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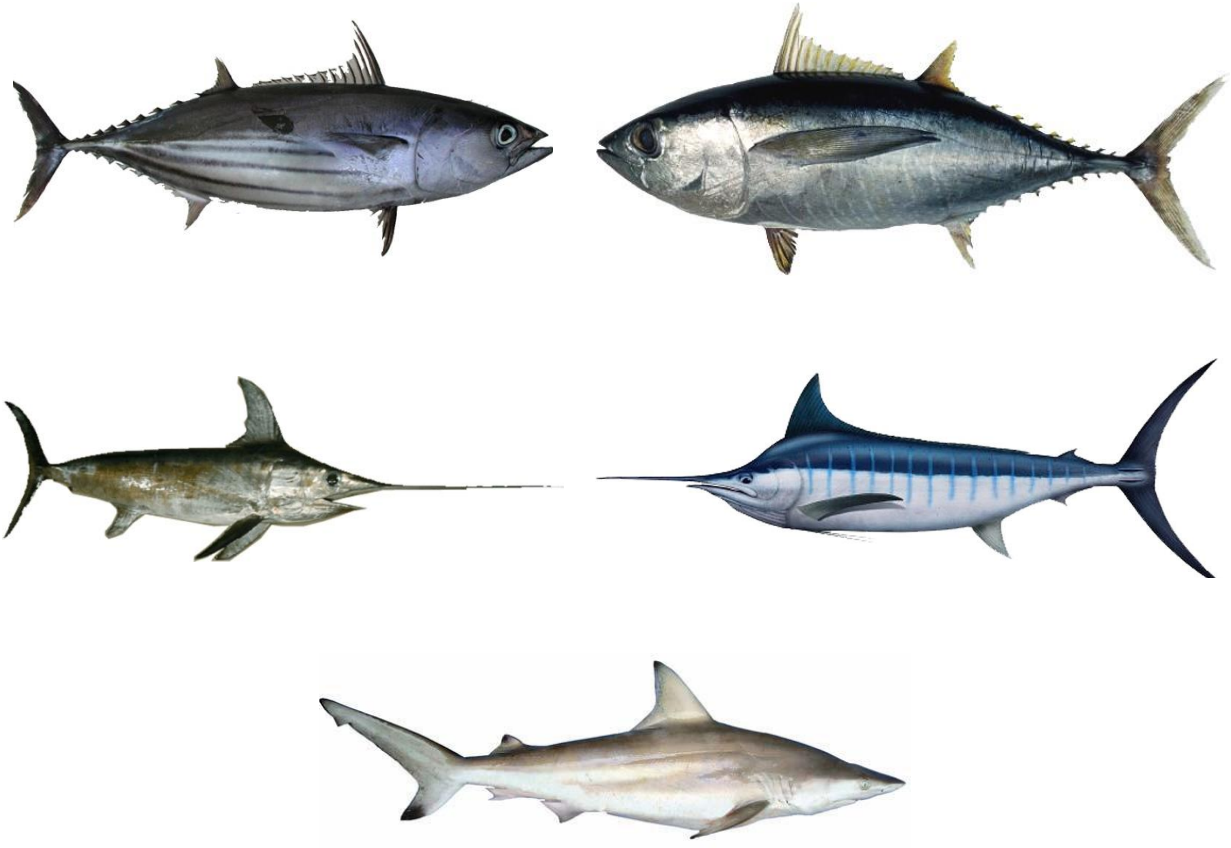
India's National Report to the Scientific Committee of the Indian Ocean Tuna Commission (IOTC)

2019



India's National Report to the Scientific Committee of the Indian Ocean Tuna Commission
2019

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INFORMATION OF FISHERIES, RESEARCH AND STATISTICS

In accordance with IOTC Resolution 15/02, final scientific data for the previous year was provided to the Secretariat by June of the current year, for all fleets other than longline (*e.g.* National report submitted to the Secretariat in 2018, final data for the 2017 Calendar year must be provided to the Secretariat by 30 June, 2018).	Yes Date: 29.06.2019
In accordance with IOTC Resolution 15/02, provisional longline data for the previous year was provided to the Secretariat by 30 June of the current year (*e.g.* National report submitted to the Secretariat in 2017, preliminary data for the 2016 Calendar year was provided to the IOTC Secretariat by 30 June, 2017).	Yes Date: 29.06.2019
If no, please indicate the reason(s) and intended actions	-

Executive Summary

The total landings of tuna and tuna-like species (hereinafter referred to as tuna fishery) in India for 2018 was estimated at 208 928 tonnes, showing a marginal increase of 3.46 percent over the previous year (201,942 tonnes in 2017). Gillnets contributed 40.45 percent to the total landings of tuna fishery, followed by small purse/ring seines (12.42%) and trawls (10.01%). Pole and line fishing, practiced exclusively in the waters of the Lakshadweep Group of Islands, contributed 6.03 percent to the total tuna landings. Other gears like small longline and gillnet-cum-longline also contributed to tuna landings in small quantities during the year.

Considerable spatial variation was observed in the tuna landings along the mainland coastline. The western coast of India (FAO area 51) contributed the major share to the landings (64%) and the balance 36 percent landings took place on the east coast (FAO area 57). Tuna landings in 2018 were supported by seven species, four representing the neritic (27.76%) and three from the oceanic group (35.65%). Yellowfin tuna (*Thunnus albacares*) contributed the maximum (17.94%), followed by Skipjack (*Katsuwonus pelamis*) (17.42%) and Kawakawa (*Euthynnus affinis*) (15.89%).

There was no reporting of sea bird interactions with the tuna fishery during the reporting period. Similarly, there was no reporting of mortality of sea turtles, marine mammals and whale sharks, which are protected under Schedule 1 of the Wildlife (Protection) Act of 1972 of India. The Central Marine Fisheries Research Institute of the Indian Council of Agricultural Research (ICAR-CMFRI), Fishery Survey of India (FSI) of the Department of Fisheries, Ministry of Fisheries, Animal Husbandry & Dairying, Government of India and the Department of Fisheries of the coastal States and Union Territories (UTs) are the main agencies responsible for data collection and collation on tuna fishery.

Contents

List of Tables

List of Figures

1.0 Background/General Fishery Information

The potential contribution of marine resources to future growth and prosperity has been recognised at the highest levels of the Government in India. Marine fisheries are a major source of employment and food security for 1 million coastal fishermen and households, who also generate further multiplier employment in ancillary activities and fish processing and marketing.

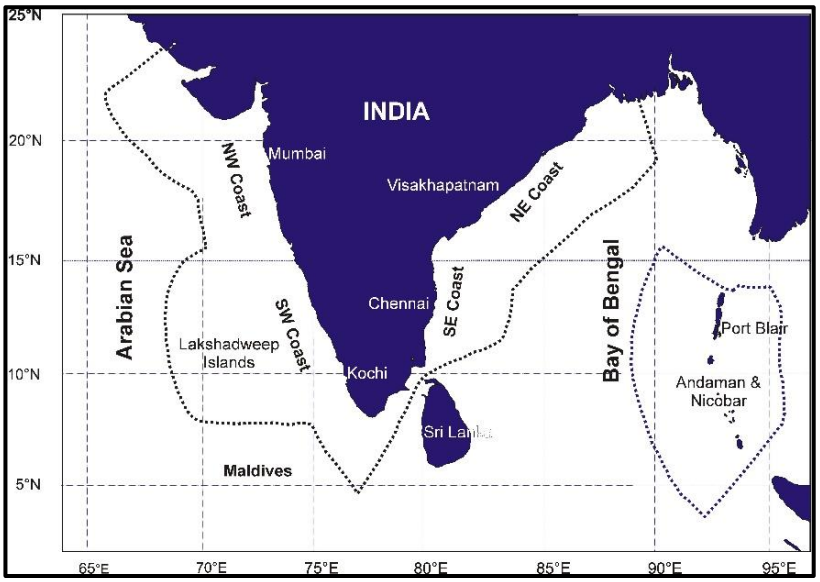

Figure 1: Exclusive Economic Zone of India

Fisheries contribute about 0.9 percent to the GDP. In 2017-18, the total marine fish production was 3.69 million tonnes, and the estimated value of marine fish landings during 2018 was INR 526.36 billion (approx. USD 7.35 billion) at point of first sale and INR 803.20 billion (approx. USD 11.20 billion) at retail market. India has also become a major global force in seafood trade, with total seafood exports amounting to over 1.38 million tonnes, valued at over US$ 7.1 billion during 2017-18.

India's Exclusive Economic Zone or EEZ (2.02 million sq.km) contains diverse and multi-species fish stocks, exploited by multi-gear fisheries, which are mostly concentrated in coastal areas (<100m depth). Major fisheries exploit small pelagics (*e.g.* sardines, mackerels), demersals (*e.g.* ribbonfish) and crustaceans (*e.g.* shrimps). The fishing fleet structure is mainly comprised of mechanized (42,471 nos), motorized (98,181 nos) and non-motorized (27,350 nos), operating from 1,547 landing centers in 9 coastal States, 2 Union Territories (UTs) and 2 Island groups.

In India, the small-scale and artisanal sectors largely contribute to the tuna fishery, deploying both mechanized[1] and motorized[2] boats using a variety of gear. The Lakshadweep group of Islands located in the Arabian Sea (FAO Area 51) use artisanal pole and line targeting the oceanic species, primarily the skipjack tunas. In the past one decade, efforts were made to convert small-scale trawlers in to longliners in order to promote resource specific fishing within the country's EEZ.

[1] ***In India, the mechanized fleet pertains to fishing vessels fitted with inboard engines that are used for both propulsion and hauling the gear. The mechanized boats have a wheel house and the entire fleet is below 24-meter length overall (LoA).***

[2] ***The Indian motorized fleet comprises undecked boats using outboard motors for propulsion only. The entire fleet is below 24 meter LoA.***

2.0 Fleet Structure

The Indian fishing fleet comprises an assemblage of fishing boats that mainly include trawlers, gillnetters, small purse/ring seiners, hook and line boats, etc. Other than pole and line boats and to some extent hook and line boats, all other gear catch a variety of species including tunas. Table 1 below provides the data on the fishing fleet structure.

Table 1: Fishing fleet structure of India, 2018

#	Craft/Gear	East coast	West coast	Total
Mechanized				
Mainland India				
1.	Trawlers	9,815	20,671	30,486
2.	Gillnetters	2,563	3,939	6,502
3.	Dol/Bagnetters	191	3,203	3,394
4.	Liners	47	2	49
5.	Ring seiners	297	646	943
6.	Purse seiners	0	1,189	1,189
7.	Others	109	69	88
				Total
8.	***Total mechanized (1 to 7)***	***13,022***	***29,719***	***42,741***
9.	***Total motorized***	***57,971***	***40,210***	***98,181***
10.	***Non-motorized***	***16,733***	***10,617***	***27,350***
11.	***Grand Total***	***87,726***	***80,546***	***1,68,272***

3.0 Catch and effort by species and gear

The Indian fishery of tuna and tuna-like species (hereinafter referred to as tuna fishery) comprises a complement of 12 types of gear (plus some minor gears operated locally) harvesting a total of 18 tuna and tuna like species in 2018. Table 3 provides the composition of species/groups harvested by different gear type.

The total landings of tuna and tuna-like species along the mainland coast for 2018 was estimated at 2,08,928 tonnes, showing a marginal increase of 3.46 percent over the previous year. Gillnets contributed 40.45 percent of the total landings of tuna fishery, followed by small purse/ring seines (12.42%) and trawls (10.01%). Pole and line fishing, practiced exclusively in the waters of the Lakshadweep Group of Islands, contributed to 6.03 percent of total tuna landings. Other gears like small longline and gillnet-cum-longline also contributed to tuna landings in small quantities during the year (**Fig. 2 & Table 3**).

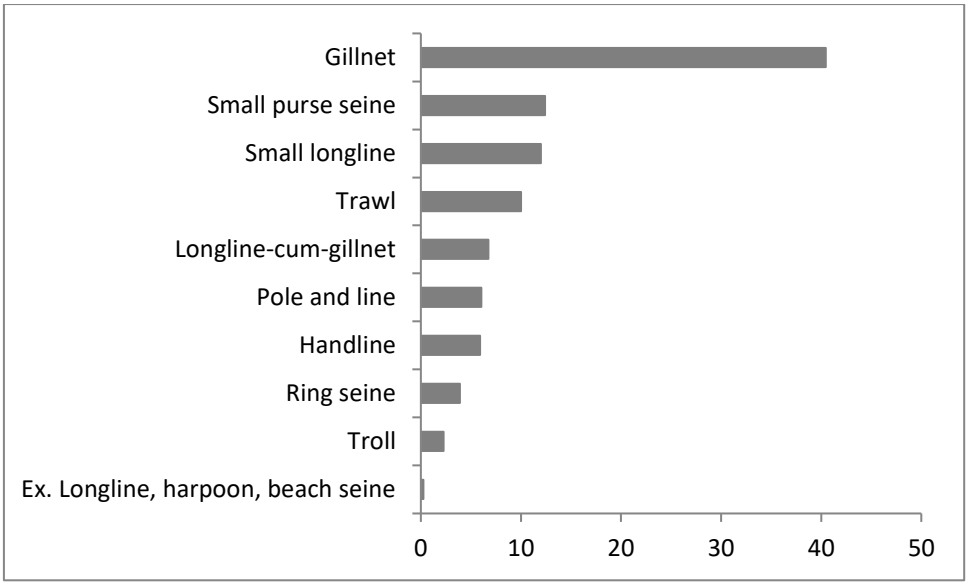

Figure 2: Gear-wise catch composition in tuna fishery in 2018

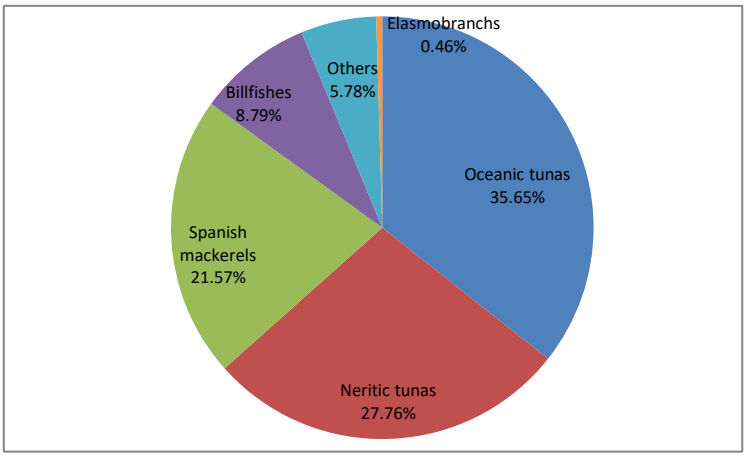

Figure 3: Group-wise catch composition of tunas and tuna-like fishes, 2018

The oceanic tunas comprising three species (yellowfin, skipjack and big eye tunas) contributed to 35.65 percent of the total tuna landings during 2018. The neritic tunas comprising four species contributed to 27.76 percent during the same period. The Spanish mackerels also contributed significantly (21.57%) to the total tuna and tuna-like species landings of India during the year 2018. The billfishes, including Indo-Pacific sailfish, marlins and swordfish collectively formed 8.79 percent, whereas the other species (5.78%) and pelagic sharks (0.46%) constituted the rest of the landings (**Fig. 3**).

The nominal catch of tropical tunas (yellowfin (YFT), skipjack (SKJ) and bigeye tunas (BET)), in 2018 was 74,486 t comprising 37,488 t of yellowfin tuna, 36,387 t of skipjack tuna and 610 t of bigeye tuna (**Fig. 4**). Area-wise landings indicate that, 60.40 percent of the total landings were from the west coast of India (FAO Area 51), whereas the remaining 39.60 percent was from the east coast (FAO Area 57) (**Fig. 5**). About 65 percent of the yellowfin, 55.57 percent of skipjack and 61.22 percent of the bigeye landings were from west coast, whereas east coast landings constituted 34.93 percent of the yellowfin, 44.43 percent of skipjack and 38.78 percent of the bigeye landings from India during 2018.

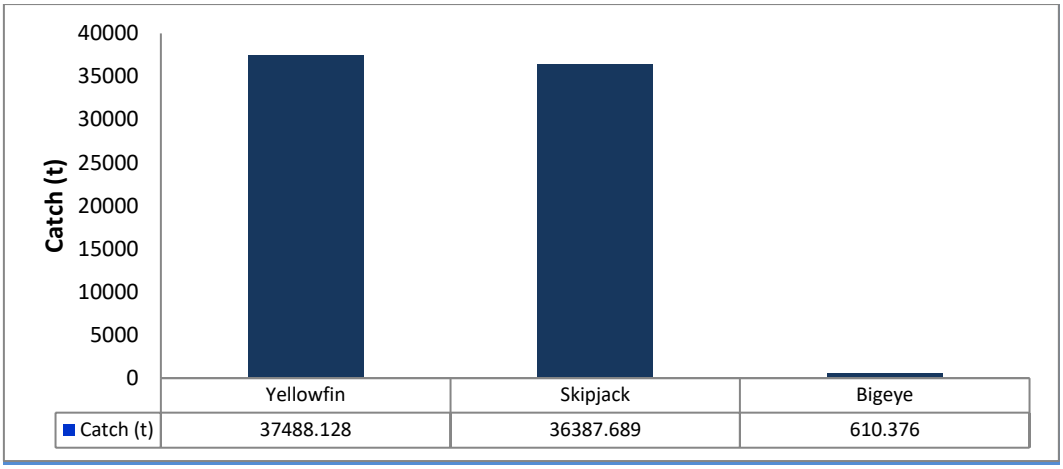

Figure 4: Nominal catch of tropical tuna species in India (2018)

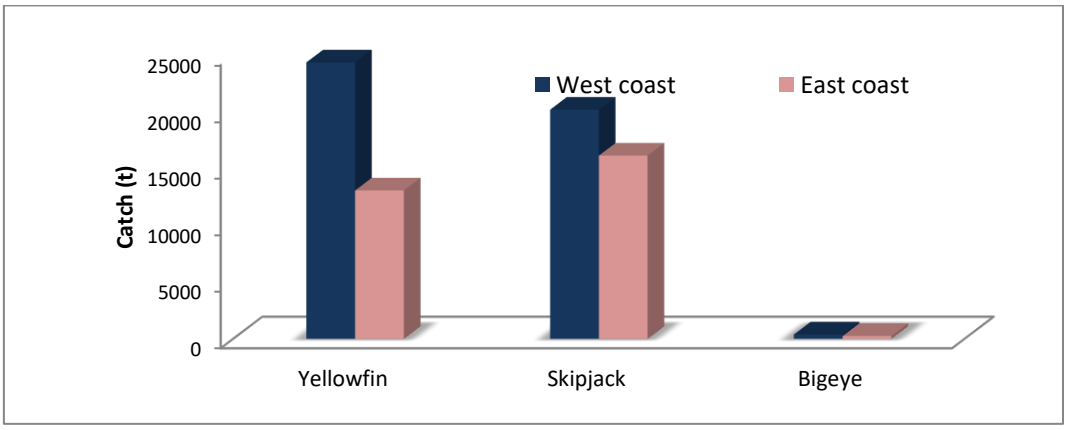

Figure 5: Pattern of tropical tuna catch in west and east coasts of India (2018)

Nine types fishing gears employed for catching the tropical tuna species. Drift gillnet remained the principal gear for exploitation of tropical tunas in India. This gear contributed 37.99 percent of the total landings of tropical tunas, 30.22 percent of yellowfin, 46.53 percent of skipjack, and 6.25 percent of bigeye tuna. Share of hand line in Indian tropical tuna catch was 15.97 percent (total catch), 21.71 percent (YFT), 9.90 percent (SKJ) and 25.04 percent (BET). Pole and line fishery, practiced in Lakshadweep Islands (south-eastern Arabian Sea) contributed 15.89 percent of the total tropical tuna catch, 5.48 percent (YFT) and 26.29 percent (SKJ). Small longlines targeting fresh tuna was the next principal gear, contributing 11.62 percent of the total tropical tuna catch, 18.52 percent (YFT), 4.18 percent (SKJ) and 31.18 percent (BET). Boats using the gears gillnet-cum-longline contributed 11.00 percent (total), 14.76 percent (YFT) and 7.30 percent (SKJ). Contribution by other gears including small purse seines to the tropical tuna catch of India during 2018 was marginal (7.53%). The exploratory longline (by Fishery Survey of India) vessels contributed a meager 0.01percent of the total tropical tuna catch of India during 2018 (**Fig. 6**).

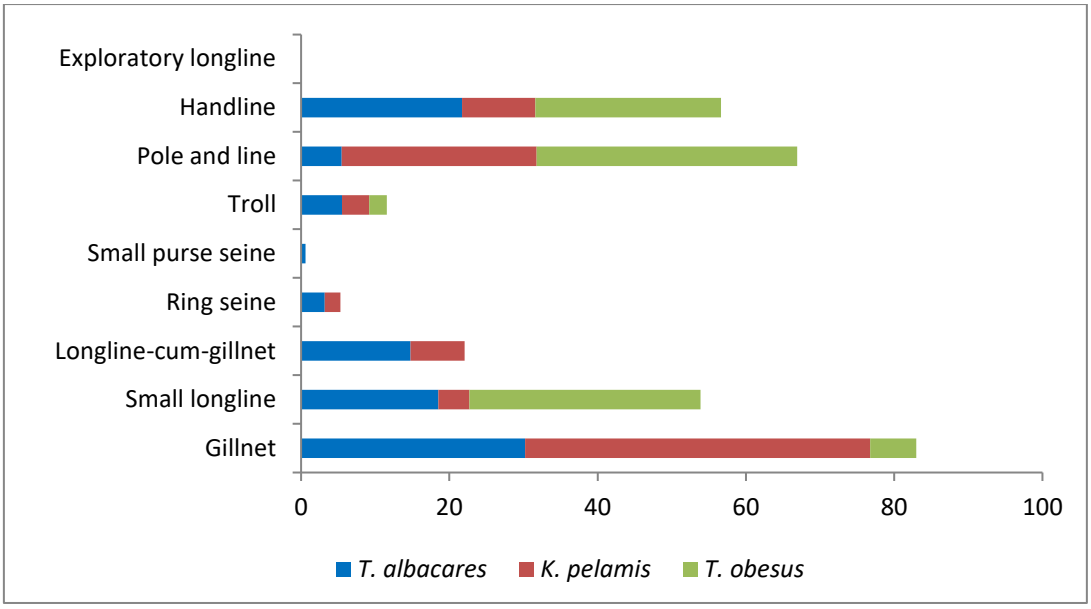

Figure 6: Tropical tuna catch (2018) by different gear

Considerable spatial variation was observed in the tuna and tuna-like species landings during 2018 in India. The western coast of India (FAO area 51) contributed the major share to the landings (63.8%) and the balance 36.2 percent landings took place on the east coast (FAO area 57). West coast, where fishing fleet is more mechanized, dominates the landing across all the groups. However, east coast enjoys relative advantage in the landing of oceanic tunas, possibly due to narrow continental shelf along the east coast (**Fig. 7**).

Neritic tunas were the dominant group in the landings of the west coast. More than 98 percent of the longtail tuna catch was from the west coast while pelagic sharks, barracudas and rays were increasingly caught from the east coast.

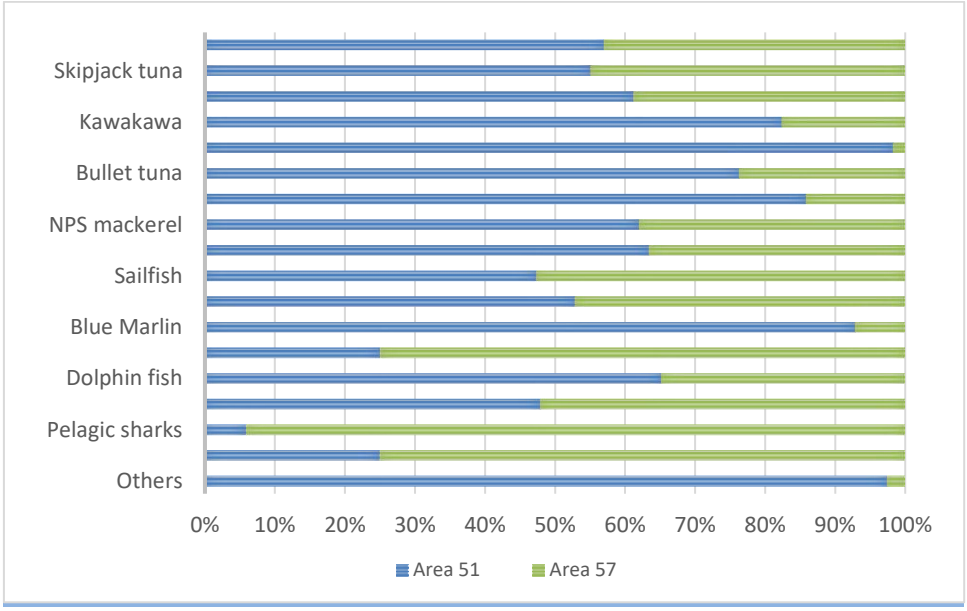

Figure 7: Area-wise composition of major groups

3.1 Longline tuna fishery in India

In India, the dedicated longline fishery is practiced by the four fishing vessels of the Fishery Survey of India. The key attributes of these four vessels are as follows:

Name	*Matsya Vrushti*	Yellowfin	*Matsya Drushti*	Blue Marlin
LoA (Meter)	37.5	36	37.5	36
GRT (Tonnage)	465	290	465	290
BHP	1100	800	1100	800
Base of operation	Mumbai	Mormugao	Chennai	Port Blair
IOTC Registration Number	IOTC 003604	IOTC 003602	IOTC 003605	IOTC 003603

The above-referred four longliners undertake exploratory surveys in the Indian EEZ for tuna and tuna-like species. The surveys undertaken during 2018 to assess the resource availability in the Indian EEZ are shown in the following figures (**Fig. 8**).

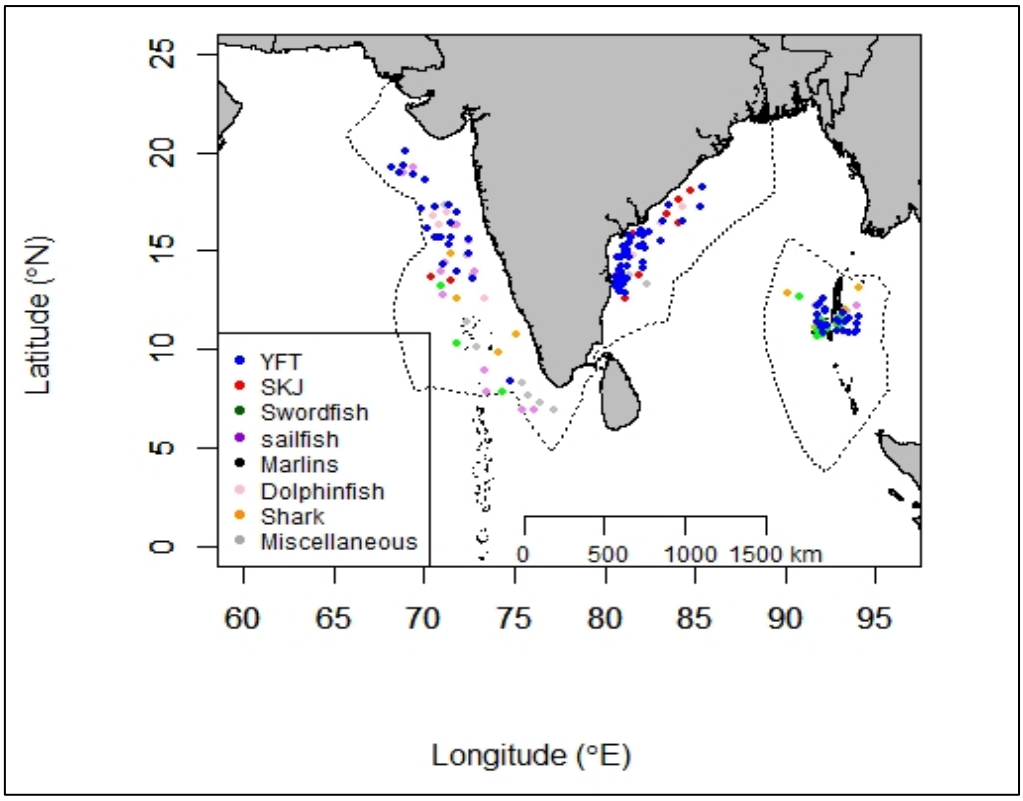

Figure 8: Map showing locations of samplings of different species during exploratory longline survey by FSI vessels

3.2 Details on size frequency of major species

3.2a. From exploratory survey

Yellowfin tuna *(T. albacares):* In 2018, a total of 295 yellowfin tunas were measured for length frequency studies onboard the research vessels with the following size attributes (FAO Fishing area 51 & 57):

Months	Numbers	Size range (in cm)	
		Min	Max
January	45	60	185
February	-	-	-
March	1	180	180
April	21	105	240
May	2	130	150
June	4	140	165
July	27	75	170
August	73	25	275
September	45	55	155
October	37	55	160
November	7	135	170
December	33	60	160
Total	**295**	**25**	**275**

Sharks

A total of five shark species were measured for length frequency studies during the exploratory survey in 2018. The size attributes of these species are furnished in the following tables (fishing area 51 & 57):

Pelagic thresher (*Alopias pelagicus*)

Months	Numbers	Size range (in cm)	
		Min	Max
January	11	235	290
February	2	270	280
March	12	200	280
May	3	260	280
September	1	200	200
Total	**29**	**200**	**290**

Bigeye Thresher (*Alopias superciliosus*):

Months	Numbers	Size range (in cm)	
		Min	Max
February	12	155	290
March	31	180	290
July	2	230	290
Total	**45**	**155**	**290**

Silky shark (*Carcharhinus falciformis*):

Months	Numbers	Size range (in cm)	
		Min	Max
March	9	180	250
June	10	130	220
July	54	60	235
August	7	90	160
September	2	105	135
November	3	125	140
Total	**85**	**60**	**250**

Tiger shark (*Galeocerdo cuvier*):

Months	Numbers	Size range (in cm)	
		Min	Max
January	3	195	255
March	2	225	250
August	1	190	195
September	1	220	225
October	3	195	250
Total	**10**	**190**	**255**

Shortfin Mako (*Isurus oxyrinchus*):

Months	Numbers	Size range (in cm)	
		Min	Max
January	3	175	225
April	2	185	190
July	3	110	195
Total	**8**	**110**	**225**

3.2.b From small-scale fishery

The following tables summarise the length studies from commercial fishery undertaken on important tuna and tuna-like species at the landing sites

Kawakawa (*Euthynnus affinis*)

Months	Numbers	Size range (in cm)	
		Min	Max
January	21	35	55
March	3	40	45
April	21	35	60
May	12	35	65
June	2	45	50
August	2	40	50
September	32	40	60
October	12	30	60
November	19	40	65
December	5	40	50
Total	**129**	**30**	**65**

Yellowfin tuna (*Thunnus albacares*)

Months	Numbers	Size range (in cm)	
		Min	Max
January	62	40	115
February	51	35	125
March	89	40	125
April	41	50	120
May	32	45	115
June	36	45	100

July	25	50	105
August	21	50	90
September	53	45	110
October	15	50	115
November	17	50	125
December	26	40	115
Total	**468**	**35**	**125**

Skipjack (*Katsuwonus pelamis*)

Months	Numbers	Size range (in cm)	
		Min	Max
January	167	40	75
February	86	40	70
March	62	40	70
April	46	25	60
May	102	40	45
June	57	35	65
July	45	35	55
August	38	40	55
September	9	45	60
October	96	35	70
November	139	40	70
December	139	40	70
Total	**986**	**25**	**75**

3.3 Management measures for conservation of sharks

In India, the following three species of marine sharks are listed under Schedule I of the Indian Wildlife (Protection) Act, 1972.

Common name	Scientific name
Whale shark	*Rhincodon typus*
Long nosed shark / Pondicherry shark	*Carcharhinus hemiodon*
Spear tooth shark	*Glyphis glyphis*

Further, with a view to stop the hunting of sharks and to enable the enforcement agencies to monitor the illegal hunting/poaching of the species of Elasmobranchs listed in Schedule I of the Wild Life (Protection) Act, 1972, the then Ministry of Environment and Forest vide its Policy Circular No. F. No. 4-36/2013 WL dated 25th of August 2013 has prohibited the removal of shark fins on board a vessel in the sea. The policy also prohibits any possession of shark fins that are not naturally attached to the body of the shark. In addition, the Ministry of Commerce, Government of India has also notified vide its Order No. 110 (RE. -2013)/2009-2014 dated 6 February 2015 prohibiting export of shark fins of all species of sharks.

The National Plan of Action for Conservation and Management of Sharks (NPOA-Sharks[3]) has been prepared by the Bay of Bengal Programme Inter-Governmental Organisation in collaboration with the Bay of Bengal Large Marine Ecosystem Project (Phase 1).

[3] https://www.boblme.org/documentRepository/BOBLME-2015-Ecology-65.pdf

Table 2: Shark species (No. & Weight in kg) caught in the exploratory survey of FSI, 2014-2018

Sl.No	Year	2014		2015		2016		2017		2018		Total	
	Name of Species	**No**	**Wt**	**No**	**Wt**	**No**	**Wt**	**No**	**Wt**	**No**	**Wt**	**No**	**Wt**
1	*Alopias pelagicus*	2	91	64	2964	24	1081	145	522	47	1582	282	6240
2	*Alopias superciliosus*			2	120	4	375	8	436	42	1681	56	2612
3	*Alopias vulpinus*			11	473	1	145	2				14	618
4	*Carcharhinus albimarginatus*	13	178									13	178
5	*Carcharhinus sorrah*			4	55							4	55
6	*Carcharhinus amblyrhynchos*			8	159							8	159
7	*Carcharhinus dussumieri*			15	214	20	330					35	544
8	*Carcharhinus longimanus*			1	26	1	50					2	76
9	*Carcharhinus brevipinna*											0	0
10	*Carcharhinus falciformis*	25	293	79	2990	37	486	1	60	85	3175	227	7004
11	*Carcharhinus hemiodon*			3	168	1	40					4	208
12	*Galeocerdo cuvier*	1	27	6	383	5	282	1	213			13	905
13	*Isurus oxyrinchus*	1	10	23	750	11	255	2	131			37	1146
14	*Sphyrna lewini*							1	45			1	45
15	*Triaenodon obesus*							17	58			17	58
	Total	**42**	**599**	**216**	**8302**	**104**	**3044**	**177**	**1465**	**174**	**6438**	**713**	**19848**

Table 3: Tuna and allied resources nominal catch – gear-wise (in tonnes) from the Coastal and oceanic fishery 2018

Fish/group	Beach seine	Gillnet	Small longline	Longline-cum-gillnet	Ring seine	Small purse seine	Trawl	Troll	Pole and line	Handline	Harpoon	Exploratory longline	Total
T. albacares		11329.6	6943.4	5534.1	1200.5	216.1		2064	2053.6	8139.4		7.3	37488.1
K. pelamis		16930.3	1521.7	2656.8	769.6			1341.3	9567.1	3600.6		0.2	36387.7
T. obesus		38.1	190.3					14.5	214.6	152.8			610.4
M. nigricans												1	1
M. indica		1337.9	3426.2	604.8				83		0.6	0.2	0.5	5453.1
Makaira spp.												0.4	0.4
I. platypterus		4580.7	2554.6	2155.8	2.9	72.2		640.2		5.9	12	1.8	10025.9
X. gladius		935.7	364.7	979.7				595.1		0.2	0.3	1.1	2876.7
S. commerson	15.3	10051.2	4485.6	667.9	1279.8	3728.9	9731.1						29959.9
S. guttatus	222.2	8364.5	1429.3	10.6	161.1	780	4133.7						15101.3
A. thazard		2434.3	389.3	268.6	137.4	4779.9	91.3		450	255.2			8806
E. affinis	80.2	12246.1	2028.9	1047.5	3880.6	10764.4	2695.5		314.7	150			33208
T. tonggol		6223.2	141.6	4.8		1150	158.6						7678.3
A. rochei		2123.6	597.5	186.4	741.3	4447.7	200.3						8296.8
Pelagic sharks		28	911.5							6.2	3.1	10.5	959.3
Manta ray												0.2	0.2
Dolphinfish												0.2	0.2
Barracuda		5866					3911					0.2	9777.2
others		2021.5	58							25.1	192.5	0.2	2297.3
Total	317.6	84510.9	25042.6	14117.1	8173.1	25939.2	20921.5	4738.1	12600	12336.1	208.1	23.5	208927.8

(Source: FSI, CMFRI, State and UT Department of Fisheries, 2018)

4.0 Recreational Fishery

Presently, recreational fishery for tunas is limited to few licenses issued in the Andaman and Nicobar Islands vide Notification No. 222/2017/F. No. 3-85/2015-16/TS/DF/PF-II) dated 20th September 2017 under the Marine Fishing Regulation Act 2003 of the UT Administration[4]. While considerable scope exists for large-scale recreational fishery for tunas and allied resources, it is yet to take up in a large way.

The National Policy on Marine Fisheries, 2017[5] in its guidance on promotion of additional/alternative sources of livelihoods, has focused on eco-tourism and in particular game fishing and the concept of Catch, Photograph and Release (CPR). Further, the government also proposes to promote CPR schemes among fishermen in suitable areas and will also consider harmonizing tourism plans related to coastal and marine waters with the livelihood needs of the fishers.

5.0 Ecosystem and by-catch issues

5.1 Sharks

The landings of pelagic sharks in India during 2018 was estimated at 959.27 tonnes. The east coast (FAO Area 57) accounted for 94 percent, and the rest (6%) from the west coast (FAO Area 51). The mechanized sector contributed to more than 80 percent of the total landings. Gillnets, longline, handline and harpoons were the major gears contributing to pelagic shark landings. Targeted shark fishery along north Kerala coast has almost stopped following the relocation of fishermen from Tamil Nadu who were engaged in this fishing (Annual Report CMFRI, 2018).

5.2 Sea birds

There were no reported instances of sea bird interactions in any of the Indian tuna fishery. Indian vessels are not engaged in tuna fishing in the Southern Indian Ocean where the sea bird interactions are reported to be more.

5.3 Marine turtles

All the five species of marine turtles occurring in the Indian waters are listed in the Schedule I of the Indian Wildlife (Protection) Act, 1972, hence protected from capture. During the reporting period, no interaction has been observed in the longline catches.

5.4 Marine mammals

Like marine turtles, all the marine mammal species occurring in the Indian waters are protected under the Wildlife (Protection) Act, 1972. The Government of India through its R&D agencies also undertakes several programmes for conservation of the marine mammal habitats. One such programme pertains to the 'marine mammal stranding interactive map', which provides scientific information on the attributes of the species, its habitat and standard operating procedure in case of stranding (CMFRI, 2018).

[4] ***http://andssw1.and.nic.in:8081/sfpermit/pdf/gazette_notification.pdf***

[5] ***http://dahd.nic.in/news/notification-national-policy-marine-fisheries-2017***

6.0 National Data collection and processing systems

The ICAR-CMFRI collects the landing data in the mainland following a stratified multi-stage random sampling method. The Fishery Survey of India undertakes exploratory surveys and the data from such surveys is also added to the national data processing system. Besides this, FSI compiles the landing data received from the two Island Territories – the Lakshadweep and the Andaman & Nicobar Group of Islands.

6.1 Log Sheet data collection and verification

The authorized tuna fishing vessels in India are reporting their catch on log sheets as per the IOTC Resolutions.

6.2 Vessel Monitoring System

While several coastal states in India have installed Vessel Tracking System (VTS) and Automatic Identification System (AIS), a full-fledged Vessel Monitoring System (VMS) is under planning and will be implemented once necessary regulatory approvals are received from other concerned Ministries/Departments within the Government system.

6.3 Observer programme

In India, observers are placed on-board on all the authorized tuna longlining vessels.

6.4 Port sampling programme

The ICAR-CMFRI and the Department of Fisheries of the coastal State/UTs undertake sampling programmes at the designated centers following a standard methodology. Besides estimating the landings, important biological and socio-economic information is also collected on a regular basis.

6.5 Unloading / Transshipment

Both unloading by foreign fishing vessels and mid-sea transshipment are not permitted under the prevailing rules/regulations.

6.6 National Research Programmes

India has a long-standing research programme on land-based sampling and sea-based exploratory surveys of tuna fishery. The ICAR-CMFRI along with the coastal States/UTs undertakes regular sampling and estimation of the tuna fishery resources from designated landing points along the indian coastline. Besides estimating the tuna fishery landings, studies on biological and socio-economic attributes of tuna fisheries are also carried out by the Institute on a regular basis. The survey of oceanic resources is undertaken by FSI through its four dedicated longliners, two based on the east coast and two on the west coast. These modern longliners undertake exploratory surveys on a regular basis through pre-determined sampling porgrammes. The exploratory surveys provide information on tuna resource distribution on Indian EEZ, effort, by-catch and also various environmental parameters to correlate with the exploitation of tuna fishery resources.

Besides the above two dedicated institutions, various other agencies, both governmental and non-governmental also undertake R&D activities on tuna fishery. The Centre for Marine Living Resources and Ecology, Ministry of Earth Sciences also undertakes exploratory surveys of the fishery resources in the Indian EEZ. These surveys often include programmes on tuna fishery. In addition, the Department of Science & Technology of the Ministry of Science &

Technology, the Indian National Centre for Ocean Information Services and the National Institute of Ocean Technology under the Ministry of Earth sciences also undertake dedicated research and development activities on tuna fisheries.

7.0 Status of Implementation of the recommendations/Resolutions of the IOTC

Res. No.	Resolution	Scientific requirement	CPC progress
11/04	On a regional observer scheme	Paragraph 9	All authorized tuna longliners are covered by the observer programme and the information is provided to IOTC in the prescribed format. Further, the requirements for monitoring the artisanal fishing vessels landing at the landing place are also carried out by the field samplers.
12/04	On the conservation of marine turtles	Paragraphs 3, 4, 6–10	- All the five species of marine turtles reported from the Indian waters are protected under the law. - The authorised longliners regularly record and report interactions with marine turtles and this information is reported to the IOTC. - The Central Institute of Fisheries Technology is carrying out research on use of circle hooks and the findings have been reported in Journal of Fishery Technology (53 (2016): 284 – 289) and the Indian Journal of Fisheries (Vol. 60(1), 2013 Pp 21-27). - FSI also carries out research on the use of circle hook and research finding have been published in the Journal 'Current Science' (Vol. 98, No. 10, Pp – 1378-1384). -To create awareness, FSI also brings out popular articles in its in house publications namely, *Meena News* and *Bulletin of Fishery Survey of India*. -The entire stretch of the coastline where mass stranding of turtles takes place in India is protected through national and state legislation and no fishing activity is permitted to be carried out in such areas. Further, the Department of Forest and the Indian Coast Guard monitors the implementation of the conservation measures for protection of marine turtles. - The coastal states where mass stranding

			takes place have also made it mandatory the use of Turtle Excluder Devices in the trawl nets.
12/06	On reducing the incidental bycatch of seabirds in longline fisheries.	Paragraphs 3–7	There were no reported instances of sea bird interactions in any of the Indian tuna fishery.
12/09	On the conservation of thresher sharks (family Alopiidae) caught in association with fisheries in the IOTC area of competence	Paragraphs 4–8	The Indian authorized longline vessels are implementing this resolution and the same is reported to IOTC.
13/04	On the conservation of cetaceans	Paragraphs 7– 9	The national legislation prohibits capture and trade of marine mammals in Indian waters.
13/05	On the conservation of whale sharks (*Rhincodon typus*)	Paragraphs 7– 9	The national legislation prohibits capture and trade of whale sharks in Indian waters.
13/06	On a scientific and management framework on the conservation of shark species caught in association with IOTC managed fisheries	Paragraph 5–6	The Wild Life (Protection) Act, 1972 and various orders issued by the Ministry of Environment and Forest and the Ministry of Commerce provide for conservation of shark species in Indian EEZ. Further, a National Plan of Action (NPOA) on Conservation and Management of Sharks is under finalization.
15/01	On the recording of catch and effort by fishing vessels in the IOTC area of competence	Paragraphs 1–10	The authorized longline vessels are collecting the catch and effort data and providing the same to the IOTC on regular basis.
15/02	Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)	Paragraphs 1–7	The mandatory statistical reporting is carried out on regular basis.
15/05	On conservation measures for striped marlin, black marlin and blue marlin	1	The authorized longlining vessels are undertaking conservation measures for striped marlin, black marlin and blue marlin and the data is provided to the IOTC on regular basis.
17/05	On the conservation of	Paragraphs 6, 9, 11	- The data collected from the authorised longlining vessels are submitted to IOTC to

	sharks caught in association with fisheries managed by IOTC		meet the reporting requirements. - The national legislation provided for conservation of shark species including landing of sharks with fin attached. -India has a national programme on elasmobranchs that includes stock assessment and conservation. A decision on India's participation in the proposed project will be taken after the details on the project are known.
18/01	On an Interim Plan for Rebuilding the Indian Ocean Yellowfin Tuna Stock in the IOTC Area of Competence	4. Gillnet: CPCs whose Gillnet catches of yellowfin reported for 2014 were above 2000 MT to reduce their Gillnet catches of yellowfin by 10 percent from the 2014 levels. 5. Longline: CPCs whose Longline catches of yellowfin reported for 2014 were above 5000 MT to reduce their Longline catches of yellowfin by 10 percent from the 2014 levels 6. CPCs' other gears: CPCs whose catches of yellowfin from other gears reported for 2014 were above 5000 MT to reduce their other gear catches of yellowfin by 5 percent from the 2014 levels.	This Resolution is applicable to the vessels in the IOTC list of authorized vessels, and since India does not have any gillnet vessels in this category, the catch reduction is not applicable to Indian gillnet fishery. Catch by Indian longline vessels in the IOTC registry during 2014 was <5000 mt Catch by Indian vessels in the IOTC registry using other gears during 2014 was <5000 mt
18/02	On Management Measures for the Conservation of Blue Shark Caught in Association with IOTC Fisheries	Paragraph 2 Paragraph 3 Paragraph 4 Paragraph 5	Data is recorded and furnished to the IOTC Data collection programmes are in place Catches are being monitored domestically Scientific research on blue sharks is being undertaken and results has been published (e.g., Varghese et al., 2017)
18/05	On Management Measures for the Conservation of the Billfishes: Striped	Paragraph 2	India is adopting a number of management measures for conservation of fishery resources (including billfishes) in its seas, most important of which is annual

	Marlin, Black Marlin, Blue Marlin and Indo-Pacific Sailfish	Paragraph 8	ban on fishing for two months. Catches are being monitored and reported to the IOTC

8.0 Literature cited

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