100.00%**	**95.08%**	**4,395.70**	**4,395.70**	**43.36%**	**43.36%**
	Auctioneer's SGP			4.92%	*227.50*	*227.50*	2.24%	2.24%
	Price paid to the auctioneer		**104.92%**	**100.00%**	***4,623.20***	***4,623.20***	**45.61%**	**45.61%**
Trader	Product acquisition	0%	76.99%	56.82%	4,623.20	4,623.20	45.61%	45.61%
	Services	0%	-	-	-	-	-	-
	Labour cost	0%	-	-	-	-	-	-
	Inputs	0%	5.27%	3.89%	316.60	316.60	3.12%	3.12%
	Losses	0%	-	-	-	-	-	-
	Transport cost	0%	10.19%	7.52%	612.10	612.10	6.04%	6.04%
	Taxes	0%	7.54%	5.56%	452.80	452.80	4.47%	4.47%
	Total cost to the trader excl. product acquisition		**23.01%**	**16.98%**	**1,381.50**	**1,381.50**	**13.63%**	**13.63%**
	Total cost to the trader		**100.00%**	**73.79%**	**6,004.70**	**6,004.70**	**59.23%**	**59.23%**
	Trader's SGP			26.21%	*2,132.58*	*2,132.58*	21.04%	21.04%
	Price paid to the trader		**126.21%**	**100.00%**	***8,137.28***	***8,137.28***	**80.27%**	**80.27%**
Hotel	Product acquisition	0%	100.00%	80.27%	8,137.28	8,137.28	80.27%	80.27%
	Maintenance	0%	-	-	-	-	-	-
	Labour cost	0%	-	-	-	-	-	-
	Inputs	0%	-	-	-	-	-	-
	Losses	0%	-	-	-	-	-	-
	Transport cost	0%	-	-	-	-	-	-
	Taxes	0%	-	-	-	-	-	-
	Total cost to the hotel excl. product acquisition		-	-	-	-	-	-
	Total cost to the hotel		**100.00%**	**80.27%**	**8,137.28**	**8,137.28**	**80.27%**	**80.27%**
	Hotel's SGP			19.73%	*2,000.00*	*2,000.00*	19.73%	19.73%
	Price paid to the hotel		**119.73%**	**100.00%**	***10,137.28***	***10,137.28***	**100.00%**	**100.00%**

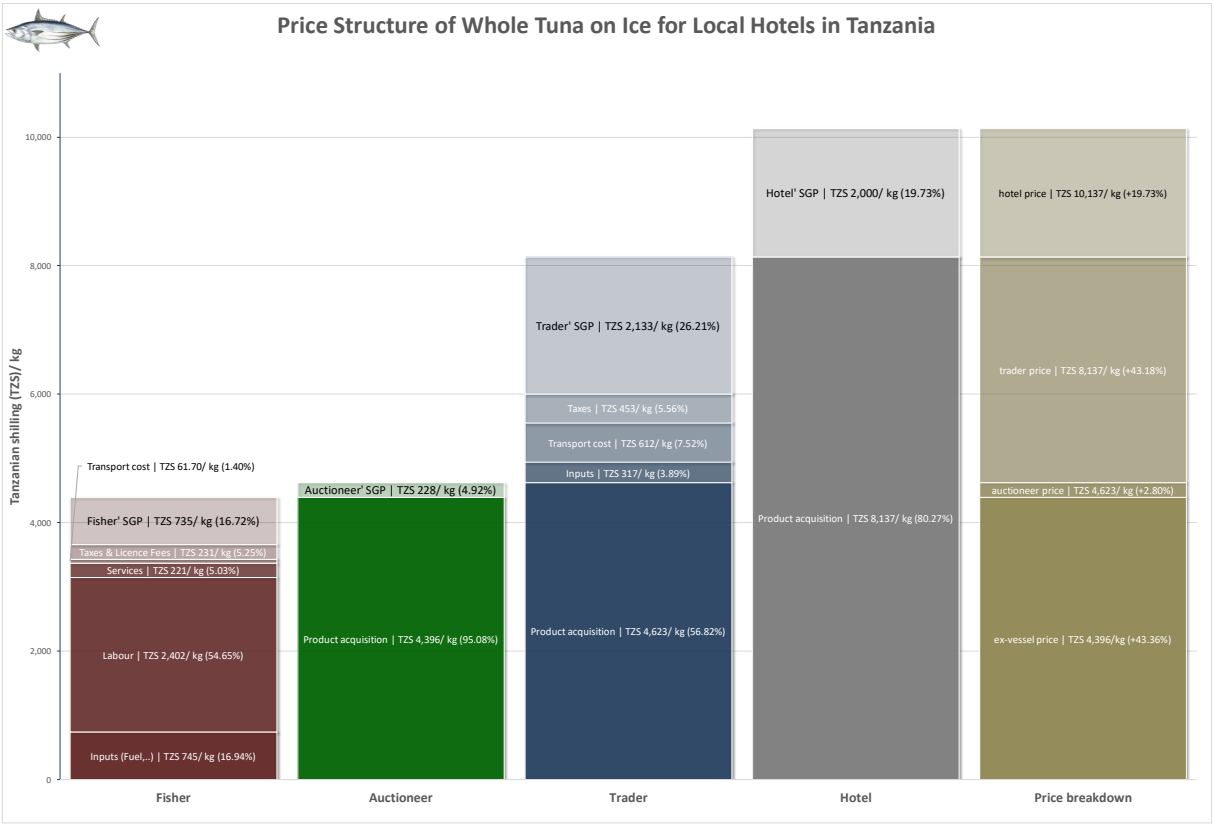


Figure 10-2: "Whole tuna on ice" strand's price structure in Tanzania

10.5.3.2 Strand module's dashboard section

We note here that we labelled the pessimistic and optimist scenario under the "Min" and "Max" labels respectively.

The dashboard section as shown in Table 10-21 through Table 10-29 gather data for each strand under the 3 scenarios and give:

1. A succinct description of the various capital investment and their values expressed in one of five possible currencies selected by the user and for each actor along the strand's VC under the 3 scenarios. Note that the estimated investment's life duration is stored elsewhere in the model
2. Data on the target species under the 3 scenarios
   - 2.1. The actor's monthly and annual catch (or production) of the target species relevant to the strand and expressed in kg
   - 2.2. A recap of the actor's target species price per kg GWte and the monthly and annual revenues from the target species relevant to the strand and expressed in one of five possible currencies as selected by the user.
   - 2.3. The number of months of the actor's activity per year targeting the main species
   - 2.4. Where relevant, the actor's catch (or production) per unit of effort or CPUE (kg/ day) for the strand
3. Data on by-catch species (or by-product) under the 3 scenarios
   - 3.1. The actor's monthly and annual by-catch (or by-product) relevant to the strand and expressed in kg and activated or not by the user
   - 3.2. the actor's by-catch (or by-product) price per kg GWte and the monthly and annual revenues from the by-catch species relevant to the strand and expressed in one of five possible currencies as selected by the user and activated or not by the latest.
   - 3.3. The number of months of the actor's activity per year catching secondary species.

3.4. Where relevant, the actor's by-catch (or by-product) per unit of effort or CPUE (kg/ day) for the strand

4. A recap of the actor's unit cost per cost centre expressed in one of five possible currencies per kg GWte and the corresponding monthly and annual costs under the 3 scenarios.
5. The actor's monthly and annual profit (or loss) expressed in one of five possible currencies under the 3 scenarios
6. The actor's net present value (NPV) over T years using a discount rate of r as defined by the user under the 3 scenarios
7. The actor's Internal Rate of Return (IRR) over T years as defined by the user under the 3 scenarios

10.5.3.2.1 "Frozen cut tuna" strand

Table 10-21: Dashboard by actor along the "Frozen Cut Tuna" Strand's VC: Fisher

Fisher				
	Investment	**Min**	**Max**	**Average**
	6m Vessel (TZS)	3,800,000.00	4,200,000.00	4,000,000.00
	Engine (TZS)	-	-	-
	Equipment (sail, paddle) (TZS)	1,900,000.00	2,100,000.00	2,000,000.00
	Other Investments (TZS)	-	-	-
	Total investment	**5,700,000.00**	**6,300,000.00**	**6,000,000.00**
	Target species	**Min**	**Max**	**Average**
	Catch/ month (kg)	315.00	385.00	350.00
	Price (TZS/ kg)	5,169.00	5,169.00	5,169.00
	Revenue/ month (TZS)	1,628,235.00	1,990,065.00	1,809,150.00
	number of months fished/ year	7	7	7
	CPUE (kg/ day)	15.75	19.25	17.50
	Annual Revenue (TZS)	**11,397,645.00**	**13,930,455.00**	**12,664,050.00**
	By-catch	**Min**	**Max**	**Average**
	Catch/ month (kg)	-	-	-
	Price (TZS/ kg)	-	-	-
	Revenue/ month (TZS)	-	-	-
	number of months fished/ year	-	-	-
	CPUE (kg/ day)	-	-	-
	Annual Revenue (TZS)	**-**	**-**	**-**
	Costs	**Min**	**Max**	**Average**
	Cost (TZS/ kg gwte)	1,619.00	1,619.00	1,619.00
	Average Cost/ month (TZS)	509,985.00	623,315.00	566,650.00
	Annual cost (TZS)	**3,569,895.00**	**4,363,205.00**	**3,966,550.00**
	Profits/ losses	**Min**	**Max**	**Average**
	Average profit (TZS/ month)	1,118,250.00	1,366,750.00	1,242,500.00
	Annual profit/ loss (TZS)	**7,827,750.00**	**9,567,250.00**	**8,697,500.00**
	NPV	**Min**	**Max**	**Average**
	Net present value (NPV) over 10 years (TZS)	**54,743,810.59**	**67,575,768.50**	**61,159,789.55**
	Internal rate of return (IRR) over 10 years (TZS)	**137%**	**152%**	**145%**

Table 10-22: Dashboard by actor along the "Frozen Cut Tuna" Strand's VC: Auctioneer

Auctioneer				
	Investment	**Min**	**Max**	**Average**
	Vehicle (TZS)	-	-	-
	Buildings (TZS)	-	-	-
	Equipment (TZS)	-	-	-
	Total investment	**-**	**-**	**-**
	Target species	**Min**	**Max**	**Average**
	Quantity Auctionned/ month (kg)	315	385	350
	Price (TZS/ kg)	5,324.00	5,324.00	5,324.00
	Revenue/ month (TZS)	1,677,060.00	2,049,740.00	1,863,400.00
	number of months fished/ year	7	7	7
	CPUE (kg/ day)	-	-	-
	Annual Revenue (TZS)	**11,739,420.00**	**14,348,180.00**	**13,043,800.00**
	By-catch	**Min**	**Max**	**Average**
	Quantity Auctionned/ month (kg)	-	-	-
	Price (TZS/ kg)	-	-	-
	Revenue/ month (TZS)	-	-	-
	number of months fished/ year	-	-	-
	CPUE (kg/ day)	-	-	-
	Annual Revenue (TZS)	**-**	**-**	**-**
	Costs	**Min**	**Max**	**Average**
	Cost (TZS/ kg gwte)	5,169.00	5,169.00	5,169.00
	Average Cost/ month (TZS)	1,628,235.00	1,990,065.00	1,809,150.00
	Annual cost (TZS)	**11,397,645.00**	**13,930,455.00**	**12,664,050.00**
	Profits/ losses	**Min**	**Max**	**Average**
	Average profit (TZS/ month)	48,825.00	59,675.00	54,250.00
	Annual profit/ loss (TZS)	**341,775.00**	**417,725.00**	**379,750.00**
	NPV	**Min**	**Max**	**Average**
	Net present value (NPV) over 10 years (TZS)	**2,639,095.96**	**3,225,561.72**	**2,932,328.84**
	Internal rate of return (IRR) over 10 years (TZS)	**#N/A**	**#N/A**	**#N/A**

Table 10-23: Dashboard by actor along the "Frozen Cut Tuna" Strand's VC: Trader/ processor

Trader/ processor				
	Investment	**Min**	**Max**	**Average**
	Vehicle (TZS)	-	-	-
	Buildings (TZS)	-	-	-
	Equipment (TZS)	47,500,000.00	52,500,000.00	50,000,000.00
	Total investment	**47,500,000.00**	**52,500,000.00**	**50,000,000.00**
	Target species	**Min**	**Max**	**Average**
	Quantity traded/ month (kg)	182.7	223.3	203
	Price (TZS/ kg)	8,943.00	8,943.00	8,943.00
	Revenue/ month (TZS)	1,633,886.10	1,996,971.90	1,815,429.00
	number of months fished/ year	7	7	7
	CPUE (kg/ day)	-	-	-
	Annual Revenue (TZS)	**11,437,202.70**	**13,978,803.30**	**12,708,003.00**
	By-catch	**Min**	**Max**	**Average**
	Quantity traded/ month (kg)	-	-	-
	Price (TZS/ kg)	-	-	-
	Revenue/ month (TZS)	-	-	-
	number of months fished/ year	-	-	-
	CPUE (kg/ day)	-	-	-
	Annual Revenue (TZS)	**-**	**-**	**-**
	Costs	**Min**	**Max**	**Average**
	Cost (TZS/ kg gwte)	7,328.00	7,328.00	7,328.00
	Average Cost/ month (TZS)	1,338,825.60	1,636,342.40	1,487,584.00
	Annual cost (TZS)	**9,371,779.20**	**11,454,396.80**	**10,413,088.00**
	Profits/ losses	**Min**	**Max**	**Average**
	Average profit (TZS/ month)	295,060.50	360,629.50	327,845.00
	Annual profit/ loss (TZS)	**2,065,423.50**	**2,524,406.50**	**2,294,915.00**
	NPV	**Min**	**Max**	**Average**
	Net present value (NPV) over 10 years (TZS)	**(31,551,347.22)**	**(33,007,202.15)**	**(32,279,274.68)**
	Internal rate of return (IRR) over 10 years (TZS)	**-13%**	**-11%**	**-12%**

Table 10-24: Dashboard by actor along the "Frozen Cut Tuna" Strand's VC: Secondary trader

Secondary trader				
	Investment	**Min**	**Max**	**Average**
	Vehicle (TZS)	-	-	-
	Buildings (TZS)	-	-	-
	Equipment (TZS)	-	-	-
	Total investment	**-**	**-**	**-**
	Target species	**Min**	**Max**	**Average**
	Quantity traded/ month (kg)	182.7	223.3	203
	Price (TZS/ kg)	9,943.00	9,943.00	9,943.00
	Revenue/ month (TZS)	1,816,586.10	2,220,271.90	2,018,429.00
	number of months fished/ year	7	7	7
	CPUE (kg/ day)	-	-	-
	Annual Revenue (TZS)	**12,716,102.70**	**15,541,903.30**	**14,129,003.00**
	By-catch	**Min**	**Max**	**Average**
	Quantity traded/ month (kg)	-	-	-
	Price (TZS/ kg)	-	-	-
	Revenue/ month (TZS)	-	-	-
	number of months fished/ year	-	-	-
	CPUE (kg/ day)	-	-	-
	Annual Revenue (TZS)	**-**	**-**	**-**
	Costs	**Min**	**Max**	**Average**
	Cost (TZS/ kg gwte)	8,943.00	8,943.00	8,943.00
	Average Cost/ month (TZS)	1,633,886.10	1,996,971.90	1,815,429.00
	Annual cost (TZS)	**11,437,202.70**	**13,978,803.30**	**12,708,003.00**
	Profits/ losses	**Min**	**Max**	**Average**
	Average profit (TZS/ month)	182,700.00	223,300.00	203,000.00
	Annual profit/ loss (TZS)	**1,278,900.00**	**1,563,100.00**	**1,421,000.00**
	NPV	**Min**	**Max**	**Average**
	Net present value (NPV) over 10 years (TZS)	**9,875,326.80**	**12,069,843.87**	**10,972,585.33**
	Internal rate of return (IRR) over 10 years (TZS)	**#N/A**	**#N/A**	**#N/A**

Table 10-25: Dashboard by actor along the "Frozen Cut Tuna" Strand's VC: Retailer

Retailer				
	Investment	**Min**	**Max**	**Average**
	Vehicle (TZS)	-	-	-
	Buildings (TZS)	-	-	-
	Equipment (TZS)	-	-	-
	Total investment	**-**	**-**	**-**
	Target species	**Min**	**Max**	**Average**
	Quantity sold/ month (kg)	182.7	223.3	203
	Price (TZS/ kg)	10,443.00	10,443.00	10,443.00
	Revenue/ month (TZS)	1,907,936.10	2,331,921.90	2,119,929.00
	number of months fished/ year	7	7	7
	CPUE (kg/ day)	-	-	-
	Annual Revenue (TZS)	**13,355,552.70**	**16,323,453.30**	**14,839,503.00**
	By-catch	**Min**	**Max**	**Average**
	Quantity sold/ month (kg)	-	-	-
	Price (TZS/ kg)	-	-	-
	Revenue/ month (TZS)	-	-	-
	number of months fished/ year	-	-	-
	CPUE (kg/ day)	-	-	-
	Annual Revenue (TZS)	**-**	**-**	**-**
	Costs	**Min**	**Max**	**Average**
	Cost (TZS/ kg gwte)	9,943.00	9,943.00	9,943.00
	Average Cost/ month (TZS)	1,816,586.10	2,220,271.90	2,018,429.00
	Annual cost (TZS)	**12,716,102.70**	**15,541,903.30**	**14,129,003.00**
	Profits/ losses	**Min**	**Max**	**Average**
	Average profit (TZS/ month)	91,350.00	111,650.00	101,500.00
	Annual profit/ loss (TZS)	**639,450.00**	**781,550.00**	**710,500.00**
	NPV	**Min**	**Max**	**Average**
	Net present value (NPV) over 10 years (TZS)	**4,937,663.40**	**6,034,921.93**	**5,486,292.67**
	Internal rate of return (IRR) over 10 years (TZS)	**#N/A**	**#N/A**	**#N/A**

10.5.3.2.2 "Whole tuna on ice" strand

Table 10-26: Dashboard by actor along the "Whole Tuna on Ice" Strand's VC: Fisher

Fishers	Investment	Min	Max	Average
	6m Vessel (TZS)	5,700,000.00	6,300,000.00	6,000,000.00
	Engine (TZS)	3,420,000.00	3,780,000.00	3,600,000.00
	Equipment (sail, paddle) (TZS)	9,500,000.00	10,500,000.00	10,000,000.00
	Other Investments (TZS)	-	-	-
	Total investment	**18,620,000.00**	**20,580,000.00**	**19,600,000.00**
	Target species	**Min**	**Max**	**Average**
	Catch/ month (kg)	657.00	803.00	730.00
	Price (TZS/ kg)	4,395.70	4,395.70	4,395.70
	Revenue/ month (TZS)	2,887,974.90	3,529,747.10	3,208,861.00
	number of months fished/ year	12	12	12
	CPUE (kg/ day)	32.85	40.15	36.50
	Annual Revenue (TZS)	**34,655,698.80**	**42,356,965.20**	**38,506,332.00**
	By-catch (red snprice_2per)	**Min**	**Max**	**Average**
	Catch/ month (kg)	-	-	-
	Price (TZS/ kg)	-	-	-
	Revenue/ month (TZS)	-	-	-
	number of months fished/ year	-	-	-
	CPUE (kg/ day)	-	-	-
	Annual Revenue (TZS)	**-**	**-**	**-**
	Costs	**Min**	**Max**	**Average**
	Cost (TZS/ kg gwte)	3,660.80	3,660.80	3,660.80
	Average Cost/ month (TZS)	2,405,145.60	2,939,622.40	2,672,384.00
	Annual cost (TZS)	**28,861,747.20**	**35,275,468.80**	**32,068,608.00**
	Profits/ losses	**Min**	**Max**	**Average**
	Average profit (TZS/ month)	482,829.30	590,124.70	536,477.00
	Annual profit/ loss (TZS)	**5,793,951.60**	**7,081,496.40**	**6,437,724.00**
	NPV	**Min**	**Max**	**Average**
	Net present value (NPV) over 10 years (TZS)	**26,119,358.45**	**34,101,438.10**	**30,110,398.28**
	Internal rate of return (IRR) over 10 years (TZS)	**29%**	**32%**	**31%**

Table 10-27: Dashboard by actor along the "Whole Tuna on Ice" Strand's VC: Auctioneer

Auctioneer	Investment	Min	Max	Average
	Vehicle (TZS)	-	-	-
	Buildings (TZS)	-	-	-
	Equipment (TZS)	95,000,000.00	105,000,000.00	100,000,000.00
	Total investment	**95,000,000.00**	**105,000,000.00**	**100,000,000.00**
	Target species	**Min**	**Max**	**Average**
	Quantity Auctionned/ month (kg)	657	803	730
	Price (TZS/ kg)	4,623.20	4,623.20	4,623.20
	Revenue/ month (TZS)	3,037,442.40	3,712,429.60	3,374,936.00
	number of months fished/ year	7	7	7
	CPUE (kg/ day)	-	-	-
	Annual Revenue (TZS)	**21,262,096.80**	**25,987,007.20**	**23,624,552.00**
	By-catch	**Min**	**Max**	**Average**
	Quantity Auctionned/ month (kg)	-	-	-
	Price (TZS/ kg)	-	-	-
	Revenue/ month (TZS)	-	-	-
	number of months fished/ year	-	-	-
	CPUE (kg/ day)	-	-	-
	Annual Revenue (TZS)	**-**	**-**	**-**
	Costs	**Min**	**Max**	**Average**
	Cost (TZS/ kg gwte)	4,395.70	4,395.70	4,395.70
	Average Cost/ month (TZS)	2,887,974.90	3,529,747.10	3,208,861.00
	Annual cost (TZS)	**20,215,824.30**	**24,708,229.70**	**22,462,027.00**
	Profits/ losses	**Min**	**Max**	**Average**
	Average profit (TZS/ month)	149,467.50	182,682.50	166,075.00
	Annual profit/ loss (TZS)	**1,046,272.50**	**1,278,777.50**	**1,162,525.00**
	NPV	**Min**	**Max**	**Average**
	Net present value (NPV) over 10 years (TZS)	**(86,920,961.09)**	**(95,125,619.11)**	**(91,023,290.10)**
	Internal rate of return (IRR) over 10 years (TZS)	**-28%**	**-27%**	**-27%**

Table 10-28: Dashboard by actor along the "Whole Tuna on Ice" Strand's VC: Trader

Trader				
	Investment	**Min**	**Max**	**Average**
	Vehicle (TZS)	-	-	-
	Buildings (TZS)	-	-	-
	Equipment (TZS)	-	-	-
	Total investment	**-**	**-**	**-**
	Target species	**Min**	**Max**	**Average**
	Quantity traded/ month (kg)	657	803	730
	Price (TZS/ kg)	8,137.28	8,137.28	8,137.28
	Revenue/ month (TZS)	5,346,192.96	6,534,235.84	5,940,214.40
	number of months fished/ year	7	7	7
	CPUE (kg/ day)	-	-	-
	Annual Revenue (TZS)	**37,423,350.72**	**45,739,650.88**	**41,581,500.80**
	By-catch	**Min**	**Max**	**Average**
	Quantity traded/ month (kg)	-	-	-
	Price (TZS/ kg)	-	-	-
	Revenue/ month (TZS)	-	-	-
	number of months fished/ year	-	-	-
	CPUE (kg/ day)	-	-	-
	Annual Revenue (TZS)	**-**	**-**	**-**
	Costs	**Min**	**Max**	**Average**
	Cost (TZS/ kg gwte)	6,004.70	6,004.70	6,004.70
	Average Cost/ month (TZS)	3,945,087.90	4,821,774.10	4,383,431.00
	Annual cost (TZS)	**27,615,615.30**	**33,752,418.70**	**30,684,017.00**
	Profits/ losses	**Min**	**Max**	**Average**
	Average profit (TZS/ month)	1,401,105.06	1,712,461.74	1,556,783.40
	Annual profit/ loss (TZS)	**9,807,735.42**	**11,987,232.18**	**10,897,483.80**
	NPV	**Min**	**Max**	**Average**
	Net present value (NPV) over 10 years (TZS)	**75,732,733.17**	**92,562,229.43**	**84,147,481.30**
	Internal rate of return (IRR) over 10 years (TZS)	**#N/A**	**#N/A**	**#N/A**

Table 10-29: Dashboard by actor along the "Whole Tuna on Ice" Strand's VC: Hotel

Hotel				
	Investment	**Min**	**Max**	**Average**
	Vehicle (TZS)	-	-	-
	Buildings (TZS)	-	-	-
	Equipment (TZS)	-	-	-
	Total investment	**-**	**-**	**-**
	Target species	**Min**	**Max**	**Average**
	Quantity sold month (kg)	657	803	730
	Price (TZS/ kg)	10,137.28	10,137.28	10,137.28
	Revenue/ month (TZS)	6,660,192.96	8,140,235.84	7,400,214.40
	number of months fished/ year	7	7	7
	CPUE (kg/ day)	-	-	-
	Annual Revenue (TZS)	**46,621,350.72**	**56,981,650.88**	**51,801,500.80**
	By-catch	**Min**	**Max**	**Average**
	Quantity sold month (kg)	-	-	-
	Price (TZS/ kg)	-	-	-
	Revenue/ month (TZS)	-	-	-
	number of months fished/ year	-	-	-
	CPUE (kg/ day)	-	-	-
	Annual Revenue (TZS)	**-**	**-**	**-**
	Costs	**Min**	**Max**	**Average**
	Cost (TZS/ kg gwte)	8,137.28	8,137.28	8,137.28
	Average Cost/ month (TZS)	5,346,192.96	6,534,235.84	5,940,214.40
	Annual cost (TZS)	**37,423,350.72**	**45,739,650.88**	**41,581,500.80**
	Profits/ losses	**Min**	**Max**	**Average**
	Average profit (TZS/ month)	1,314,000.00	1,606,000.00	1,460,000.00
	Annual profit/ loss (TZS)	**9,198,000.00**	**11,242,000.00**	**10,220,000.00**
	NPV	**Min**	**Max**	**Average**
	Net present value (NPV) over 10 years (TZS)	**71,024,517.88**	**86,807,744.07**	**78,916,130.98**
	Internal rate of return (IRR) over 10 years (TZS)	**#N/A**	**#N/A**	**#N/A**

10.5.4 Model's financial indicators

Several charts and tables summarize the resulting financial indicators from the current situation or simulation for all the strands together and under the various scenarios, pessimistic, optimistic, and average.

10.5.4.1 The Model's Breakeven Catch

The breakeven catch q_i^* is defined such as the annual catch for which the corresponding total profit

over the years equals the capital investment value or,
Define q_{ij}^{*} the breakeven catch of the j^{th} actor in the i^{th} strand such that,

$$q_{ij}^{*} = \frac{\sum_{k=1}^{K_{ij}} n_{ijk} \cdot I_{ijk}}{T \cdot (p_{ij} - c_{ij})} = \frac{\sum_{k=1}^{K_{ij}} n_{ijk} \cdot I_{ijk}}{T \cdot \pi_{ij}}$$

where,

T is the number of years on which to base the calculation of the breakeven catch along the i^{th} strand's VC which can vary between 1 and 10 years as defined by the user during the simulation,
p_{ij} is the price per kg received by the j^{th} actor for the i^{th} strand,
c_{ij} is the cost per kg paid by the j^{th} actor for the i^{th} strand,
I_{ijk} is the k^{th} investment of the j^{th} actor for the i^{th} strand,
K_{ijk} is the number of different capital investment I_{ijk} from the j^{th} actor for the i^{th} strand,
n_{ijk} corresponds to the number of time the j^{th} actor's k^{th} capital investment I_{ijk} needs to be renewed during T number of years for the i^{th} strand.
π_{ij} is the unit profit (or loss if <0) per kg produced by the j^{th} actor for the i^{th} strand,

10.5.4.1.1 The Fishers' Breakeven Catch comparison

Table 10-30: Fishers' breakeven catch (tons) comparison by Tuna strand and for the 3 scenarios, optimistic, pessimistic and average

	Strand by species & product type	Optimistic Scenario	Pessimistic Scenario	Average Scenario
Tuna	Frozen Cut Tuna (Local)	0.18	0.16	0.17
	Whole Tuna on Ice (Hotel)	2.80	2.53	2.67

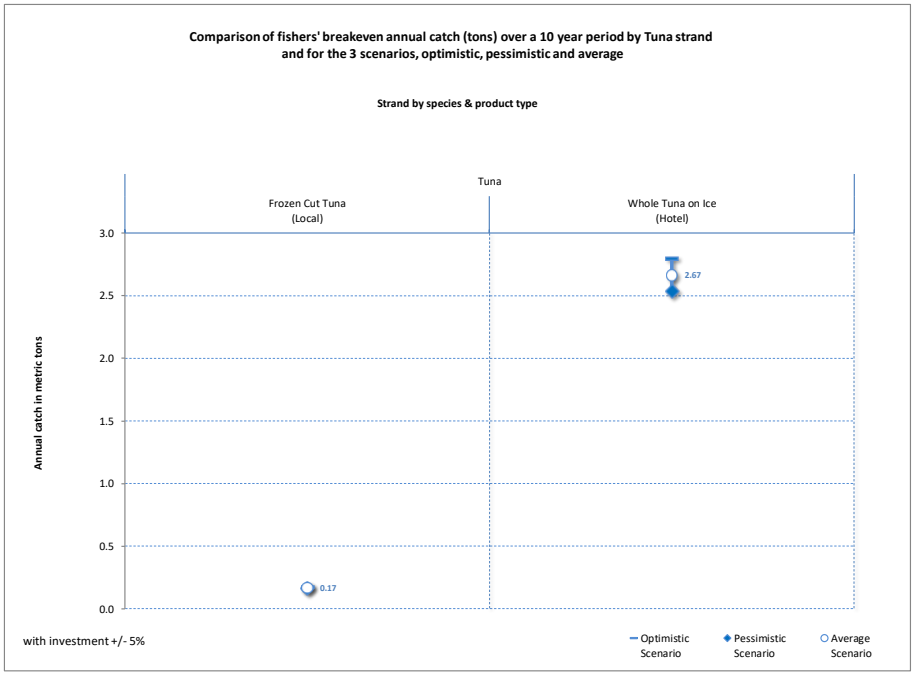


Figure 10-3: Fishers' breakeven catch (tons) graphical comparison by Tuna strand and for the 3 scenarios, optimistic, pessimistic and average

10.5.4.1.2 The Strands' Breakeven Catch comparison

Table 10-31: Strands' breakeven catch (tons) comparison by Tuna strand and for the 3 scenarios, optimistic, pessimistic and average

	Strand by species & product type	Optimistic Scenario	Pessimistic Scenario	Average Scenario
Tuna	Frozen Cut Tuna (Local)	0.86	0.78	0.82
	Whole Tuna on Ice (Hotel)	2.46	2.23	2.35

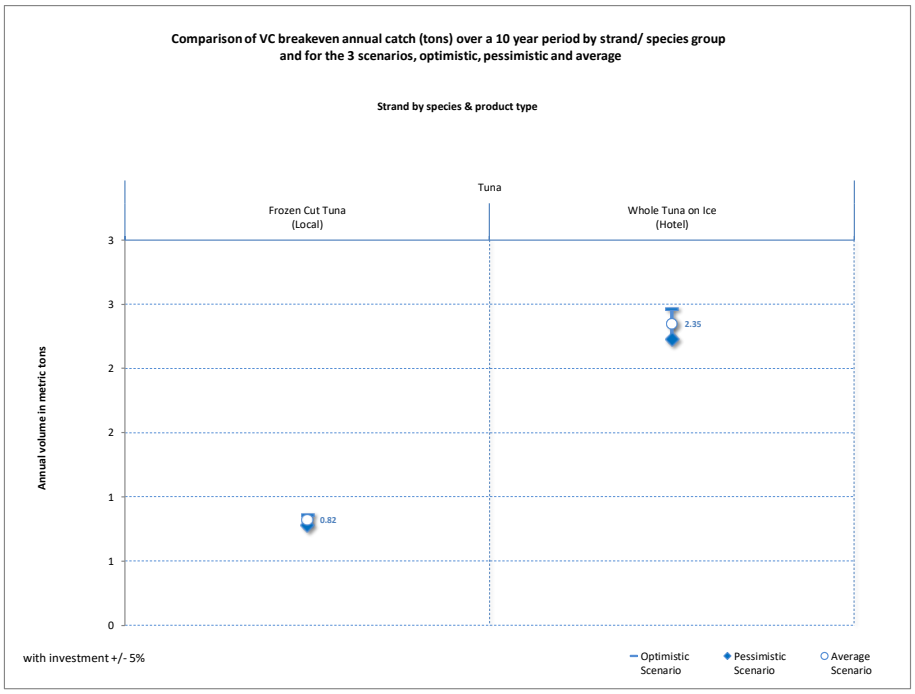


Figure 10-4: Strands' breakeven catch (tons) graphical comparison by Tuna strand and for the 3 scenarios, optimistic, pessimistic and average

10.5.4.2 The Model's Net Present Value (NPV) calculation

The NPV's calculation for strand i follows the formula:

$$NPV_i = \sum_{t=1}^{T} \sum_{j=1}^{N_i} \frac{(p_{ij} - c_{ij}) \cdot q_{ij}}{(1+r)^t} - \sum_{j=1}^{N_i} \sum_{k=1}^{K_{ij}} n_{ijk} \cdot I_{ijk}$$

where,

T is the number of years on which to calculate the NPV along the i^{th} strand's VC which can vary between 1 and 10 years as defined by the user during the simulation,
N_i is the number of actors along the i^{th} strand's VC,
p_{ij} is the price per kg received by the j^{th} actor for the i^{th} strand,
c_{ij} is the cost per kg paid by the j^{th} actor for the i^{th} strand,
q_{ij} is the catch or volume in kg produced by the j^{th} actor for the i^{th} strand,
r is the discount rate as defined by the user for the simulation of all the strand's VC,
I_{ijk} is the k^{th} investment of the j^{th} actor for the i^{th} strand,
K_{ijk} is the number of different capital investment I_{ijk} from the j^{th} actor for the i^{th} strand,
n_{ijk} corresponds to the number of time the j^{th} actor's k^{th} capital investment I_{ijk} needs to be renewed during T number of years for the i^{th} strand.

The formula can be simplified further and be rewritten as,

$$NPV_i = \sum_{t=1}^{T} \sum_{j=1}^{N_i} \frac{\pi_{ij} \cdot q_{ij}}{(1+r)^t} - \sum_{j=1}^{N_i} \sum_{k=1}^{K_{ij}} n_{ijk} \cdot I_{ijk}$$

where,

π_{ij} is the unit profit (or loss if <0) per kg produced by the j^{th} actor for the i^{th} strand,

10.5.4.2.1 The Fishers' NPV comparison

Table 10-32: Fishers' NPV (user defined currency) comparison by Tuna strand and for the 3 scenarios, optimistic, pessimistic and average

	Strand by species & product type	Optimistic Scenario	Pessimistic Scenario	Average Scenario
Tuna	Frozen Cut Tuna (Local)	67,575,768.50	54,743,810.59	61,159,789.55
	Whole Tuna on Ice (Hotel)	34,101,438.10	26,119,358.45	30,110,398.28

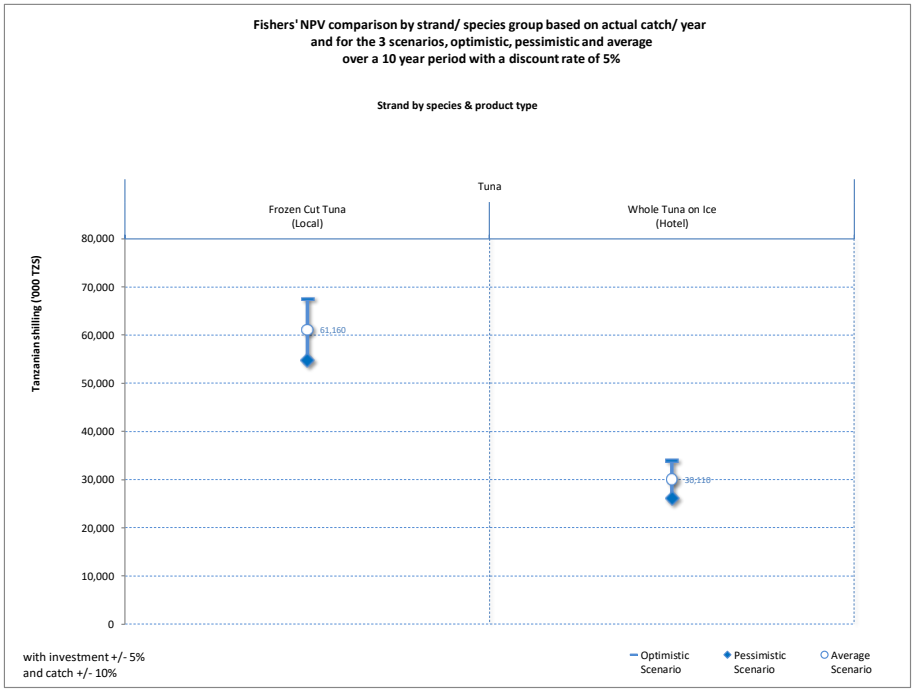


Figure 10-5: Fishers' NPV (user defined currency) graphical comparison by Tuna strand and for the 3 scenarios, optimistic, pessimistic and average

10.5.4.2.2 The Strands' NPV comparison

Table 10-33: Strands' NPV (user defined currency) comparison by Tuna strand and for the 3 scenarios, optimistic, pessimistic and average

	Strand by species & product type	Optimistic Scenario	Pessimistic Scenario	Average Scenario
Tuna	Frozen Cut Tuna (Local)	55,898,893.87	40,644,549.53	48,271,721.70
	Whole Tuna on Ice (Hotel)	118,345,792.49	85,955,648.40	102,150,720.45

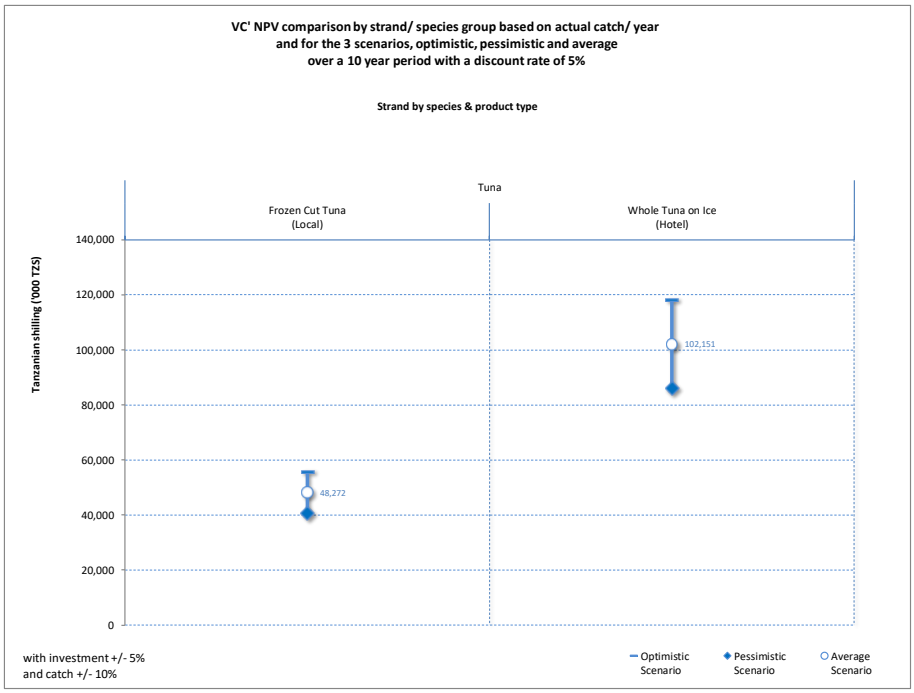


Figure 10-6: Strands' NPV (user defined currency) graphical comparison by Tuna strand and for the 3 scenarios, optimistic, pessimistic and average

10.5.4.3 The Model's Internal Rate of Return (IRR) calculation

r_i^*, the IRR for strand i is determined through an iterative process following the formula:

$$\sum_{t=1}^{T}\sum_{j=1}^{N_i}\frac{(p_{ij}-c_{ij})\cdot q_{ij}}{(1+r_i^*)^t}-\sum_{j=1}^{N_i}\sum_{k=1}^{K_{ij}} n_{ijk}\cdot I_{ijk}=\sum_{t=1}^{T}\sum_{j=1}^{N_i}\frac{\pi_{ij}\cdot q_{ij}}{\left(1+r_i^*\right)^t}-\sum_{j=1}^{N_i}\sum_{k=1}^{K_{ij}} n_{ijk}\cdot I_{ijk}=0$$

where,

r_i^* is the Internal rate of return of the i^{th} strand being determined iteratively and numerically
T is the number of years on which to calculate the NPV along the i^{th} strand's VC which can vary between 1 and 10 years as defined by the user during the simulation,
N_i is the number of actors along the i^{th} strand's VC,
p_{ij} is the price per kg received by the j^{th} actor for the i^{th} strand,
c_{ij} is the cost per kg paid by the j^{th} actor for the i^{th} strand,
q_{ij} is the catch or volume in kg produced by the j^{th} actor for the i^{th} strand,
r is the discount rate as defined by the user for the simulation of all the strand's VC,
I_{ijk} is the k^{th} investment of the j^{th} actor for the i^{th} strand,
K_{ijk} is the number of different capital investment I_{ijk} from the j^{th} actor for the i^{th} strand,
n_{ijk} corresponds to the number of time the j^{th} actor's k^{th} capital investment I_{ijk} needs to be renewed during T number of years for the i^{th} strand.
π_{ij} is the unit profit (or loss if <0) per kg produced by the j^{th} actor for the i^{th} strand,

10.5.4.3.1 The Fishers' IRR comparison

Table 10-34: Fishers' IRR (%) comparison by Tuna strand and for the 3 scenarios, optimistic, pessimistic and average

	Strand by species & product type	Optimistic Scenario	Pessimistic Scenario	Average Scenario
Tuna	Frozen Cut Tuna (Local)	152%	137%	145%
	Whole Tuna on Ice (Hotel)	32%	29%	31%

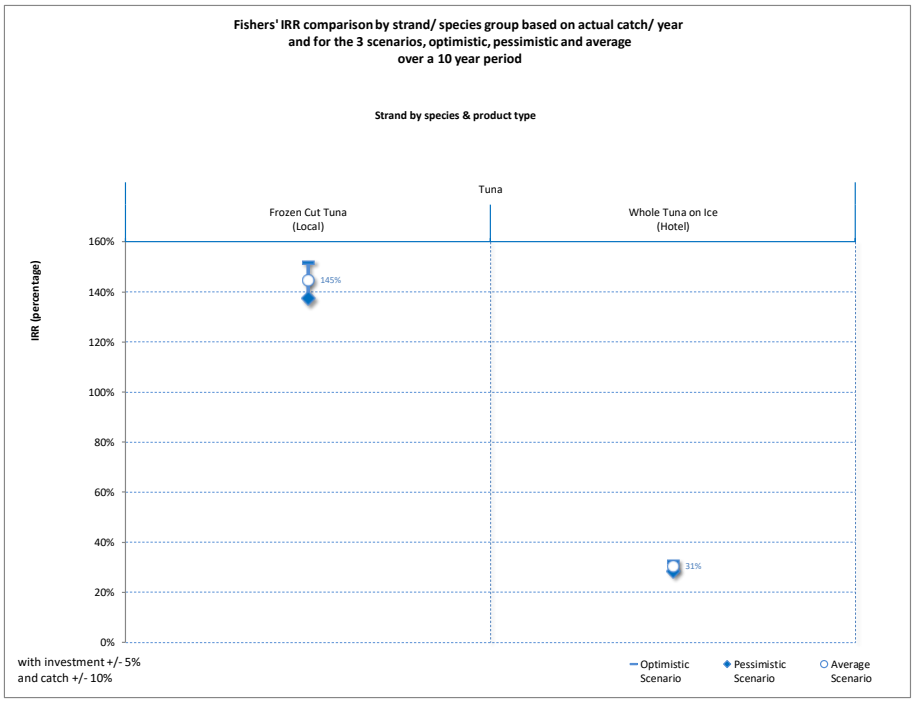


Figure 10-7: Fishers' IRR (%) graphical comparison by Tuna strand and for the 3 scenarios, optimistic, pessimistic and average

10.5.4.3.2 The Strands' IRR comparison

Table 10-35: Strands' IRR (%) comparison by Tuna strand and for the 3 scenarios, optimistic, pessimistic and average

	Strand by species & product type	Optimistic Scenario	Pessimistic Scenario	Average Scenario
Tuna	Frozen Cut Tuna (Local)	22%	19%	20%
	Whole Tuna on Ice (Hotel)	22%	19%	20%

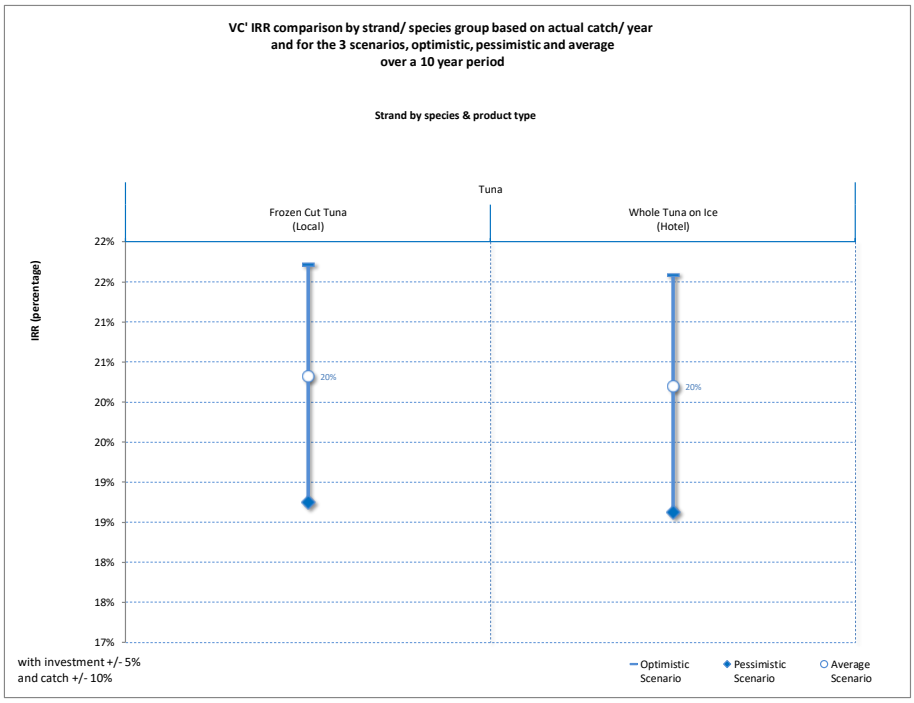


Figure 10-8: Strands' IRR (%) graphical comparison by Tuna strand and for the 3 scenarios, optimistic, pessimistic and average

10.5.5 Comparaison between the 2 strands by actor along the VC in term of Simple Gross Profit (SGP)

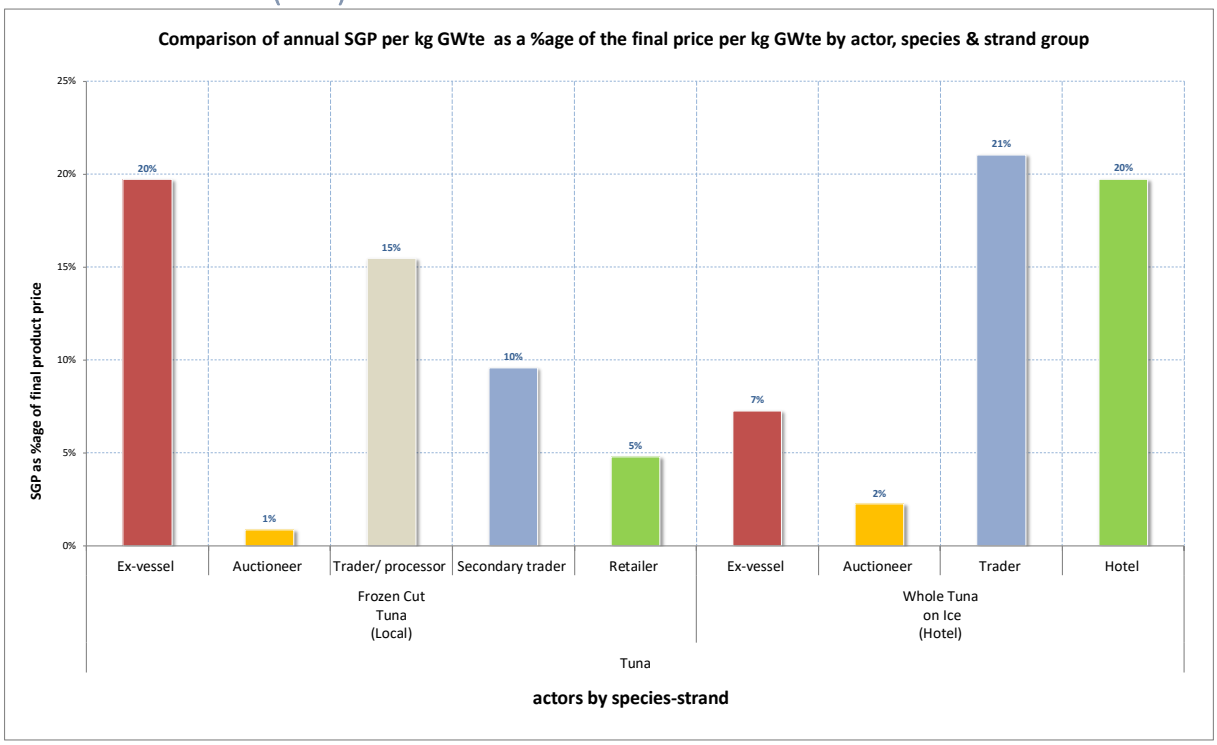


Figure 10-9: Comparison of annual SGP per kg GWte as a %age of the final price per kg GWte by actor, species & strand group.

10.6 Relevant Harmonized Commodity Description and Coding Systems (HS) for the tuna products exported by SWIOFC MS

The Harmonized System is an international nomenclature for the classification of products. It allows participating countries to classify traded goods on a common basis for customs purposes. At the international level, the Harmonized System (HS) for classifying goods is a six-digit code system. The Harmonized Commodity Description and Coding System generally referred to as "Harmonized System" or simply "HS" is a multipurpose international product nomenclature developed by the World Customs Organization (WCO, 2019). Note that certain species can have 2 different codes, that is Southern Bluefin Tuna with codes SBT or SBF and Pacific bluefin tuna with codes PBF or

Table 10-36: List of the codes of tuna products exported by SWIOFC MS following the 6-digit Harmonized Commodity and Coding Systems (HS).

Commodity Code	Commodity description	Short description
030194	**Name**: Fish; live, Atlantic and Pacific bluefin tunas (Thunnus thynnus, Thunnus orientalis) **Description**: -- Atlantic and Pacific bluefin tunas (Thunnus thynnus, Thunnus orientalis)	PBF (live)
030195	**Name**: Fish; live, southern bluefin tunas (Thunnus maccoyii) **Description**: -- Southern bluefin tunas (Thunnus maccoyii)	SBF (live)
030231	**Name**: Fish; fresh or chilled, albacore or longfinned tunas (Thunnus alalunga), excluding fillets, fish meat of 0304, and edible fish offal of subheadings 0302.91 to 0302.99 **Description**: -- Albacore or longfinned tunas (Thunnus alalunga)	ALB (frozen or chilled)
030232	**Name**: Fish; fresh or chilled, yellowfin tunas (Thunnus albacares), excluding fillets, fish meat of 0304, and edible fish offal of subheadings 0302.91 to 0302.99 **Description**: -- Yellowfin tunas (Thunnus albacares)	YFT (fresh or chilled)
030233	**Name**: Fish; fresh or chilled, skipjack or stripe-bellied bonito, excluding fillets, fish meat of 0304, and edible fish offal of subheadings 0302.91 to 0302.99 **Description**: -- Skipjack or stripe-bellied bonito	SKJ (fresh or chilled)
030234	**Name**: Fish; fresh or chilled, bigeye tunas (Thunnus obesus), excluding fillets, fish meat of 0304, and edible fish offal of subheadings 0302.91 to 0302.99 **Description**: -- Bigeye tunas (Thunnus obesus)	BET (fresh or chilled)
030235	**Name**: Fish; fresh or chilled, Atlantic and Pacific bluefin tunas (Thunnus thynnus, Thunnus orientalis), excluding fillets, fish meat of 0304, and edible fish offal of subheadings 0302.91 to 0302.99 **Description**: -- Atlantic and Pacific bluefin tunas (Thunnus thynnus, Thunnus orientalis)	PBF (fresh or chilled)
030236	**Name**: Fish; fresh or chilled, southern bluefin tunas (Thunnus maccoyii), excluding fillets, fish meat of 0304, and edible fish offal of subheadings 0302.91 to 0302.99 **Description**: -- Southern bluefin tunas (Thunnus maccoyii)	SBF (fresh or chilled)
030239	**Name**: Fish; fresh or chilled, tuna, n.e.c. in item no. 0302.3, excluding fillets, fish meat of 0304, and edible fish offal of subheadings 0302.91 to 0302.99 **Description**: -- Other	TUN (fresh or chilled)
030341	**Name**: Fish; frozen, albacore or longfinned tunas (Thunnus alalunga), excluding fillets, fish meat of 0304, and edible fish offal of subheadings 0303.91 to 0303.99 **Description**: -- Albacore or longfinned tunas (Thunnus alalunga)	ALB (frozen)
030342	**Name**: Fish; frozen, yellowfin tunas (Thunnus albacares), excluding fillets, fish meat of 0304, and edible fish offal of subheadings 0303.91 to 0303.99 **Description**: -- Yellowfin tunas (Thunnus albacares)	YFT (frozen)
030343	**Name**: Fish; frozen, skipjack or stripe-bellied bonito, excluding fillets, fish meat of 0304, and edible fish offal of subheadings 0303.91 to 0303.99 **Description**: -- Skipjack or stripe-bellied bonito	SKJ (frozen)
030344	**Name**: Fish; frozen, bigeye tunas (Thunnus obesus), excluding fillets, fish meat of 0304, and edible fish offal of subheadings 0303.91 to 0303.99 **Description**: -- Bigeye tunas (Thunnus obesus)	BET (frozen)
030345	**Name**: Fish; frozen, Atlantic and Pacific bluefin tunas (Thunnus thynnus, Thunnus orientalis), excluding fillets, fish meat of 0304, and edible fish offal of subheadings 0303.91 to 0303.99 **Description**: -- Atlantic and Pacific bluefin tunas (Thunnus thynnus, Thunnus orientalis)	SBF (frozen)
030346	**Name**: Fish; frozen, southern bluefin tunas (Thunnus maccoyii), excluding fillets, fish meat of 0304, and edible fish offal of subheadings 0303.91 to 0303.99 **Description**: -- Southern bluefin tunas (Thunnus maccoyii)	SBF (frozen)
030349	**Name**: Fish; frozen, tuna, n.e.c. in item no. 0303.4, excluding fillets, fish meat of 0304, and edible fish offal of subheadings 0303.91 to 0303.99 **Description**: -- Other	TUN (frozen)
030449	**Name**: Fish fillets; fresh or chilled, other than fish of heading 0304.4 **Description**: -- Other	TUN (fresh or chilled fillet)[1]
030459	**Name**: Fish meat; excluding fillets, whether or not minced; fresh or chilled, of fish n.e.c. in item no. 0304.5 **Description**: -- Other	TUN (fresh or chilled meat)[1]
030487	**Name**: Fish fillets; frozen, tunas (of the genus Thunnus), skipjack or stripe-bellied bonito (Euthynnus (Katsuwonus) pelamis) **Description**: -- Tunas (of the genus Thunnus), skipjack or stripe-bellied bonito (Euthynnus (Katsuwonus) pelamis)	SKJ (frozen fillets)
030510	**Name**: Fish; flours, meals and pellets, fit for human consumption **Description**: -Flours, meals and pellets of fish, fit for human consumption	TUN (meals)[1]
030549	**Name**: Fish; smoked, whether or not cooked before or during smoking, n.e.c. in item no. 0305.4, includes fillets, but excludes edible fish offal **Description**: -- Other	TUN (smoked)[1]
030554	**Name**: Dried herrings, anchovies, sardines, sardinella, brisling or sprats, mackerel (incl Indian, jack, or horse), seerfishes, jacks, crevalles, cobia, silver pomfrets, Pacific saury, scads, capelin, swordfish, Kawakawa, bonitos, marlins, sailfishes, spearfish **Description**: -- Herrings (Clupea harengus, Clupea pallasii), anchovies (Engraulis spp.), sardines (Sardina pilchardus, Sardinops spp.), sardinella (Sardinella spp.), brisling or sprats (Sprattus sprattus), mackerel (Scomber scombrus, Scomber australasicus, Scomber ja[...])	TUN (dried)[1]
030569	**Name**: Fish; salted or in brine, not dried or smoked, other than edible fish offal, n.e.c. in item no. 0305.6 **Description**: -- Other	TUN (salted)[1]
160414	**Name**: Fish preparations; tunas, skipjack and Atlantic bonito (sarda spp.), prepared or preserved, whole or in pieces (but not minced) **Description**: -- Tunas, skipjack and bonito (Sarda spp.)	SKJ (canned)
160419	**Name**: Fish preparations; fish prepared or preserved, whole or in pieces (but not minced), n.e.c. in heading no. 1604 **Description**: -- Other	TUN (prep minced)[1]
160420	**Name**: Fish preparations; fish minced or in forms n.e.c. in heading no. 1604, prepared or preserved **Description**: -Other prepared or preserved fish	TUN (prep not minced)[1]

[1] Commodities that might include non-tuna species. We prorated the quantities recorded under these codes based on the FAO FishStatJ data we filtered which only include tuna species.

10.7 Comparison FAO and ComTrade export data

We looked at export data from two different sources in order to fill-in potential gaps in the available data. We first downloaded volume and value trade data from the UN ComTrade website (UN Comtrade, 2019) by country, year and commodity codes selecting the relevant 6 digit commodity codes from the 2012 Harmonised system (HS2012), see section 10.6 above. The UNContrade covered trade data (export, import, re-export and re-import) for almost all the SWIOFC MS until 2017 (some SWIOFC MS had partial data available for 2018 as well), the exception being Somalia, Réunion and Yemen; however we found data Somalia and Yemen for 2017 in the FAO FishStatJ database . We then downloaded production and trade data from the FAO FishStatJ database (FAO, 2019c). The FAO FishStatJ database contains statistics on the annual production of fishery commodities and imports and exports (including re-exports) of fishery commodities by country and commodities in terms of volume and value from 1976 to 2017. Although the FAO FishStatJ does not use the HS2012 codification system (it uses the HS2017 but without code, just a description), we were able to match FAO commodity description with an HS 2012 equivalent code. In the tables below we compare 2 queries we ran on the export data by SWIOFC MS and commodity in 2017 in both databases. The label in red in the 2 tables below correspond to HS codes which in the UN ComTrade case might include non-tuna species (see Table 10-36) while the corresponding adjusted codes in the FAO FishStatJ table only includes tuna species. In this case , where available and for those codes only, we prorated the UN ComTrade reported values with FAO data for that code, country, year and for each partner (i.e. market destination).

FAO Fishstats

Trade flow	Exports
Disaggregated	0

Sum of FAO Volume (Mt)	Year
Reporter/ Commodity	2017
Comoros	**-**
160414 [SKJ (canned)]	-
Kenya	**16**
030349 [TUN (frozen)]	14
160414 [SKJ (canned)]	2
Madagascar	**8,447**
160414 [SKJ (canned)]	8,391
030234 [BET (fresh or chilled)]	21
030231 [ALB (frozen or chilled)]	18
030232 [YFT (fresh or chilled)]	16
030239 [TUN (fresh or chilled)]	1
030343 [SKJ (frozen)]	-
030344 [BET (frozen)]	-
Maldives	**71,756**
030343 [SKJ (frozen)]	41,056
030342 [YFT (frozen)]	11,598
030232 [YFT (fresh or chilled)]	5,174
160420 [TUN (prep not minced)¹]	4,896
030459 [TUN (fresh or chilled meat)¹]	4,044
030510 [TUN (meals)¹]	1,907
030554 [TUN (dried)¹]	1,506
030349 [TUN (frozen)]	896
030234 [BET (fresh or chilled)]	400
030344 [BET (frozen)]	257
030487 [SKJ (frozen fillets)]	12
030549 [TUN (smoked)¹]	8
030341 [ALB (frozen)]	2
Mauritius	**67,077**
160420 [TUN (prep not minced)¹]	29,389
160414 [SKJ (canned)]	26,167
160419 [TUN (prep minced)¹]	4,654
030349 [TUN (frozen)]	2,516
030342 [YFT (frozen)]	2,296
030341 [ALB (frozen)]	882
030344 [BET (frozen)]	618
030343 [SKJ (frozen)]	531
030232 [YFT (fresh or chilled)]	12
030234 [BET (fresh or chilled)]	7
030239 [TUN (fresh or chilled)]	4
030231 [ALB (frozen or chilled)]	1
Mozambique	**721**
030239 [TUN (fresh or chilled)]	433
030345 [SBT (frozen)]	149
030342 [YFT (frozen)]	57
030344 [BET (frozen)]	39
030349 [TUN (frozen)]	29
030232 [YFT (fresh or chilled)]	7
030234 [BET (fresh or chilled)]	5
030236 [SBT (fresh or chilled)]	2
030231 [ALB (frozen or chilled)]	-
Seychelles	**135,379**
030343 [SKJ (frozen)]	45,821
030342 [YFT (frozen)]	36,103
160414 [SKJ (canned)]	34,701
030344 [BET (frozen)]	13,340
030341 [ALB (frozen)]	2,793
030349 [TUN (frozen)]	2,599
030345 [SBT (frozen)]	22
Somalia	**2**
030239 [TUN (fresh or chilled)]	2
South Africa	**3,954**
030341 [ALB (frozen)]	1,853
160414 [SKJ (canned)]	1,177
030232 [YFT (fresh or chilled)]	283
030234 [BET (fresh or chilled)]	235
030342 [YFT (frozen)]	139
030349 [TUN (frozen)]	72
030231 [ALB (frozen or chilled)]	57
030344 [BET (frozen)]	38
030236 [SBT (fresh or chilled)]	32
030195 [SBT (live)]	25
030345 [SBT (frozen)]	24
030239 [TUN (fresh or chilled)]	13
030235 [BFT (fresh or chilled)]	6
030194 [BFT (live)]	-
030343 [SKJ (frozen)]	-
Tanzania, United Rep. of	**1,318**
030232 [YFT (fresh or chilled)]	1,296
030349 [TUN (frozen)]	21
030239 [TUN (fresh or chilled)]	1
Yemen	**2,812**
160414 [SKJ (canned)]	966
030349 [TUN (frozen)]	898
030231 [ALB (frozen or chilled)]	534
030239 [TUN (fresh or chilled)]	176
030342 [YFT (frozen)]	143
030341 [ALB (frozen)]	58
030236 [SBT (fresh or chilled)]	33
030232 [YFT (fresh or chilled)]	4
Grand Total	**291,482**

UN ComTrade

Trade Flow	Exports
Disaggregated	0

Volume (metric tonnes)	Year
Reporter/ Commodity	2017
Kenya	**95**
030569 [TUN (salted)¹]	78
030349 [TUN (frozen)]	14
160414 [SKJ (canned)]	2
160420 [TUN (not minced)¹]	0
030510 [TUN (meals)¹]	0
030449 [TUN (fresh or chilled fillets)¹]	0
160419 [TUN (minced)¹]	0
030342 [YFT (frozen)]	0
Madagascar	**10,426**
160414 [SKJ (canned)]	8,391
030342 [YFT (frozen)]	1,953
030449 [TUN (fresh or chilled fillets)¹]	26
030234 [BET (fresh or chilled)]	21
030231 [ALB (frozen or chilled)]	18
030232 [YFT (fresh or chilled)]	16
030459 [TUN (fresh or chilled meat)¹]	1
030344 [BET (frozen)]	0
030343 [SKJ (frozen)]	0
030341 [ALB (frozen)]	0
Maldives	**68,231**
030343 [SKJ (frozen)]	41,056
030342 [YFT (frozen)]	11,598
030232 [YFT (fresh or chilled)]	5,174
160414 [SKJ (canned)]	4,896
030449 [TUN (fresh or chilled fillets)¹]	4,033
030487 [SKJ (frozen fillets)]	785
030234 [BET (fresh or chilled)]	396
030344 [BET (frozen)]	257
030349 [TUN (frozen)]	24
030459 [TUN (fresh or chilled meat)¹]	10
030341 [ALB (frozen)]	2
Mauritius	**67,104**
160414 [SKJ (canned)]	55,555
160420 [TUN (not minced)¹]	4,654
030487 [SKJ (frozen fillets)]	2,503
030342 [YFT (frozen)]	2,296
030341 [ALB (frozen)]	882
030344 [BET (frozen)]	618
030343 [SKJ (frozen)]	531
030569 [TUN (salted)¹]	28
030232 [YFT (fresh or chilled)]	12
030349 [TUN (frozen)]	12
030234 [BET (fresh or chilled)]	7
160419 [TUN (minced)¹]	4
030239 [TUN (fresh or chilled)]	2
030231 [ALB (frozen or chilled)]	1
Mozambique	**727**
030239 [TUN (fresh or chilled)]	449
030349 [TUN (frozen)]	150
030342 [YFT (frozen)]	57
030344 [BET (frozen)]	39
030232 [YFT (fresh or chilled)]	12
030459 [TUN (fresh or chilled meat)¹]	9
030234 [BET (fresh or chilled)]	5
030231 [ALB (frozen or chilled)]	4
030236 [SBT (fresh or chilled)]	2
030346 [SBT (frozen)]	1
160419 [TUN (minced)¹]	0
160420 [TUN (not minced)¹]	0
030569 [TUN (salted)¹]	0
Seychelles	**61,224**
160414 [SKJ (canned)]	34,701
030342 [YFT (frozen)]	23,695
030349 [TUN (frozen)]	2,599
030343 [SKJ (frozen)]	109
160420 [TUN (not minced)¹]	99
030345 [SBT (frozen)]	22
030569 [TUN (salted)¹]	0
030344 [BET (frozen)]	0
030234 [BET (fresh or chilled)]	0
Somalia	**2**
030239 [TUN (fresh or chilled)]	2
South Africa	**11,188**
160419 [TUN (minced)¹]	3,837
160420 [TUN (not minced)¹]	2,397
030341 [ALB (frozen)]	1,853
160414 [SKJ (canned)]	1,176
030510 [TUN (meals)¹]	571
030449 [TUN (fresh or chilled fillets)¹]	374
030232 [YFT (fresh or chilled)]	259
030234 [BET (fresh or chilled)]	235
030342 [YFT (frozen)]	139
030459 [TUN (fresh or chilled meat)¹]	78
030231 [ALB (frozen or chilled)]	57
030349 [TUN (frozen)]	54
030344 [BET (frozen)]	38
030236 [SBT (fresh or chilled)]	32
030195 [SBT (live)]	25
030345 [SBT (frozen)]	24
030569 [TUN (salted)¹]	16
030239 [TUN (fresh or chilled)]	12
030235 [BFT (fresh or chilled)]	6
030487 [SKJ (frozen fillets)]	1
030343 [SKJ (frozen)]	0
030194 [BFT (live)]	0
030233 [SKJ (fresh or chilled)]	0
United Rep. of Tanzania	**5,682**
030449 [TUN (fresh or chilled fillets)¹]	4,176
030232 [YFT (fresh or chilled)]	1,296
030569 [TUN (salted)¹]	189
030349 [TUN (frozen)]	21
Yemen	**2,812**
160414 [SKJ (canned)]	966
030349 [TUN (frozen)]	898
030231 [ALB (frozen or chilled)]	534
030239 [TUN (fresh or chilled)]	176
030342 [YFT (frozen)]	143
030341 [ALB (frozen)]	58
030236 [SBT (fresh or chilled)]	33
030232 [YFT (fresh or chilled)]	4
Grand Total	**227,491**

10.8 Tuna Species Geographic Distribution.

FAO's compilation of aquatic species distribution maps of interest to fisheries uses a GIS approach and are based on a large number of aquatic species which are accurately reproduced and now publicly available. Geographic terms and habitat descriptions were extracted from the FAO Catalogues of Species and combined with global databases from authoritative sources. (FAO, 2019d)

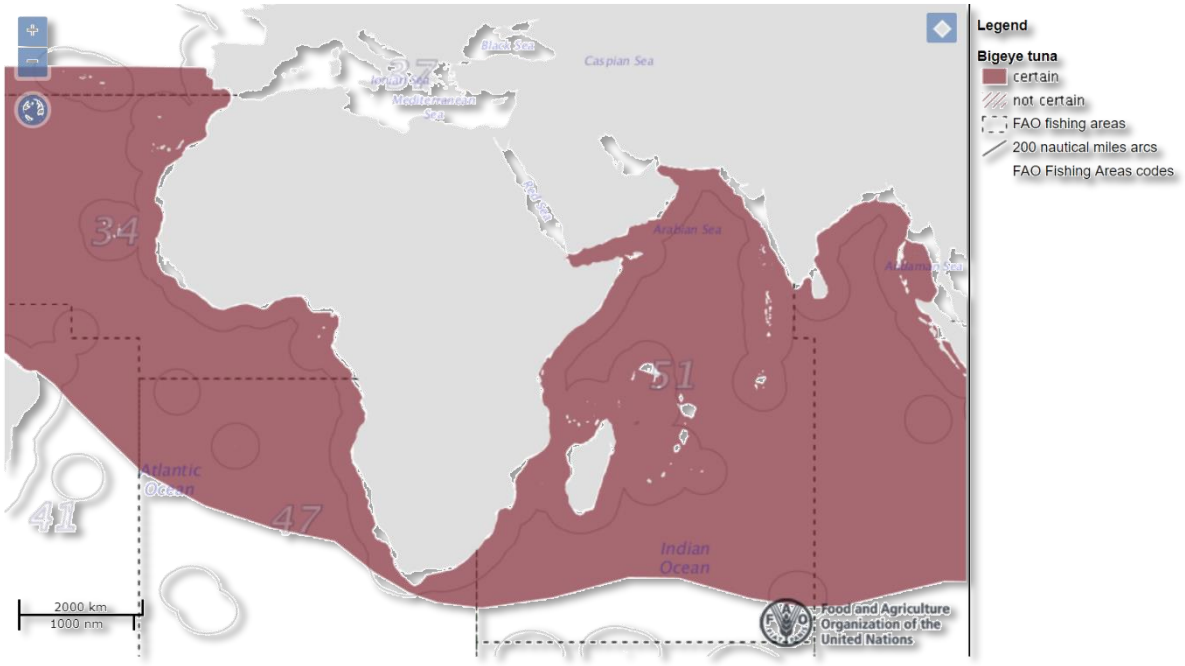


Figure 10-10: Geographic Distribution of Bigeye tuna - Thunnus obesus - Scombridae - SCOMBROIDEI – BET in the region of interest. Source FAO (2019d)

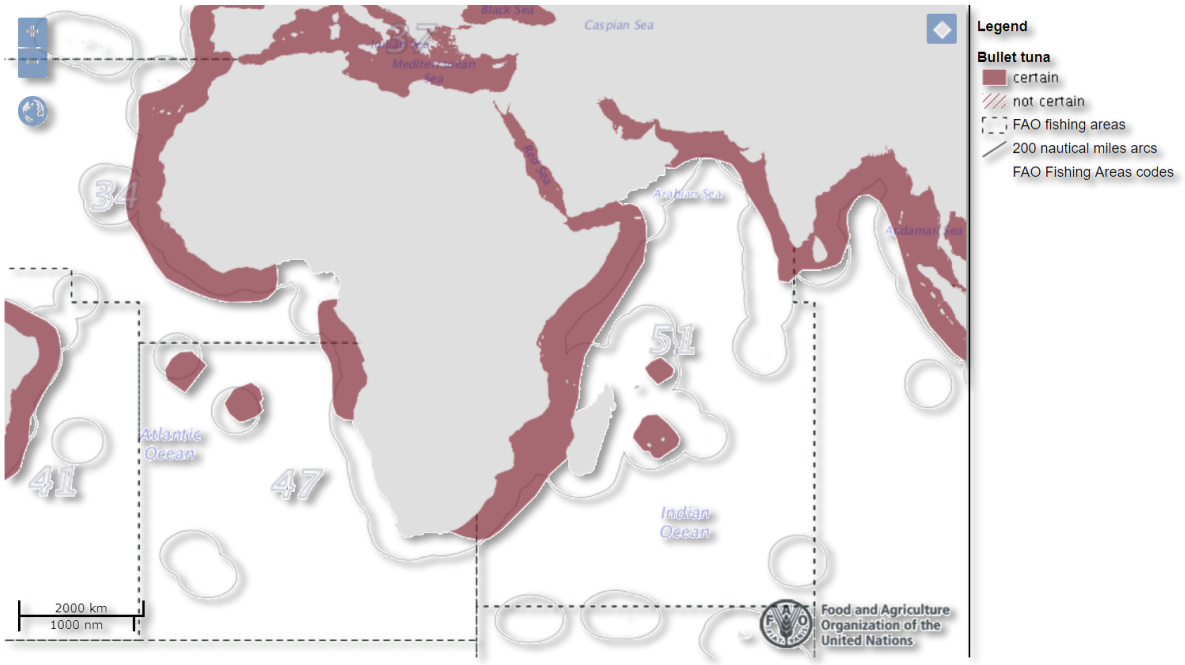


Figure 10-11: Geographic Distribution of Bullet tuna - Auxis rochei - Scombridae - SCOMBROIDEI – BLT in the region of interest. Source FAO (2019d)

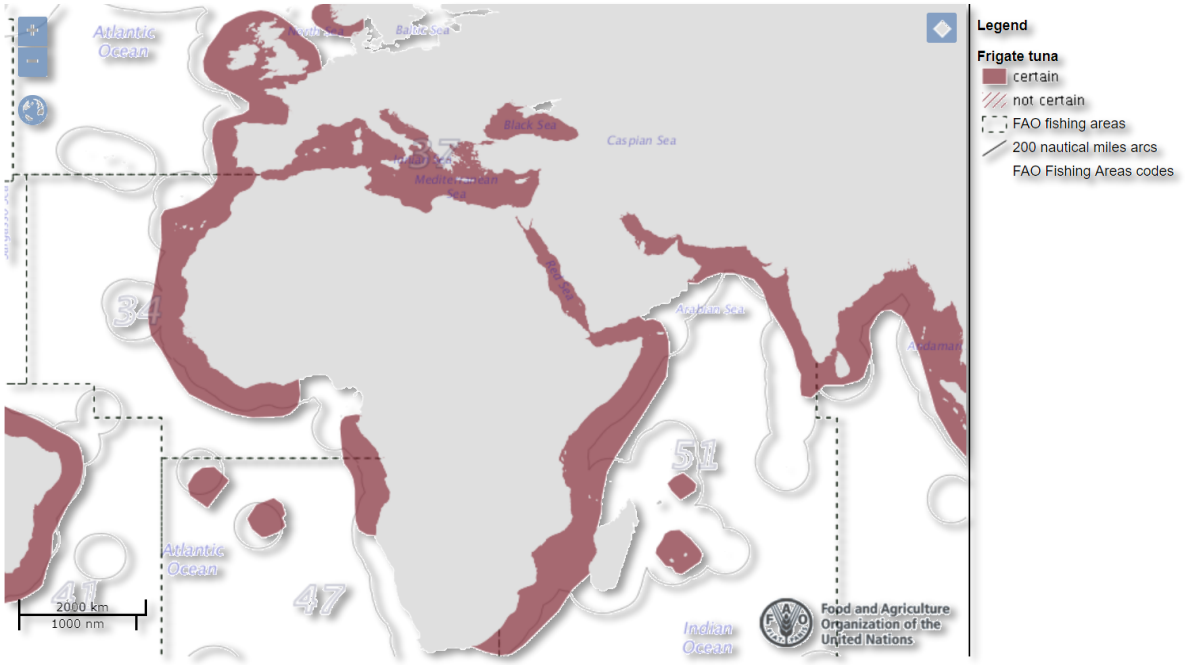


Figure 10-12: Geographic Distribution of Frigate tuna - Auxis thazard - Scombridae - SCOMBROIDEI - FRI in the region of interest. Source FAO (2019d)

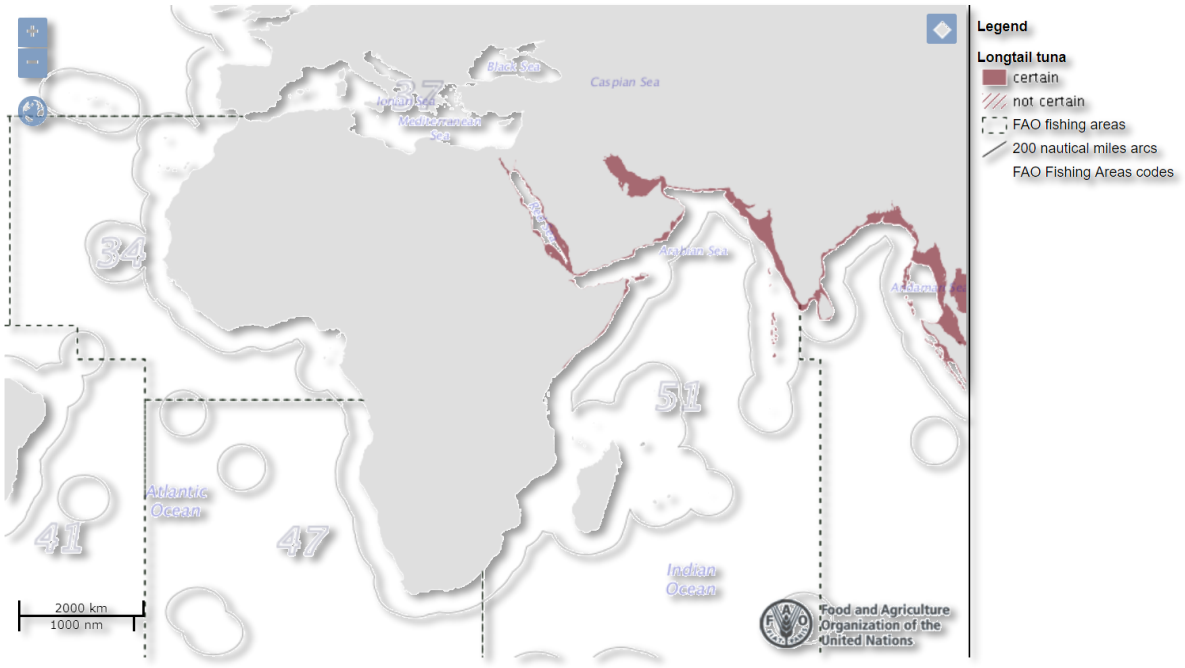


Figure 10-13: Geographic Distribution of Longtail tuna - Thunnus tonggol - Scombridae - SCOMBROIDEI - LOT in the region of interest. Source FAO (2019d)

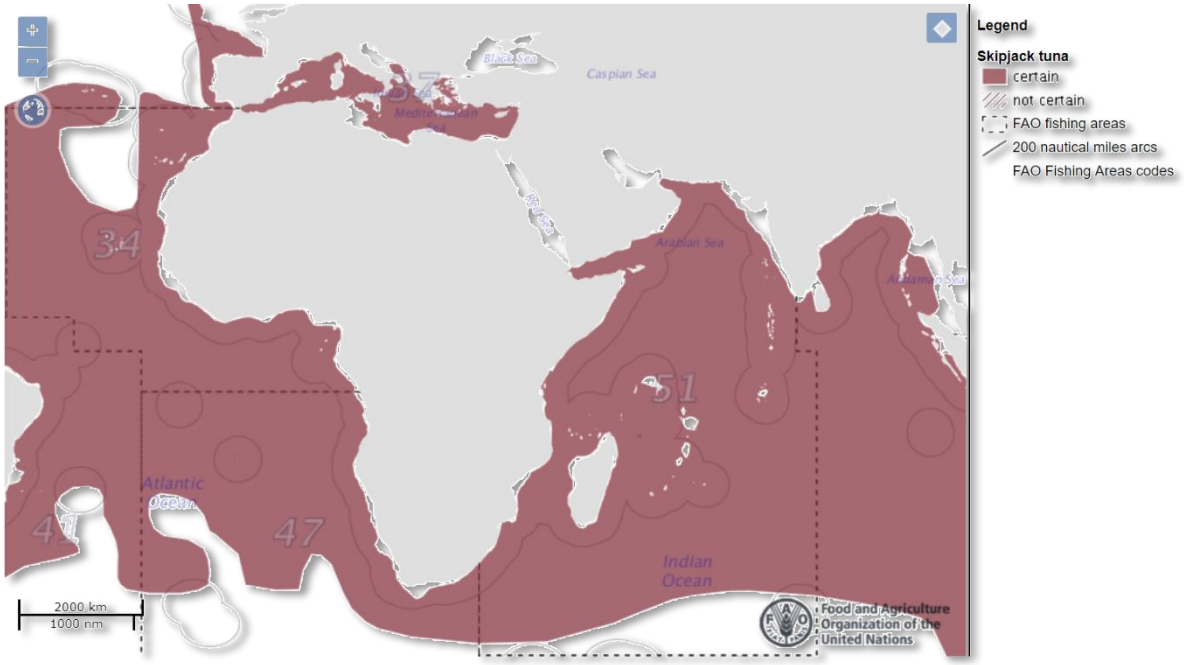


Figure 10-14: Geographic Distribution of Skipjack tuna - Katsuwonus pelamis - Scombridae - SCOMBROIDEI – SKJ in the region of interest. Source FAO (2019d)

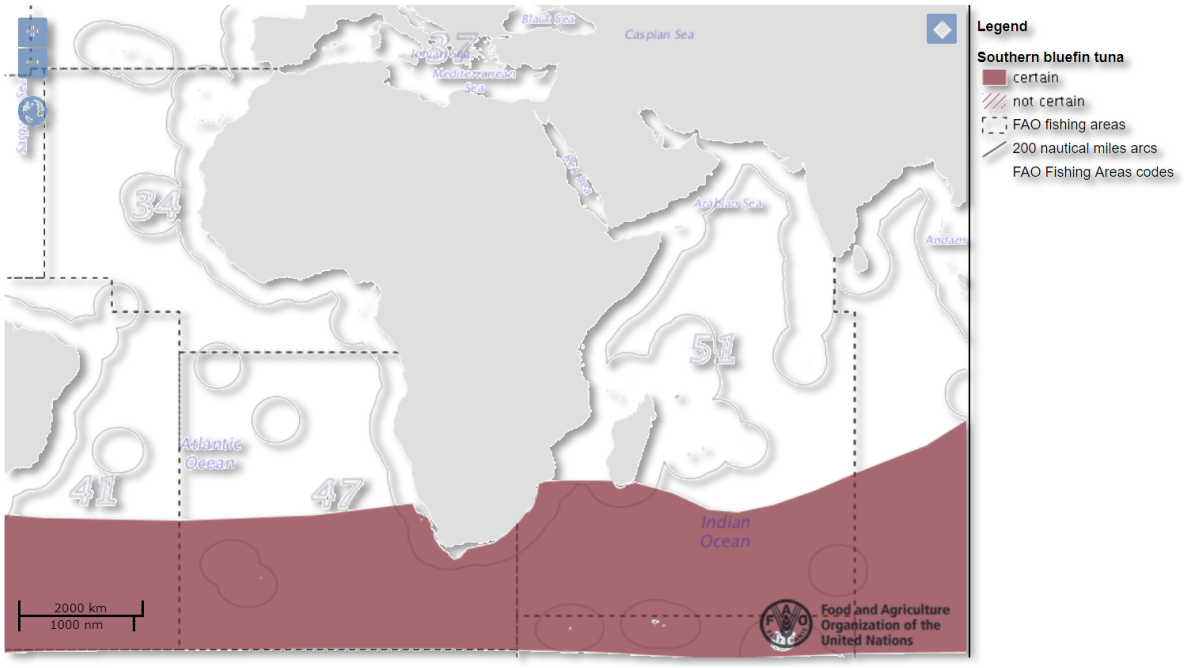


Figure 10-15: Geographic Distribution of Southern bluefin tuna - Thunnus maccoyii - Scombridae - SCOMBROIDEI - SBF in the region of interest. Source FAO (2019d)

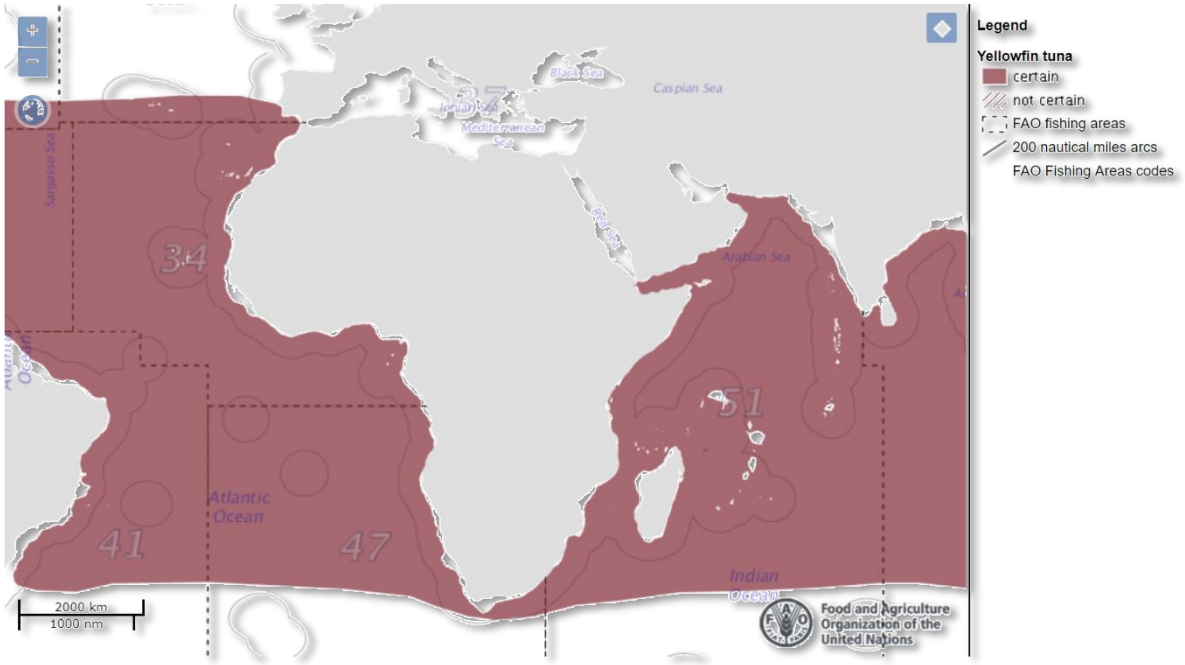


Figure 10-16: Geographic Distribution of Yellowfin tuna - Thunnus albacares - Scombridae - SCOMBROIDEI – YFT in the region of interest. Source FAO (2019d)

10.9 IOTC Catch-Effort reporting Grid system

The IOTC Catch-Effort (C-E) database lists catch in weight (purse seine) and/or numbers of fish (longline) of tuna and tuna-like species, preferably raised to the total nominal catch and fishing effort by month, species and gear. The maximum spatial aggregation is by 1°x1° grid area for purse seine and 5°x5° grid area for longline. This is not, however, the case with all C-E data available: CE data recorded for most artisanal fleets refers to irregular areas (e.g. C-E data recorded per port of unloading). (IOTC, 2019)

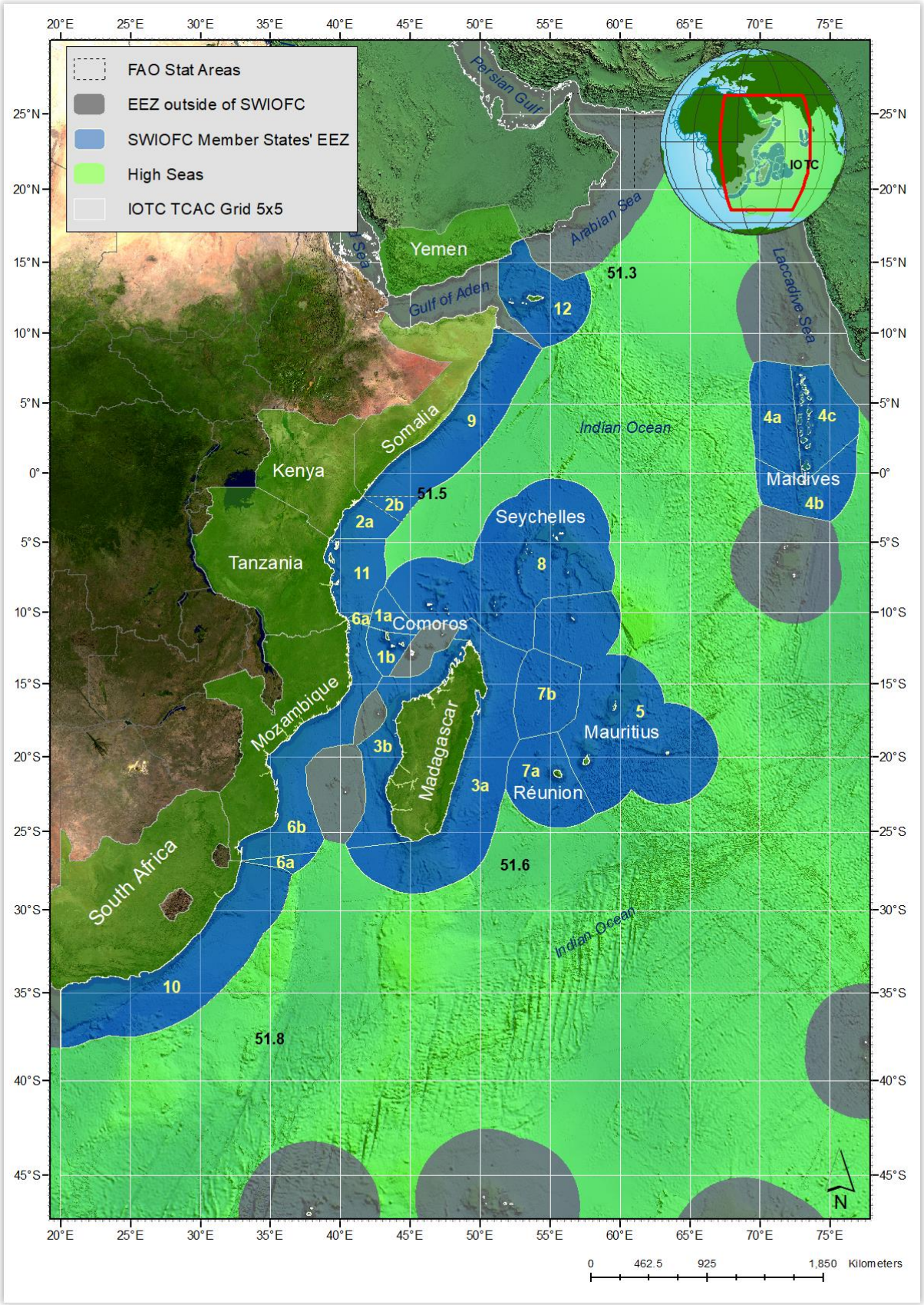


Figure 10-17: 5x5 Regular Grids within the IOTC Area of competence. Source IOTC (2019e)

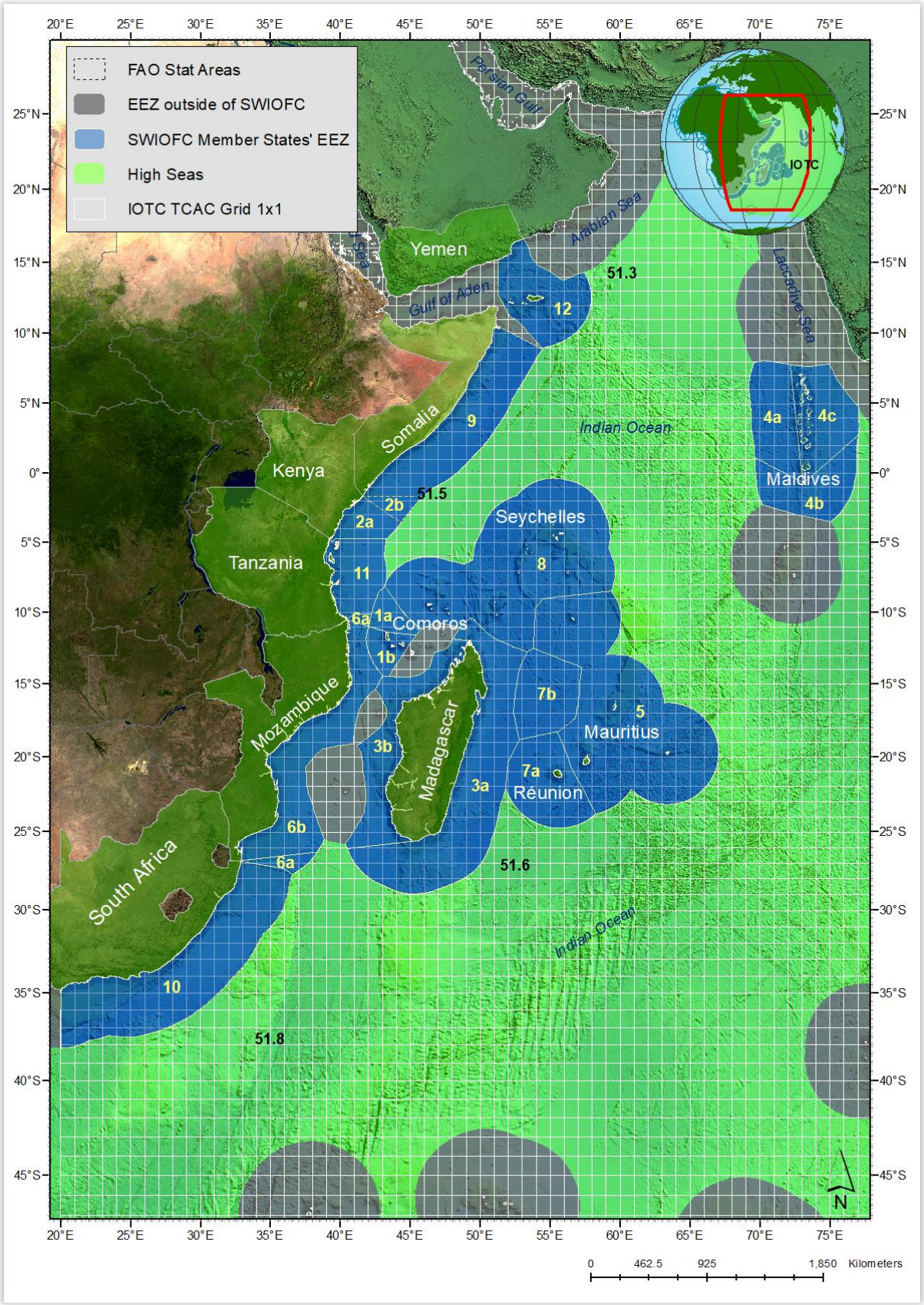


Figure 10-18: 1x1 Regular Grids within the IOTC Area of competence. Source IOTC (2019d)

10.10 Stocks status of the main tuna species in the Indian Ocean

Table 10-37: Status of main Indian Ocean tuna stocks as of 2018. Species Catch levels (2015) and MSY Stock status 2018. Source (IOTC, 2018)

		Tuna Species	Category	Value
Yellowfin tuna	Catches 2017 = 409,567 tonnes	Yellowfin tuna	2017 Catch (t)	409,567
	Average catches 2013-2017 = 390,185 tonnes	Yellowfin tuna	2013-2017 Avg. catch (t)	399,830
	MSY = 403,000 tonnes	Yellowfin tuna	2018 MSY catch (t)	403,000
	Overexploited and overfished stock	Yellowfin tuna	Stock Status	Overexploited and overfished stock
Albacore tuna	Catches 2017 = 38,347 tonnes	Albacore tuna	2017 Catch (t)	38,347
	Average catches 2013-2017 = 36,004 tonnes	Albacore tuna	2013-2017 Avg. catch (t)	36,004
	MSY = 38,800 tonnes	Albacore tuna	2018 MSY catch (t)	38,800
	Healthy stock	Albacore tuna	Stock Status	Healthy stock
Skipjack tuna	Catches 2017 = 524,282 tonnes	Skipjack tuna	2017 Catch (t)	524,282
	Average catches 2013-2017 = 454,103 tonnes	Skipjack tuna	2013-2017 Avg. catch (t)	454,103
	MSY = 510,100 tonnes	Skipjack tuna	2018 MSY catch (t)	510,100
	Healthy stock	Skipjack tuna	Stock Status	Healthy stock
Bigeye tuna	Catches 2017 = 90,050 tonnes	Bigeye tuna	2017 Catch (t)	90,050
	Average catches 2013-2017 = 95,997 tonnes	Bigeye tuna	2013-2017 Avg. catch (t)	95,997
	MSY = 104,000 tonnes	Bigeye tuna	2018 MSY catch (t)	104,000
	Healthy stock	Bigeye tuna	Stock Status	Healthy stock
Longtail tuna	Catches 2017 = 135,006 tonnes	Longtail tuna	2017 Catch (t)	135,006
	Average catches 2013-2017 = 139,856 tonnes	Longtail tuna	2013-2017 Avg. catch (t)	139,856
	MSY = 140,000 tonnes	Longtail tuna	2018 MSY catch (t)	140,000
	Overexploited and overfished stock	Longtail tuna	Stock Status	Overexploited and overfished stock
Kawakawa	Catches 2017 = 159,881 tonnes	Kawakawa	2017 Catch (t)	159,881
	Average catches 2013-2017 = 157,326 tonnes	Kawakawa	2013-2017 Avg. catch (t)	157,326
	MSY = 152,000 tonnes	Kawakawa	2018 MSY catch (t)	152,000
	Healthy stock	Kawakawa	Stock Status	Healthy stock
Bullet tuna	Catches 2017 = 11,094 tonnes	Bullet tuna	2017 Catch (t)	11,094
	Average catches 2013-2017 = 9,959 tonnes	Bullet tuna	2013-2017 Avg. catch (t)	9,959
	MSY = unknown	Bullet tuna	2018 MSY catch (t)	unknown
	Unknown stock status	Bullet tuna	Stock Status	Unknown stock status
Frigate tuna	Catches 2017 = 74,886 tonnes	Frigate tuna	2017 Catch (t)	74,886
	Average catches 2013-2017 = 86,157 tonnes	Frigate tuna	2013-2017 Avg. catch (t)	86,157
	MSY = unknown	Frigate tuna	2018 MSY catch (t)	unknown
	Unknown stock status	Frigate tuna	Stock Status	Unknown stock status

overexploited and overfished stock | healty stock | unknown stock status

10.11 2017 IOTC Catch Effort Data

The data presented below are based on IOTC' data and Grid system used for reporting spatially catch and fishing effort (IOTC, 2019). The data were analysed and aggregated by EEZ by identifying for each grid which EEZ or portion of High Seas they were overlapping with. We used ESRI ArcGIS to manipulate the Grid and EEZ layers (i.e. shapefiles). Using ArcGIS we calculated for each portion of Grid overlapping either an EEZ or a High Seas region the area in squared kilometre. We then use the squared kilometre area for each portion of intersecting Grid and calculated a ratio between that portion and the overall Grid area from which the portion is part of and that was used to report a given catch and effort; we then applied the ratio to the grid catch to prorate that portion of catch within the intersecting EEZ. The whole process used the Grid shapefile from the IOTC website and presented in section 10.9 above. The EEZs shapefile was downloaded from the Marine region website (Marine Regions, 2018).

Table 10-38: Tuna catch by sector, method, fishing fleet flag and SWIO adjacent EEZ in 2017. Source based on IOTC (2019)

Sector/Method/Flag	Comoros EEZ	Somalia EEZ	Reunion EEZ	Kenya EEZ	Madagascar EEZ	Maldives EEZ	Mozambique EEZ	Mauritius EEZ	Seychelles EEZ	South Africa EEZ	Tanzania EEZ	Yemen EEZ	High Seas	Neighboring EEZs	SubTotal Tuna catch (Mt)
Coastal Artisanal	1,873.48	0.17	1,104.84	-	-	992.72	485.67	152.24	65.21	-	190.81	-	258.70	7,839.71	12,963.54
Coastal longline	-	-	53.59	-	-	640.23	-	51.13	-	-	-	-	157.13	1.89	903.97
EU.France.Reunion	-	-	53.59	-	-	-	-	51.13	-	-	-	-	22.20	0.16	127.08
Maldives	-	-	-	-	-	640.23	-	-	-	-	-	-	134.93	1.73	776.89
Gillnet	181.17	-	91.41	-	-	-	46.97	-	6.31	-	18.45	-	-	747.80	1,092.11
Comoros	181.17	-	91.41	-	-	-	46.97	-	6.31	-	18.45	-	-	747.80	1,092.11
Hand line	509.44	-	257.04	-	-	352.43	132.06	-	17.73	-	51.89	-	31.66	2,205.76	3,558.01
Comoros	509.44	-	257.04	-	-	-	132.06	-	17.73	-	51.89	-	-	2,102.72	3,070.89
Maldives	-	-	-	-	-	352.43	-	-	-	-	-	-	31.61	91.06	475.10
UK.Territories	-	-	-	-	-	-	-	-	-	-	-	-	-	11.98	12.02
Hand line and Troll line	-	-	105.97	-	-	-	-	101.10	-	-	-	-	43.89	0.32	251.28
Mauritius	-	-	105.97	-	-	-	-	101.10	-	-	-	-	43.89	0.32	251.28
Offshore gillnet	-	0.17	-	-	-	-	-	-	-	-	-	-	26.03	0.51	26.70
Sri Lanka	-	0.17	-	-	-	-	-	-	-	-	-	-	26.03	0.51	26.70
Troll line	1,182.87	-	596.83	-	-	-	306.64	-	41.17	-	120.47	-	-	4,883.43	7,131.47
Comoros	1,182.87	-	596.83	-	-	-	306.64	-	41.17	-	120.47	-	-	4,882.27	7,130.25
Maldives	-	-	-	-	-	-	-	-	-	-	-	-	-	1.16	1.22
Industrial Longline	271.14	733.47	2,763.59	131.93	121.14	128.00	414.34	4,268.93	7,112.92	507.10	1,344.02	23.88	33,043.84	6,804.91	57,669.19
Longline	268.52	731.13	715.59	131.93	52.84	44.37	120.07	1,145.88	5,919.56	201.82	1,321.44	18.66	15,382.43	3,034.22	29,088.48
China	220.13	338.00	163.05	7.28	13.79	0.52	12.44	260.53	1,022.02	-	1,069.53	11.32	3,506.12	1,070.96	7,695.70
Maldives	-	-	-	-	0.12	25.45	-	-	-	-	-	-	99.42	4.45	129.51
Seychelles	3.68	229.97	103.32	101.54	14.93	11.71	3.82	163.78	1,199.57	37.66	27.51	4.65	3,027.50	544.98	5,474.61
Taiwan,China	44.71	163.16	449.22	23.11	24.01	6.68	103.82	721.57	3,697.90	164.17	224.40	2.70	8,749.40	1,413.83	15,788.67
Longline Fresh	2.62	2.34	1,798.84	-	63.48	83.63	175.71	2,954.97	364.60	64.80	9.31	5.22	17,479.56	3,337.16	26,342.23
China	0.73	-	248.99	-	-	1.57	-	240.57	197.07	-	-	-	1,607.39	180.53	2,476.85
Malaysia	1.49	-	53.88	-	23.53	-	-	44.40	2.73	-	9.18	-	1,416.81	290.28	1,842.29
Mauritius	-	-	33.05	-	-	-	165.34	-	-	3.72	0.13	-	12.11	38.08	252.46
Sri Lanka	-	2.34	-	-	19.69	45.57	-	-	0.26	-	-	5.22	921.90	181.60	1,176.57
Taiwan,China	0.37	-	1,462.92	-	20.26	36.48	10.37	2,670.00	164.54	61.08	-	-	13,521.36	2,646.67	20,594.06
Longline targeting swordfish	-	-	249.16	-	4.81	-	118.55	168.08	828.75	240.48	13.27	-	181.85	433.52	2,238.47
EU.France.Reunion	-	-	212.83	-	0.85	-	-	1.92	-	-	-	-	22.81	293.81	532.22
EU.Portugal	-	-	2.06	-	1.13	-	6.84	0.26	-	9.08	-	-	97.27	18.26	134.90
EU.Spain	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EU.UK	-	-	0.13	-	-	-	0.32	0.28	-	0.49	-	-	22.76	2.47	26.45
EUFrance	-	-	-	-	-	-	7.68	-	-	-	13.27	-	-	9.58	30.53
Madagascar	-	-	0.63	-	2.20	-	-	-	-	-	-	-	-	94.31	97.14
Mauritius	-	-	30.96	-	-	-	-	165.61	-	-	-	-	9.44	8.16	214.17
Mozambique	-	-	2.55	-	-	-	103.71	-	-	-	-	-	-	6.87	113.13
Seychelles	-	-	-	-	0.64	-	-	-	828.75	-	-	-	25.53	-	854.95
South Africa	-	-	-	-	-	-	-	-	-	230.91	-	-	4.04	-	234.98
Industrial Purseseine	-	325.43	-	-	-	84.59	-	0.69	87.57	-	-	-	5,666.88	1,345.16	7,510.33
Baitboat	-	-	-	-	-	84.59	-	-	-	-	-	-	35.89	1,289.37	1,409.85
Maldives	-	-	-	-	-	84.59	-	-	-	-	-	-	35.89	1,289.37	1,409.85
Purse seine	-	325.43	-	-	-	-	-	0.69	87.57	-	-	-	5,629.69	55.80	6,099.18
EUFrance	-	-	-	-	-	-	-	-	-	-	-	-	30.26	-	30.26
Philippines	-	-	-	-	-	-	-	-	-	-	-	-	31.28	-	31.28
Seychelles	-	325.43	-	-	-	-	-	-	87.57	-	-	-	5,554.41	55.80	6,023.21
Thailand	-	-	-	-	-	-	-	0.69	-	-	-	-	13.74	-	14.43
Ring net (offshore)	-	-	-	-	-	-	-	-	-	-	-	-	1.30	-	1.30
Sri Lanka	-	-	-	-	-	-	-	-	-	-	-	-	1.30	-	1.30
SubTotal Tuna catch (Mt)	**2,144.62**	**1,059.06**	**3,868.43**	**131.93**	**121.14**	**1,205.31**	**900.01**	**4,421.86**	**7,265.70**	**507.10**	**1,534.84**	**23.88**	**38,969.41**	**15,989.78**	**78,143.06**

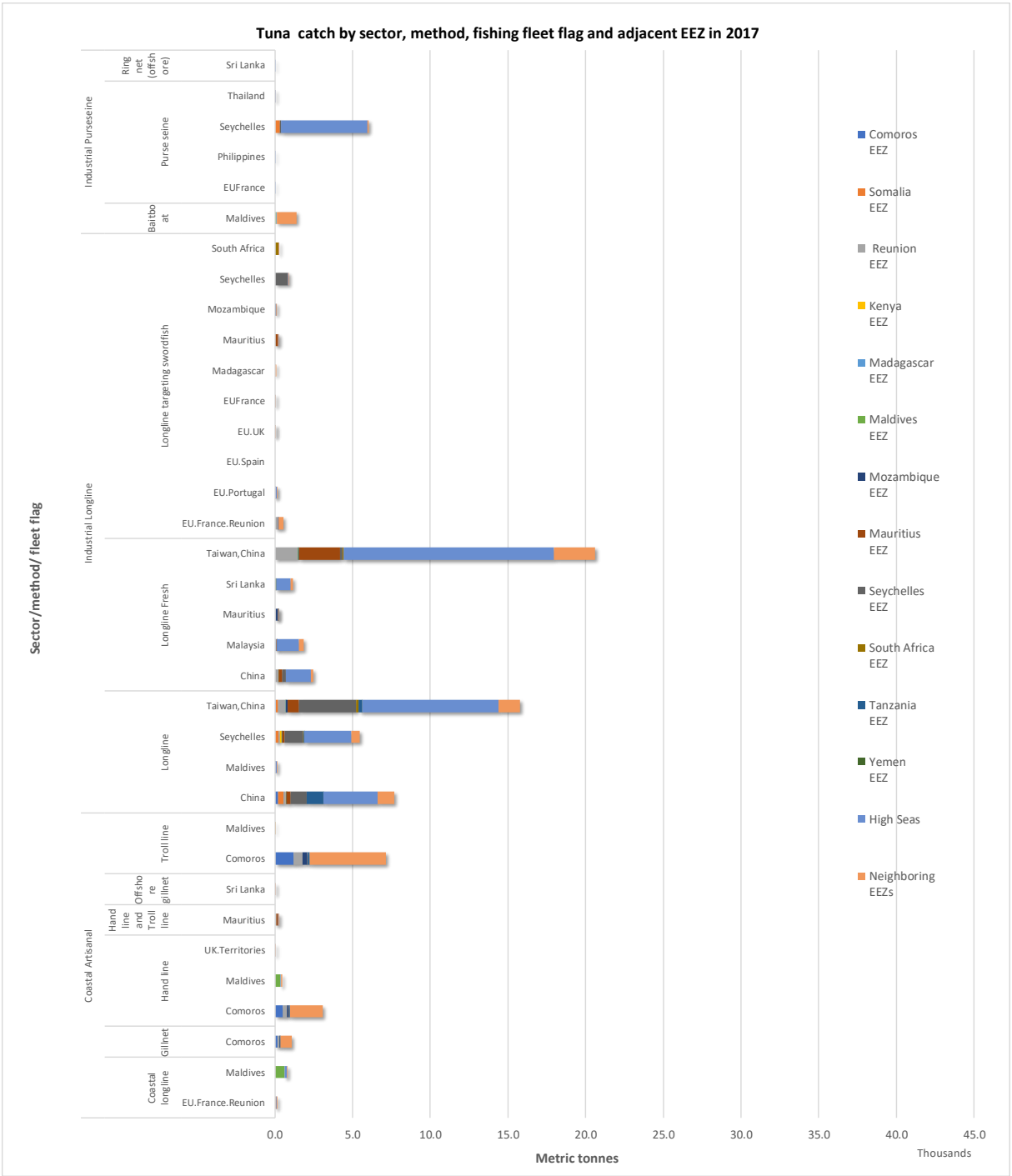


Figure 10-19: Tuna catch by sector, method, fishing fleet flag and SWIO adjacent EEZ in 2017. Source based on IOTC (2019)

Table 10-39: SWIO Tuna ex-vessel prices in 2017 by species. Source Poseidon (2019)

Species	Code	Poseidon price 2017 (US$/ t)
Albacore	ALB	2,643
Bigeye tuna	BET	1,961
Bullet and frigate tunas	FRZ	1,770
Bullet tuna	BLT	1,770
Dogtooth tuna	DOT	1,770
Frigate tuna	FRI	1,770
Kawakawa	KAW	1,770
Longtail tuna	LOT	1,770
Skipjack tuna	SKJ	2,084
Southern bluefin tuna	SBF	12,000
Striped bonito	BIP	1,770
Tunas	TUX	1,770
Tunas, bonitos, billfishes	BOP	7,284
Yellowfin tuna	YFT	3,503

10.12 SWIOFC Member States' Official exchange rate

Table 10-40: SWIOFC MS's Official exchange rate (LCU per USD , period average) between 2010 and 2018

	Exchange Rate vs US$								
Member State	2010	2011	2012	2013	2014	2015	2016	2017	2018
Comoros	371.46	353.90	382.90	370.53	370.81	443.59	444.76	436.57	416.79
Kenya	79.23	88.81	84.53	86.12	87.92	98.18	101.50	103.41	101.30
Madagascar	2,089.95	2,025.12	2,194.97	2,206.91	2,414.81	2,933.51	3,176.54	3,116.11	3,334.75
Maldives	12.80	14.60	15.36	15.37	15.38	15.37	15.37	15.39	15.39
Mauritius	30.78	28.71	30.05	30.70	30.62	35.06	35.54	34.48	33.93
Mozambique	33.96	29.07	28.37	30.10	31.35	39.98	63.06	63.58	60.33
Réunion (Euro area)	0.76	0.72	0.78	0.75	0.75	0.90	0.90	0.89	0.85
Seychelles	12.07	12.38	13.70	12.06	12.75	13.31	13.32	13.65	13.91
Somalia	31,269.66	29,966.84	22,516.00	19,283.80	20,230.93	22,254.24	23,061.78	23,097.99	#N/A
South Africa	7.32	7.26	8.21	9.66	10.85	12.76	14.71	13.33	13.24
Tanzania	1,395.62	1,557.43	1,571.70	1,597.56	1,653.23	1,991.39	2,177.09	2,228.86	2,263.78
United States	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Yemen, Rep.	219.59	213.80	214.35	214.89	214.89	214.89	214.89	214.89	214.89

Source: World Bank, World Development Indicators & International Monetary Fund, International Financial Statistics.
(https://data.worldbank.org/indicator/PA.NUS.FCRF?end=2018&locations=KM-KE-MG-MV-MU-MZ-SC-SO-ZA-TZ-YE-XC&most_recent_year_desc=false&start=2010)

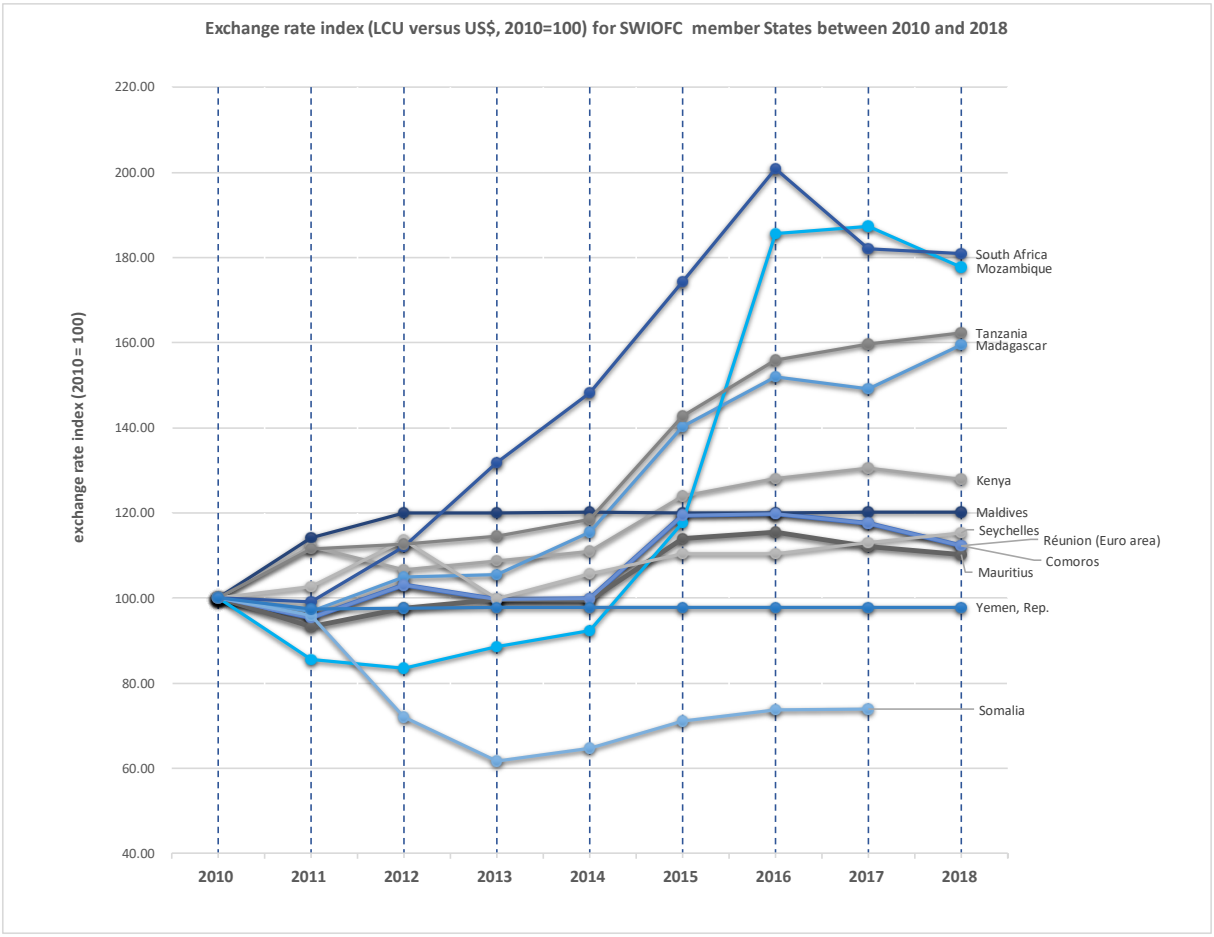


Figure 10-20: Nominal Exchange rate index (LCU versus USD , 2010=100) for SWIOFC member States between 2010 and 2018