IOTC-2021-SC24-NR08

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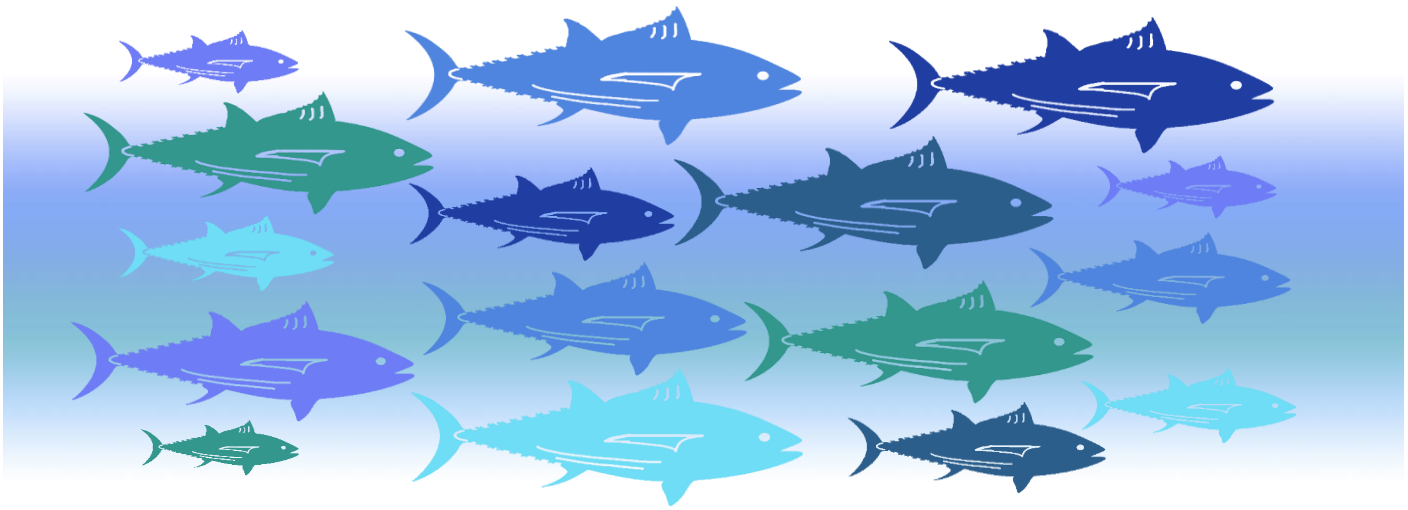
India's National Report to the Scientific Committee of the Indian Ocean Tuna Commission 2021



India's National Report to the Scientific Committee of the Indian Ocean Tuna Commission
2021

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INFORMATION ON FISHERIES, RESEARCH AND STATISTICS

In accordance with IOTC Resolution 15/02, final scientific data for the previous year was provided to the IOTC Secretariat by 30 June of the current year, **for all fleets other than longline** [e.g. for a National Report submitted to the IOTC Secretariat in 2021, final data for the 2020 calendar year must be provided to the Secretariat by 30 June 2021)	YES 30/06/2021
In accordance with IOTC Resolution 15/02, provisional **longline data** for the previous year was provided to the IOTC Secretariat by 30 June of the current year [e.g. for a National Report submitted to the IOTC Secretariat in 2021, preliminary data for the 2020 calendar year was provided to the IOTC Secretariat by 30 June 2021). **REMINDER:** Final longline data for the previous year is due to the IOTC Secretariat by 30 Dec of the current year [e.g. for a National Report submitted to the IOTC Secretariat in 2021, final data for the 2020 calendar year must be provided to the Secretariat by 30 December 2021).	YES 30/06/2021
If no, please indicate the reason(s) and intended actions:	

Executive Summary

The total landings of tuna and tuna-like species along Indian coasts had been showing a decreasing trend in the recent past. The total landings of tuna and tuna-like species for 2020 is estimated at 1,52,593.16 tonnes, showing a decrease of 23.66 percent over the previous year. Gillnets remained the major gear contributing to the tuna and tuna like fish catch during 2020 also, however, the percentage contribution of this gear to the catch recorded reducing trend in comparison to the previous year (27.92% in 2020 against 37.19% in 2019). Trawl and ring seine (17.82% and 17.57% respectively), followed by small longline (8.50%) where the principle gears contributing the catch. Pole and line fishing, practiced exclusively in the waters of the Lakshadweep Group of Islands, contributed 7.21 percent to the total tuna landings. Other gears like Drift longline, small purse seines, Small purse seines, Handline, Troll lines also contributed to the tuna landings in small quantities during the year.

Considerable spatial variation was observed in the tuna landings during 2020. The western coast of India (FAO area 51) contributed the larger share to the landings (61.11%) and the balance 38.89 percent landings came from the east coast (FAO area 57). Tuna landings in 2020 comprised seven species, four representing the neritic (32.51%) and three from the oceanic group (27%). Kawakawa (*Euthynnus affinis,* 33.18%) and Yellowfin tuna (*Thunnus albacares*) (22.90%) contributed the maximum tuna catch, followed by Skipjack (*Katsuwonus pelamis;* 21.35%).

There was no reporting of sea bird interactions with the tuna fishery during the reporting period. Similarly, there was no reporting of the 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

Executive Summary 3
List of Tables 5
List of Figures..... 5
1.0 Background/General Fishery Information..... 6
2.0 Fleet Structure..... 7
3.0 Catch and Effort by Species and Gear..... 7
3.1 Longline tuna fishery in India..... 11
4.0 Recreational Fishery..... 12
5.0 Ecosystem and By-catch Issues..... 12
5.1 Sharks..... 12
5.1.1. NPOA sharks..... 12
5.1.2. Sharks finning regulation..... 12
5.1.3. Blue shark..... 13
5.2 Sea birds..... 13
5.3 Marine turtles..... 13
5.4 Marine mammals..... 13
6.0 National Data Collection and Processing Systems..... 13
6.1 Log Sheet data collection and verification..... 13
6.2 Vessel Monitoring System..... 13
6.3 Observer programme..... 14
6.4 Port sampling programme 14
6.5 Unloading /Transshipment..... 14
6.6. Actions taken to monitor catches & manage fisheries for Striped Marlin, Black Marlin, Blue Marlin and Indo-pacific Sailfish..... 14
6.7. Gillnet observer coverage and monitoring..... 14
6.8. Sampling plans for Mobulid rays..... 14
7.0. National Research Programmes..... 14
8.0. Status of Implementation of the Recommendations/Resolutions of the IOTC..... 18
9.0. Literature Cited 20

List of Tables

Table 1: Fishing fleet structure of India, 2018..... 7
Table 2: Tuna and allied resources nominal catch – gear-wise (in tonnes) from the Coastal and oceanic fishery 2019 16
Table 3. Annual trends in the nominal catch (tonnes) of tuna and allied resources (2016-2019) 10
Table 4: Shark species (No.& Weight in kg) caught in the exploratory survey of FSI, 2014-2019 17

List of Figures

Figure 1: Exclusive Economic Zone of India 6
Figure 2: Gear-wise catch composition in tuna fishery in 2019..... 8
Figure 3: Group-wise catch composition of tunas and tuna-like fishes, 2019.. 8
Figure 4: Pattern of tropical tuna catch in the west and east coasts of India (2019) 8
Figure 5a. Pattern of tropical tuna catch in west and east coasts of India (2019) 9
Figure 5b: Map showing group-wise catch composition of tunas and tuna-like fishes, 2019 9
Figure 6: Tropical tuna catch (2019) by different gears 10
Figure7: Area-wise composition of major groups/species 10
Figure 8: Map showing locations of samplings by exploratory longline survey by FSI vessels (2019) 11

1.0 Background/General Fishery Information

India have a long coastline of 8118 km with a continental shelf area of 0.53 million square km and have exclusive rights over the marine living and non-living resources of 2.02 million square kilometres Exclusive Economic Zone (EEZ). Owing to this vast area of marine waters under her jurisdiction, marine fisheries had always playing an important role in the food and nutritional security, livelihoods and economic prosperity of the nation. Further, marine fisheries are a major source of employment and livelihoods for one million coastal fishermen and households, who also generate further multiplier employment in the ancillary activities like fish processing and marketing. Government of India had been keen on the sustainable harvest for perpetuity of fisheries resources.

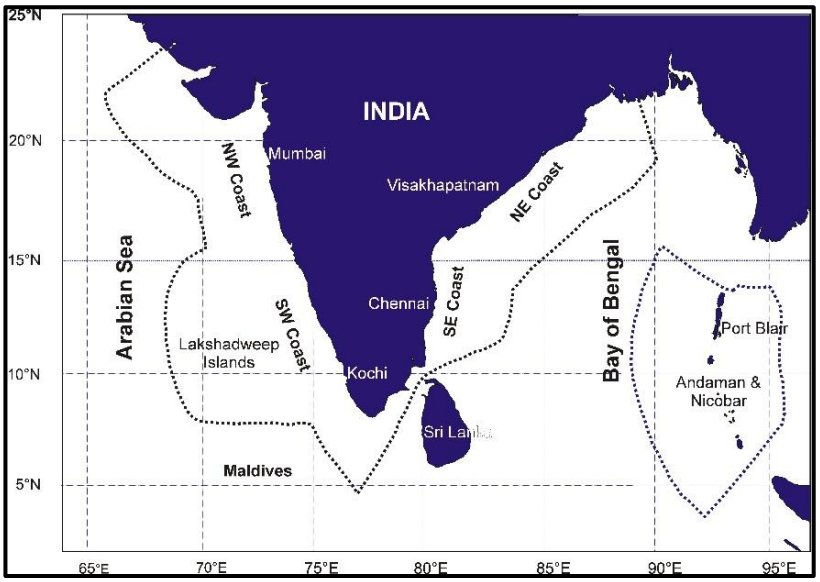


Figure 1: Exclusive Economic Zone of India

Fisheries contribute 1.24 percent to India's economy (GoI, 2020). During 2019-20, the total marine fish production was 3.72 million tonnes (GoI, 2020), and the estimated value of marine fish landings during 2018 was estimated at 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 player in the seafood trade, with total seafood exports amounting to over 1.29 million tonnes, valued at over US$ 6678.69 million during 2019-20.

India's Exclusive Economic Zone (EEZ) covering 2.02 million sq.km contains diverse and multi-species fish stocks, exploited by multi-gear fisheries, which are mostly concentrated in the coastal areas (<100m depth). Major fisheries exploit small pelagics (*e.g.* sardines, mackerels), demersals (*e.g.* ribbonfishes) and crustaceans (*e.g.* shrimps). The fishing fleet structure is mainly comprised of mechanized (42,651 nos.), motorized (95,957 nos.) and non-motorized (25,689 nos.), operating from 1,548 landing centres in the 9 coastal States, 2 Union Territories (UTs) and the 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

[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.***

surface swimming oceanic species, primarily the skipjack tunas. In the past one decade, efforts were made to convert the small-scale trawlers in to longliners to promote resource specific fishing within the country's EEZ.

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

#	Craft/Gear	East coast	West coast	Total
	Mainland India			
Mechanized				
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	31	57	88
				Total
8	Total mechanized (1 to 7)	12,944	29,707	42,651
9	Motorized	56,961	38,996	95,957
10	Non-motorized	15,468	10,221	25,689
11	Mainland Total	85,373	78,924	1,64,297
	Islands (A&N Islands and the Lakshadweep)			
12	Mechanized			162
13	Motorized			3464
14	Non-motorized			1848
15	Island Total			5474
	National			
16	Mechanized			42,813
17	Motorized			99,421
18	Non-motorized			27,537
19	Grand Total			1,69,771

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 14 types of gear (plus some minor gears operated locally) harvesting a total of 20 tuna and tuna like species in 2020. **Table 2** provides the composition of species/groups harvested by different gear type.

The total landings of tuna and tuna-like species along Indian coasts had been showing a decreasing trend in the recent past. The total landings of tuna and tuna-like species for 2020 is estimated at 1,52,593.16 tonnes, showing a decrease of 23.66 percent over the previous year (1,99,898 tonnes in 2019 and 2,08,928tonnes in 2018). Gillnets remained the major gear contributing to the tuna and tuna like fish catch during 2020 also, however, the percentage contribution of this gear to the catch recorded reducing trend in comparison to the previous year (27.92% in 2020 against 37.19% in 2019). Trawl and ring seine (17.82% and 17.57% respectively), followed by small longline (8.50%) where the principle gears contributing the catch. Pole and line fishing, practiced exclusively in the waters of the Lakshadweep Group of Islands, contributed 7.21 percent to the total tuna landings. Other gears like Drift longline, Small purse seines, Handline, Troll lines also contributed to the tuna landings in small quantities during the year (**Fig. 2& Table 2**).

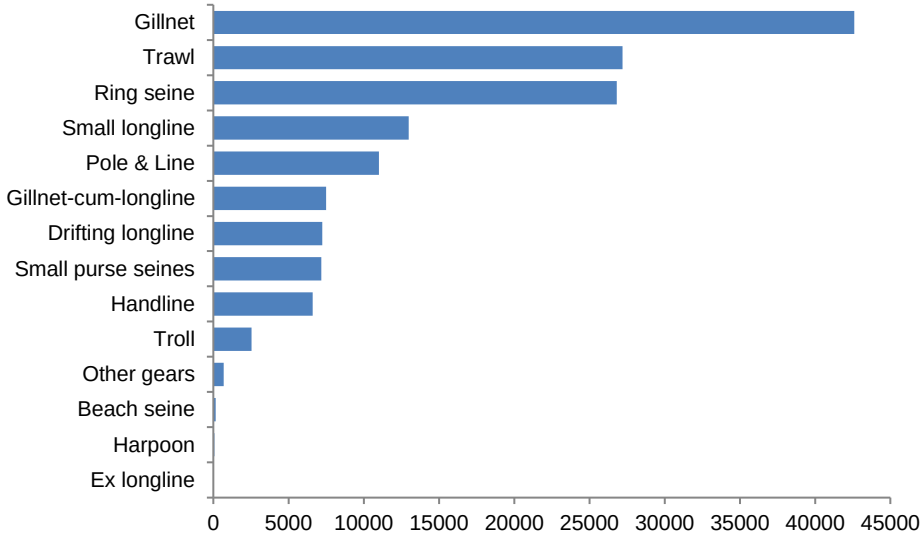


Figure 2: Gear-wise catch composition in tuna fishery in 2020

The oceanic tunas comprising three species (yellowfin [YFT], skipjack [SKJ] and bigeye [BET] tunas) contributed to 27.0 percent of the total tuna landings during 2020. The neritic tunas comprising four species contributed to 32.51 percent during the same period.

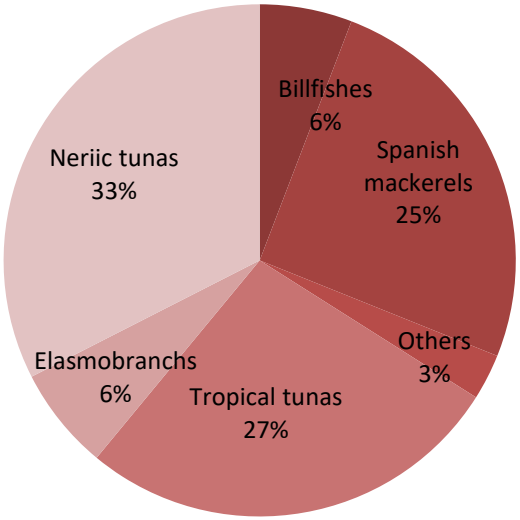


Figure 3: Group-wise catch composition of tunas and tuna-like fishes, 2020

The Spanish mackerels also contributed significantly (25.24%) to the total tuna and tuna-like species landings of India during the year 2020. The billfishes, including Indo-Pacific sailfish, marlins and swordfish collectively formed 5.84 percent, whereas pelagic sharks (6.51%) and the other species (2.90%) constituted the rest of the landings (**Fig. 3**).

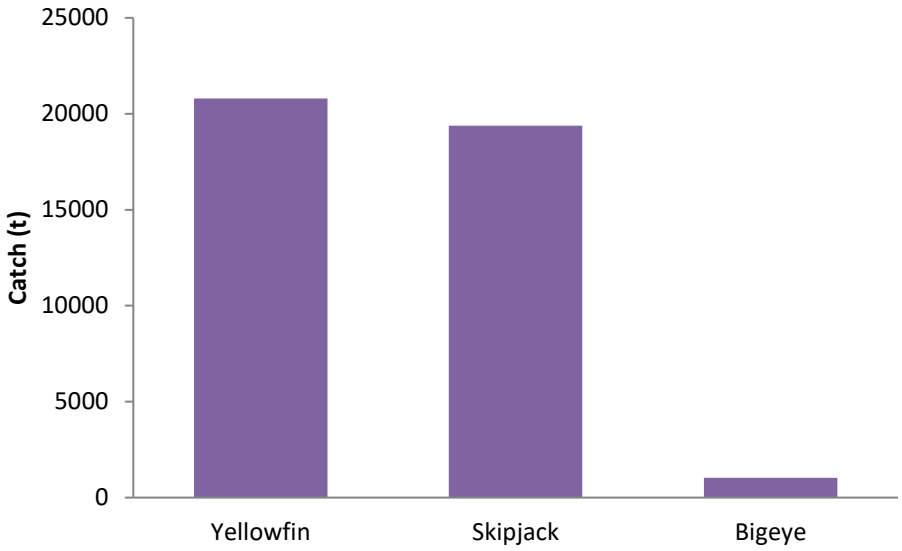
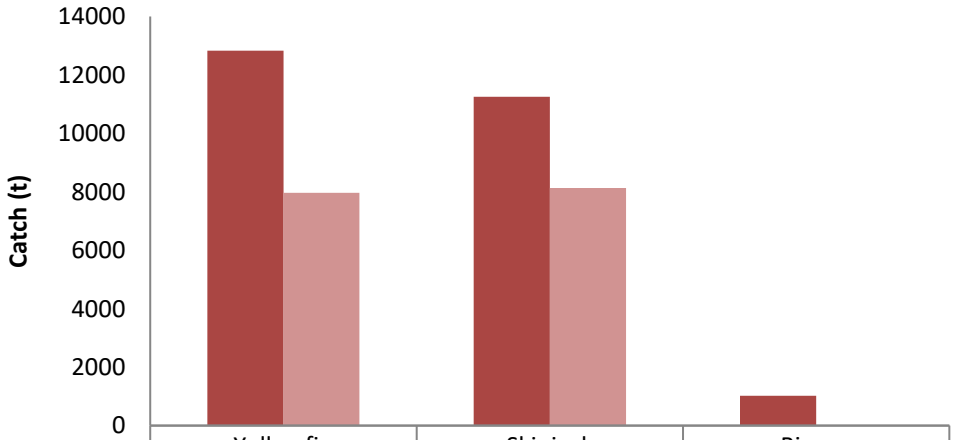


Fig. 4: Nominal catch of tropical tunas (yellowfin, skipjack and bigeye tunas), 2020

The nominal catch of tropical tunas (yellowfin, skipjack and bigeye tunas), in 2020 was 41210.87 t, comprising 20794.73t of yellowfin tuna, 19385.04t of skipjack tuna and 1031.10t of bigeye tuna (**Fig.4**). Area-wise landings indicate that 61.1 percent of the total landings were from the west coast of India including the Lakshadweep Islands (FAO Area 51), whereas the remaining 38.89 percent was from the east coast, including the Andaman and Nicobar Islands (FAO Area 57) (**Figs.5a, b**).

The landings on the west coast of India comprised 61.71 percent of yellowfin, 58.06 percent of skipjack and 98.63 percent of bigeye tuna, whereas the east coast landings constituted the remaining 38.29 percent of yellowfin, 41.95 percent of skipjack and 1.37 percent of bigeye during 2020.



	Yellowfin	Skipjack	Bigeye
Area 51	12833	11253	1017
Area 57	7961.726	8132.047	14.101

Figure 5a. Pattern of tropical tuna catch in west and east coasts of India (2020)

Twelve types fishing gears were employed for catching the tropical tuna species. Drift gillnet remained the principal gear for exploitation of tropical tunas in India. This gear contributed 32.26 percent of the total landings of tropical tunas that comprised 22.17 percent of yellowfin, 44.74 percent of skipjack, and 1.07 percent of bigeye tuna. Share of pole & line in the Indian tropical tuna catch was 20.39 percent (total catch), 4.66 percent YFT, 36.25 percent SKJ and 39.47 percent BET.

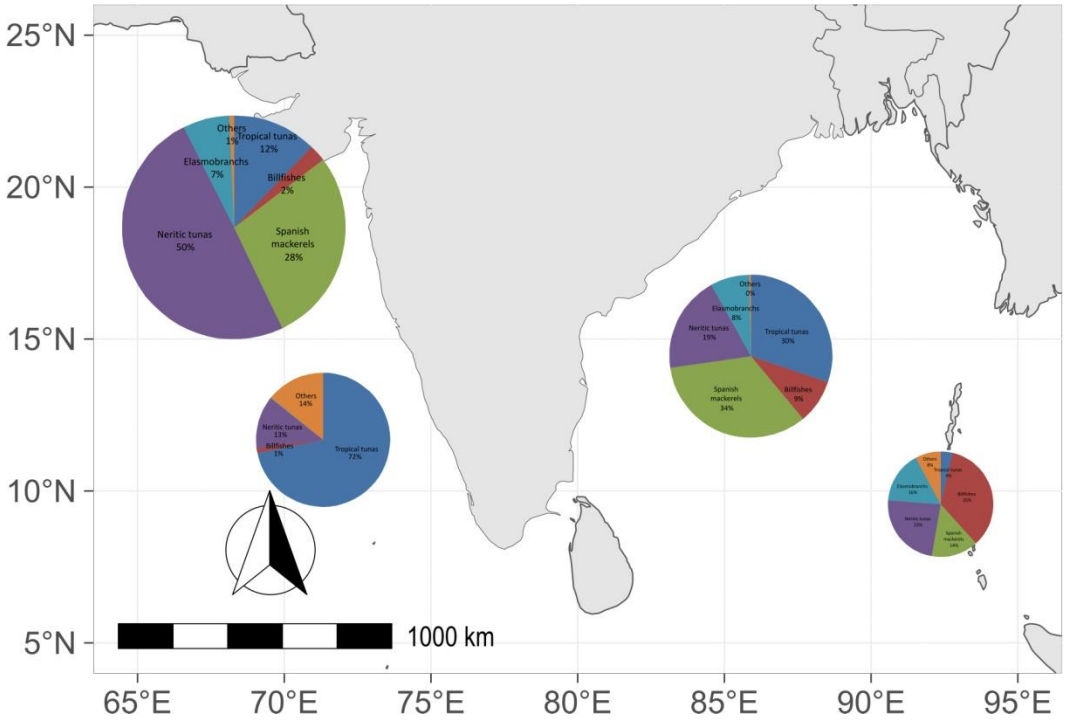


Figure 5b: Map showing group-wise catch composition of tunas and tuna-like fishes, 2019

The pole and line fishery practiced in the Lakshadweep Islands (South-eastern Arabian Sea) contributed 20.39 percent of the total tropical tuna catch, which included 4.66 percent YFT and 36.25 percent SKJ and 39.47 percent of BET. Small longlines catching tuna and bringing them ashore preserved in ice contributed 9.88 percent to the total tropical tuna catch, which included 15.36 percent YFT, and 4.53 percent SKJ. Boats using gillnet-cum-longline gear contributed to 6.25 percent of the total tropical tuna catch, comprising 9.01 percent YFT and 3.62 percent SKJ. Contributions by the other gears, including small purse seines to the tropical tuna catch of India during 2019 was marginal. Catches by the exploratory longline fishing carried out by the vessels of the Fishery Survey of India (FSI) was very less during this year (**Fig.6**).

Considerable spatial variation was observed in the landings of the tuna and tuna-like species during 2020 in India. The west coast of India (FAO area 51) contributed the larger share (61.11%) and the balance 38.89 percent landings came from the east coast (FAO area 57). West coast, where fishing fleet is more mechanized, dominates the landing across all the groups (**Fig. 7**). Neritic tunas were the dominant group in the landings of the west coast. More than 99 percent of the longtail tuna (*Thunnus tonggol*), 61 percent of *Auxis thazard*, 76 percent of *Euthynnus affinis* and 82 percent of *Auxis rochei* catch was from the west coast, while billfishes were increasing caught from the east coast.

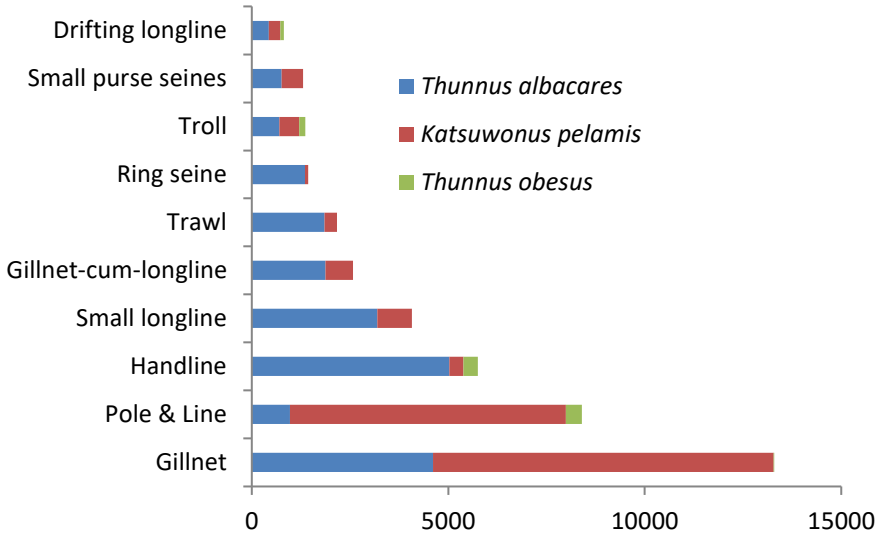


Figure 6: Tropical tuna catch (2020) by different gears

Analysis of trends in the catch over the years 2016-2020 revealed remarkable reduction in the catch of tuna and tuna like species during the year 2020 (**Table 3**). The total catch reduced by 47,305 t, yellowfin tuna by 12,759 t and skipjack 5,998 t were reduced during the year 2020 than 2019.

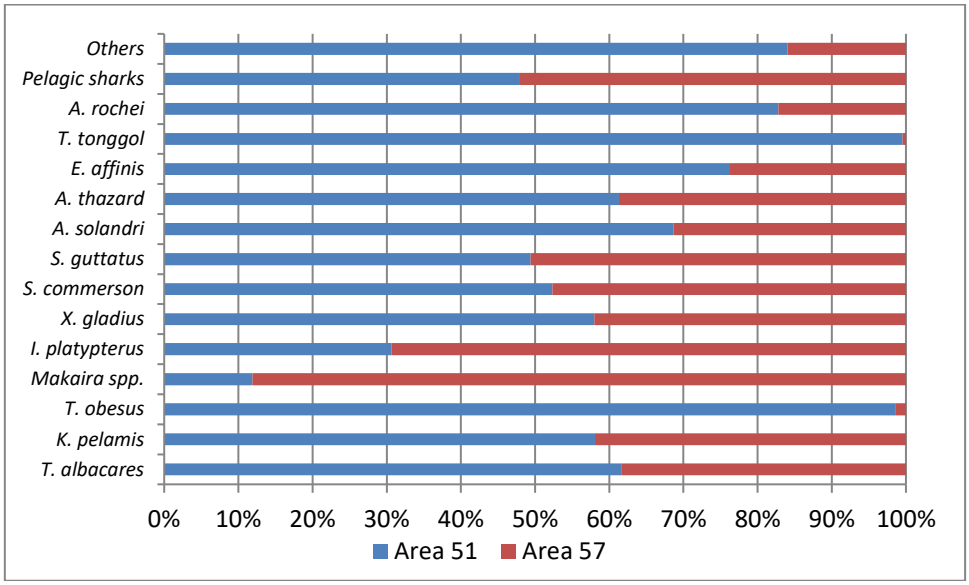


Figure7: Area-wise composition of major groups/species

Table 3. Annual trends in the nominal catch (tonnes) of Tuna and allied resources (2016-2020)

Species/group	2016	2017	2018	2019	2020
T. albacares	16,722.24	14,697	37,488.10	33,553.95	20794.73
K. pelamis	16,233.27	18,322.10	36,387.70	25,383.16	19,385.05
T. obesus	30	89	610.4	1043.64	1,031.10
Marlins	7,179.09	2,032.70	5,454.50	6,027.16	4952.315
I. platypterus	6,148.31	6,852.80	10,025.90	8,699.52	3,438.03
X. gladius	1,692.09	2,462.70	2,876.70	2,310.34	514.35
Pelagic sharks	22,336.80	18,983	959.3	15,247.98	9926.5
S. commerson	37,524	30,169.10	29,959.90	30,780	24,024.00
S. guttatus	16,835	18,162	15,101.30	16,279	14,126.00
A. thazard	6,900	5,499	8,806	8,669	8,487.00
E. affinis	35,393	27,680	33,208	33,863	30,134.00
T. tonggol	8,090	7,349	7,678.30	5,852	4,050.00
A. rochei	6,505	11,307	8,296.80	7,242	6,930.00
Rays	0.543	0.8	0.2	0.065	0.03
NEI	1,089.25	38,335.60	12,074.70	4,947.32	4800.074
Total	1,82,678.60	2,01,941.80	2,08,927.80	1,99,898.10	1,52,593.2

NEI – not elsewhere included

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***	Yellow Fin	***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 2019 to assess the resource availability in the Indian EEZ are shown in the following figure (**Fig. 8**). Due to several reasons, the survey operations were limited during the reporting year.

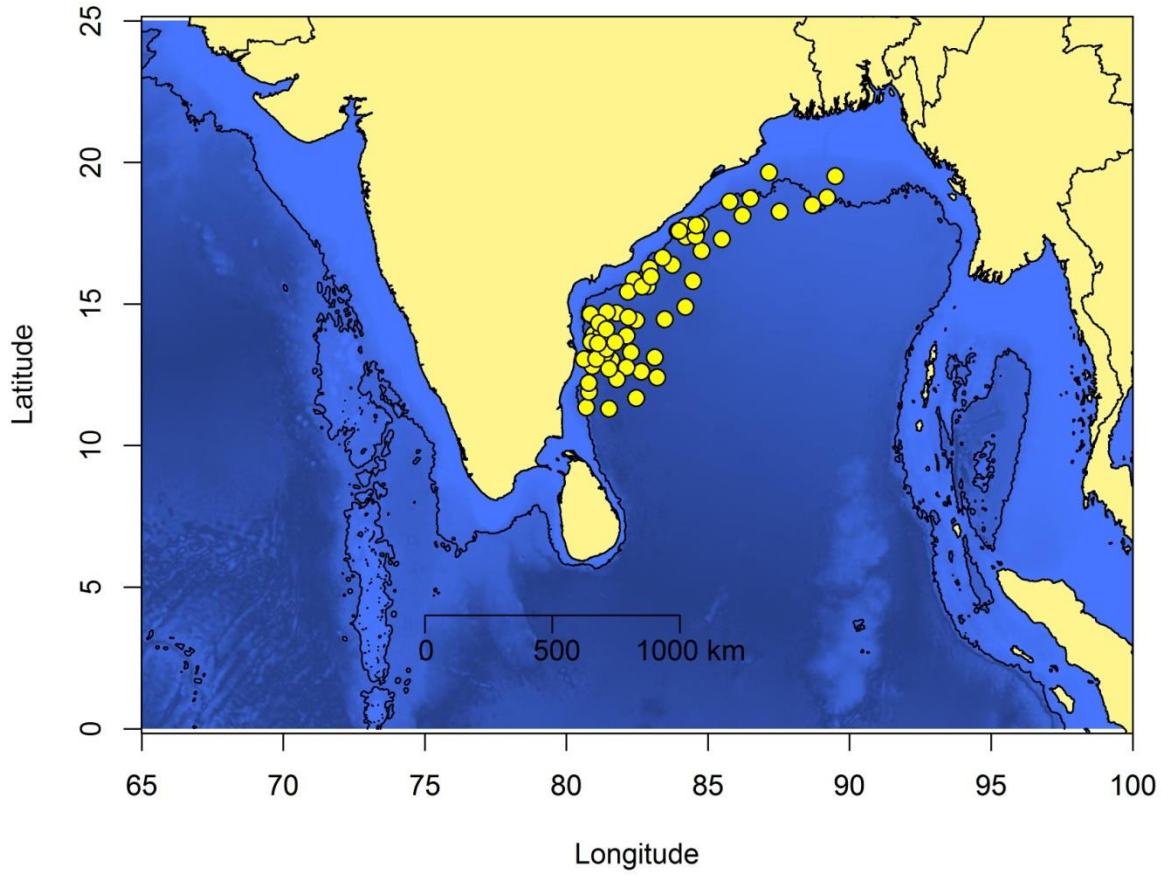


Figure 8: Map showing sampling locations by exploratory longline survey by the FSI vessels (2020)

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 20thSeptember 2017 under the Marine Fishing Regulation Act 2003 of the UT Administration[3].

The National Policy on Marine Fisheries, 2017 [4] in its guidance on the 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) while undertaking such fishing. 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.

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

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

5.0 Ecosystem and by-catch issues

5.1 Sharks

The landings of pelagic sharks in India during 2020 were estimated at 9,927 tonnes. The west coast (FAO Area 51) accounted for 47.85 percent, and the rest (52.15%) from the east coast (FAO Area 57). The mechanized sector contributed to more than 80 percent of the total landings. Trawls, gillnets and longlines were the major gears contributing to pelagic shark landings. Targeted shark fishery along the north Kerala coast has almost stopped, following the relocation of fishermen from Tamil Nadu who were engaged in this fishing (Annual Report CMFRI, 2018).

5.1.1. NPOA sharks

The National Plan of Action for Conservation and Management of Sharks (NPOA-Sharks[5]) 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).

5.1.2. Sharks finning regulation

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 the vessels 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.

5.1.3. Blue shark

Blue sharks are sporadically reported in the shark bycatch in the Indian tuna fishery. However, India has a well-established fishery data collection system, regularly collecting the data on fish catch, including blue sharks and the catches are being monitored domestically. Data on the blue shark catch is recorded and furnished to the IOTC as and when reported. Scientific research on blue sharks is being undertaken and results have been published (e.g., Varghese *et al.*, 2017)

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

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. Further, the bycatch of sea turtles in the Indian longline fishery was remarkably lower that those reported elsewhere (Varghese *et al*., 2010). However, 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). Further, the Fishery Survey of India, in collaboration with CMFRI and MPEDA had undertaken a programme on stock assessment of marine mammals of the Indian EEZ.

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, the FSI also 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. Actions taken to monitor catches & manage fisheries for Striped Marlin, Black Marlin, Blue Marlin and Indo-pacific Sailfish

The landings of Striped Marlin, Black Marlin, Blue Marlin and Indo-pacific Sailfish are monitored through the sampling programme listed in 6.4.

6.7. Gillnet observer coverage and monitoring

India does not have a large-scale gillnet fishery registered in the IOTC RAV.

6.8 Sampling plans for mobulid rays

India has a national sampling programme, for all the fish caught, including mobulid rays caught by the artisanal fishery. The fishery and biology data is being collected at national as well as State (Province) levels.

7.0 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 the distribution of tuna resources in the 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 under the Ministry of Earth Sciences (MoES) 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 MoES also undertake dedicated research and development activities on tuna fisheries. Further, the Wildlife Institute of India, an autonomous body under the Ministry of Environment, Forest and Climate Change is working on development of programmes to monitor the marine mammals in the Indian EEZ.

Table 2: Tuna and allied resources nominal catch – gear-wise (in tonnes) from the coastal and oceanic fishery 2020

Species/group	Gillnet	Trawl	Small longline	Small purse seines	Ring seine	Gillnet-cum-longline	Pole & Line	Handline	Beach seine	Troll	Harpoon	Ex longline	Drifting longline	Miscellaneous	Grand total
Thunnus albacares	4610	1850	3194	760	1356	1873	968	5031		701		1.726	431	19	**20,794.73**
Katsuwonus pelamis	8672	319	879	543	82	702	7027	358		508		0.047	294	1	**19,385.05**
Thunnus obesus	11						407	367		156		0.101	90		**1,031.10**
Makaira indica												0.315			**0.32**
Makaira spp.	830	127	1053	2	18	529		1	19				2364	9	**4,952.00**
Istiophorus platypterus	1596	168	877	1	80	550	30	3		115		0.025	7	11	**3,438.03**
Xiphias gladius	183	21	159			151				0.3			0.05		**514.35**
Scomberomorus commerson	4684	10018	3061	253	4065	949			10				979	5	**24,024.00**
Scomberomorus guttatus	5802	6111	483	465	799	86			25					355	**14,126.00**
Auxis thazard	2405	124	342	1043	1995	382	751	93		203			1149		**8,487.00**
Euthynnus affinis	6266	1825	2118	3037	14303	941	999	183	14	341			107		**30,134.00**
Thunnus tonggol	2543	357	29		1121										**4,050.00**
Auxis rochei	1173	722	38	982	2990	940			85						**6,930.00**
Pelagic sharks	2445	5245	371	93		372	1	4	1	6	4.5		1092	292	**9,926.50**
Rays												0.026			**0.03**
Sarda orientalis	235	145	111	1		11									**503.00**
Acanthocybium solandri	63	38	262	3		11									**377.00**
NEI	1083	128				1	822	570		505	72		739	0.074	**3,920.07**
Total	**42601**	**27198**	**12977**	**7183**	**26809**	**7498**	**11005**	**6610**	**154**	**2535.3**	**76.5**	**2.24**	**7252.05**	**692.074**	**1,52,593.2**

Table 4: Shark species (No.& Weight in kg) caught in the exploratory survey of FSI, 2014-2019 (Sharks were not caught during the exploratory longline operations in 2021)

Sl.No	Year	2015		2016		2017		2018		2019	
	Name of Species	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt
1	*Alopias pelagicus*	64	2,964	24	1,081	145	522	47	1,582	4	149
2	*Alopias superciliosus*	2	120	4	375	8	436	42	1,681	2	139
3	*Alopias vulpinus*	11	473	1	145	2					
4	*Carcharhinus albimarginatus*										
5	*Carcharhinus sorrah*	4	55								
6	*Carcharhinus amblyrhynchos*	8	159								
7	*Carcharhinus dussumieri*	15	214	20	330					4	27
8	*Carcharhinus longimanus*	1	26	1	50						
9	*Carcharhinus brevipinna*										
10	*Carcharhinus falciformis*	79	2,990	37	486	1	60	85	3175	9	163
11	*Carcharhinus hemiodon**	3	168	1	40						
12	*Galeocerdo cuvier*	6	383	5	282	1	213			4	141
13	*Isurus oxyrinchus*	23	750	11	255	2	131			1	70
14	*Sphyrna lewini*					1	45				
15	*Triaenodon obesus*					17	58				
	Total	**216**	**8,302**	**104**	**3,044**	**177**	**1,465**	**174**	**6,438**	**24**	**689**

*Released live

8.0 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. Further, the requirements for monitoring the artisanal fishing vessels landing at the landing sites 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 hooks and research finding have been published in the Journal 'Current Science' (Vol. 98, No. 10, Pp – 1378-1384 Varghese et al., 2010). -To create awareness, FSI also brings out popular articles in its in-house publications namely, Meena News and Bulletin of the 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 legislations 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 on 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, Forest and Climate Change 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.
17/05	On the conservation of sharks caught in association with fisheries managed by IOTC	Paragraphs 6, 9, 11	- The data collected from the authorised longlining vessels are submitted to IOTC to 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.
18/02	On management measures for the conservation of blue shark caught in association with IOTC fisheries	Paragraphs 2-5	-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 marlin, black marlin, blue marlin and Indo-Pacific sailfish	Paragraphs 7 – 11	India is adopting a number of management measures for conservation of fishery resources (including billfishes) in its seas, most important of which is annual ban on fishing for two months. Catches are being monitored and reported to the IOTC
18/07	On measures applicable in case of non-fulfilment of reporting obligations in the IOTC	Paragraphs 1, 4	India is regularly reporting the fishery and other data in respect of all IOTC fisheries; including shark species caught in association with IOTC fisheries, and is working in collaboration with the IOTC Secretariat to improve the data collection for direct and incidental catches. India had submitted the zero/positive matrix by IOTC species as well as the most commonly caught elasmobranch species in the IOTC format while submitting the mandatory catch, effort and size data
19/01	On an Interim Plan for Rebuilding the Indian Ocean Yellowfin Tuna Stock in the IOTC Area of Competence	Paragraph 22	The provisions under this Resolutions do not apply on India
19/03	On the Conservation of Mobulid Rays Caught in Association with Fisheries in the IOTC Area of Competence	Paragraph 11	India has a national sampling programme, for all the fish caught, including mobulid rays caught by artisanal fishery. The fishery and biology data is being collected at national as well as state (province) levels

9.0. Literature cited

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