

AN OVERVIEW OF COASTAL TUNA RESOURCES AND THEIR STATUS ALONG INDIAN WATERS.**M.K SINHA*, A.ANROSE & C.BABU**FISHERY SURVEY OF INDIA,
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*e.mail- manassinhafsi70@gmail.com**ABSTRACT**

India is the prominent coastal nation in Indian Ocean region, engaged in tuna fishing and research. For years together, tuna fishing activities in Indian seas were limited to coastal waters targeting mainly for neritic tunas. Neritic tunas are represented by Little tuna (*Euthynnus affinis*), Frigate tuna (*Auxis thazard*), Bullet tunas (*Auxis rochei*), Long-tail tuna (*Thunnus tonggol*) and Striped Bonito (*Sarda orientalis*). Neritic tuna are mainly caught by small traditional crafts; which operates mainly gillnets, mini purse seines, ring seines, hook and lines where the main target fish is not tuna rather it is a by catch but it contributes significantly to the tuna landing. Pole and lines and troll lines are mainly targeting tunas; which also contributes to the tuna fishery, mainly in the Island groups of Indian EEZ. At present the modern fishing fleets are also being deployed to catch the neritic tunas. The tuna production has increased commensurately, albeit, in respect of neritic tunas.

The estimated potential projected for the neritic tunas and seer fishes upto 100m depth zone are 1,56,049 tonnes. The total production of tunas and tuna-like fishes including neritic and oceanic tunas and seer fishes during the year 2012 was 1,37,544 tonnes against a total production of 1,26,609 tonnes during 2011, where as the total production of neritic tunas (59,045 tonnes) and Seer fishes (56,101 tonnes) during the year 2012 was 1,15,146 tonnes. The average tuna and seer fish landing during 2008-2012 is 1,26,282.6 tonnes. This implies that, there is an increase in the landing by coastal tuna, oceanic tuna and seer fishes. During the year 2012, among the neritic tunas; Kawakawa or little tuna was dominant (55.49%) species followed by Long tail tuna (24.5%), Bullet tuna (10.5%), Frigate tuna (6%) and Striped Bonito (3.5%). In the present paper, the status of the coastal tuna resources and gear wise landing of tuna and tuna- like fishes during the year 2008-2012 and the species distribution along the Indian coast are discussed.

Key words: Neritic tuna, EEZ, Multi-gear, Distribution, Coastal sector.

INTRODUCTION

India with vast resources in terms of 8,118 km coast line, 0.53 million sq.km. of continental shelf and 2.02 million sq.km of Exclusive Economic Zone, the country has been playing pivotal role in meeting demands of fish over the years. The country is blessed with nine maritime states and four union Territories including Andaman & Nicobar Islands and Lakshadweep Islands. The marine fishery sector in India has registered a phenomenal growth during the last five decades both quantitatively and qualitatively. While the subsistence fisheries during the early 1950's produced about 0.5 million tonnes annually, the current annual production in the year 2012 is all time high with 3.94 million tonnes, forming 89.34 % of the revalidated fishery potential of 4.41 million tonnes (comprising 2.13 million tonnes of pelagic resources, 2.07 million tonnes of demersal resources and 0.22 million tonnes of oceanic resources). All the maritime states and union territories except West Bengal and Odisha witnessed an increase in production during 2012 compared to the previous year. The pelagic resources contributed 73.4% of the total landings. Tuna and tuna like fishes are one of the major components of pelagic fishes. Ten species of coastal/neritic and oceanic species are encountered in the Indian fishery. Neritic tunas are represented by Little tuna/Kawakawa (*Euthynnus affinis*), Frigate tuna (*Auxis thazard*), Bullet tuna (*Auxis rochei*), Longtail tuna (*Thunnus tonggol*) and Bonito (*Sarda orientalis*) where as oceanic species are represented by Yellowfin (*Thunnus albacares*), Skipjack tuna (*Katsuwonus pelamis*), Dog-tooth tuna (*Gymnosarda unicolor*), Albacore (*Thunnus alalunga*) and Bigeye (*Thunnus obesus*). Dog-tooth tuna (*Gymnosarda unicolor*) is also available in the coastal waters. Fishing for tuna and tuna like fishes is carried out by operating drift gill nets, troll line, hook and line, pole and line, purse seining, ring seining etc. in coastal waters. Neritic tunas are mainly caught by small traditional crafts; which operates mainly gillnets, mini purse seines, ring seines, hook and lines where the main target fish is not the tunas, rather it is a by catch but it contributes significantly to the tuna landing. Whereas Pole and lines and troll lines are mainly targeting tunas; which also contributes to the tuna fishery, mainly in the Island groups of Indian EEZ. At present the modern fishing fleets are also used to catch the neritic tunas. The tuna production has increased commensurately, albeit, in respect of neritic tunas. Major share of the fish landings in India, where a multi species, multi gear fishery exists is from the coastal fishery

(Sajeevan and Nair, 2006). Tuna fishery in India exploited mainly by both targeted longliners and multipurpose coastal fishing fleets. India's tuna fishing fleet includes traditional, motorized and mechanised boats operating various traditional gears, small pole and line boats, small longliners and industrial longliners.

As far as the region-wise landings are concerned, South-west region comprising Kerala, Karnataka and Goa contributed maximum with 13.9 lakh tonnes (35.1%) followed by North-west region (Gujarat and Maharashtra) with 11.5 lakh tonnes (29.2%), South-east region (Tamilnadu and Andhra Pradesh) 10.1 lakh tonnes (25.5%) and North-east region (Odisha and West Bengal) 4.0 lakh tonnes (10.2%).

The status of exploitation tuna by the coastal fishery in the Indian EEZ has been reviewed and assessment of tuna stock has been made by some earlier workers (Kasim and Mohan, 2009; James and Pillai, 1993; Modayil *et al.*, 2005; Abdussamad *et al.*, 2012; Ghosh *et al.*, 2012, Sivadas *et al.*, 2012; Joshi *et al.*, 2012; James *et al.*, 1993; John and Pillai, 2009; Vijayakumaran and Varghese., 2010, 2011, 2012; Premchand *et al.*, 2013). Studies have also been done on the fishery and biology of tuna resources from the Indian coast (Ghosh *et al.*, 2012; Silas and Pillai, 1982; Rohi *et al.*, 2012; Koya *et al.*, 2012). But in the present paper, the status of the coastal tuna resources and gear wise landing of tuna and tuna-like fishes during the year 2008-2012 and the species distribution along the Indian coast are analyzed and discussed.

MATERIAL AND METHODS

Data on tuna production was collected from different agencies in India including Fishery Survey of India (FSI), Central Marine Fisheries Research Institute (CMFRI) and Marine Products Export Development Authority (MPEDA). The data on fish landings collected through multi-stage random sampling procedure by the CMFRI and submitted by the Government of India to the Indian Ocean Tuna Commission (IOTC) as National report is also utilized in this paper for analyses. In addition the nominal catch data of tuna from Indian Ocean were retrieved from the website of Indian Ocean Tuna Commission (<http://www.iotc.org/English/data.php>) for trend analyses. Landing data collected from the respective state fisheries department is also utilized for analyses.

RESULTS

AREA WISE AND SPECIES WISE LANDINGS:-

The total production of tunas and seer fishes including neritic and oceanic tunas in India during the year 2008 to 2012 fluctuated between 94,981 tonnes to 1,49,444 tonnes (Table-1). From the table, it can be observed that the production was lowest during 2010 (94,981 tonnes), whereas during 2008 it is highest (1,49,444 tonnes). However during 2012 it is 1,37,544 tonnes which is in increasing trend compare to 2011 (126,609 tonnes). Where as the average production of tuna and seer fishes during 2008 to 2012 is 126,282 tonnes. In the Table-1 it can be observed that FAO area 51 and 57 showed production of 80,581 tonnes and 56,963 tonnes during 2012 respectively. FAO area 51 forms 64% and FAO area 57 forms 36%. Figure-1 and Figure-2 represents catches of Tunas and Seer fishes during the year 2008-2012 in the FAO area 51 and 57 respectively, whereas Figure-3 represents the catches of Tunas and Seer fishes during the year 2008-2012 in total Indian waters. From the Figure-1 it can be seen that the species Narrow barred seer fish landing is high during all the five years followed by Kawakawa among the neritic tuna and seer species from the area 51 which represents the western Indian ocean. In Figure-2 it is observed that among the neritic tunas the species Kawakawa is the maximum landed fish during all the five years. The Eastern Indian ocean which represents the area-57 indicates that Kawakawa species is dominant in the year 2008 compared to other years with a landing of 16,285 tonnes. The average landing during the year 2008-2012 from Indian waters is depicted in Figure-4. From the figure it can be observed that among the tunas and seer fishes the species Narrow barred seer fish is high with 32,057 tonnes followed by Kawakawa (28,861 tonnes). Among the only neritic tunas, the species Kawakawa (28,861 tonnes) is high followed by Long tail tuna (9,189 tonnes) Frigate tuna (5,326 tonnes) and Bullet tuna (4,920 tonnes), whereas the species Bonito also contributes on an average 1,456 tonnes during 2008-12 to the fishery in India. Average percentage wise neritic tuna landing is depicted in Figure-10. From the figure it can be observed that Neritic tuna NEI percentage of landing is high with 39% followed by Kawakawa (35%), Long tail tuna (11%), Frigate tuna (7%), Bullet tuna (6%) and Striped Bonito (2%).

GEAR-WISE AND SPECIES WISE LANDING;-

The gear wise nominal catch of tunas and seer fishes from coastal fishery in India during 2008, 2009, 2010, 2011 & 2012 are depicted in Tables-2-6 and Figures.5-9. From the Table-2 and Figure- 5 it can be observed that the overall landing of tunas is maximum from the gill net followed by Hook and line, purse seine, poll and line etc. during the year 2008. Species-wise landing over the gears can also be observed from the Table-2 and Figure-5. This indicates that the Kawakawa is landed maximum in gillnet followed Skipjack tuna among tuna species.

The Table-3 and Figure-6 indicates the gear wise nominal catch of tunas and Seer fishes from coastal fishery in India during 2009. From the table and figure it can be observed that the overall landing of tunas is maximum from gillnet followed by Hook and line, purse seine, poll and line, ring seine etc. during the year 2009. Species -wise landing over the gears indicates that the Kawakawa is landed maximum in the gillnet followed by Skipjack tuna among tuna species..

The Table-4 and Figure-7 indicates the gear wise nominal catch of tunas and Seer fishes from coastal fishery in India during 2010. From the table and figure it can be observed that the overall landing of tunas is maximum from gillnet followed by Hook and line, mini purse seine, trawl net etc. during the year 2010. In the year 2010, data on poll and line is not available. Species-wise landing over the gears indicates that the Kawakawa is landed maximum in gillnet followed Yellow fin tuna among the tuna species which may be due to non-availability of data from the poll and line gear.

The Table-5 and Figure-8 indicates the gear wise nominal catch of tunas and seer fishes from coastal fishery in India during 2011. From the table and figure it can be observed that the overall landing of tunas is maximum from the gillnet followed by Hook and line, trawl net etc. during the year 2011. During the year 2011, data on poll and line is also not available. Species -wise landing over the gears indicates that the Kawakawa is landed maximum in gillnet followed Long tail tuna among tuna species.

The Table-6 and Figure-9 indicates the gear wise nominal catch of tunas and seer fishes from coastal fishery in India during 2012. From the table and figure it can be observed that the overall landing of tunas is maximum from the gillnet followed by trawl net, Hook and line etc. during the year 2012. Data on poll and line catch is also not available during this year.

NERITIC TUNA STATUS DURING 2012:-

Figure-11 represents the neritic tuna landing during the year 2012 and Figure - 12 depicts the percentage wise neritic tuna landing. The Figure -11 indicates that the neritic tuna is dominated by Kawakawa species with 32,765 tonnes, followed by Long tail tuna (14,455 tonnes), Bullet tuna (6,230 tonnes), Frigate tuna (3,516 tonnes) and Bonito (2,079 tonnes). From the Figure-12, it can be seen that among the neritic tunas; Kawakawa or little tuna was dominant (55.49%) followed by Long tail tuna (24.5%), Bullet tuna (10.5%), Frigate tuna (6%) and Striped Bonito (3.5%) during the year 2012. Altogether during 2012, five species of neritic tuna landed 59,045 tonnes only in India. Long tail tuna was only recorded from the FAO area 51 i.e Western Indian ocean though it is also available from the Eastern Indian ocean including Andaman and Nicobar Islands. Gear wise landing of neritic tuna species are depicted in Figures - 13 to 17.

STATE WISE LANDING STATUS OF NERITIC TUNA DURING 2012:-

In the state of Gujarat, the Long tail tuna contributed 66% followed by Kawakawa (23.7%), Frigate (4.9%) and other tunas (5.5%) of the total tuna landing during 2012. Maharashtra state tuna landing was dominated by Kawakawa (63%) followed by Long tail tuna (24%), Auxis spp. (5%) and other spp. (7%). In the state of Goa, tuna constituted 4.8% of the total marine landing. Kawakawa species dominated the tuna landing with 46% of the total tuna landing. Other tuna species which were landed are Frigate tuna, Bullet tuna, Long tail tuna and Bonito. In the state of Kerala the tuna landing along coast registered a marginal decline with 3.4% during the year 2012. The neritic tunas represented by five species together constitute 80.9% of the total tuna catch. In the year 2012 the species Kawakawa dominated the catch with 46% of the total tuna catch. During the year under review, the coastal/neritic tuna fishery was also supported by Frigate tuna, Bullet tuna, Bonito and long tail tuna. Lakshadweep Island which mainly operates Poll and line gear landed Skipjack tuna (45.2%), Yellowfin tuna (47.1%), Kawakawa (5.36%), Frigate tuna (2.1%) and Dog- tooth tuna (0.3%). Tamilnadu state tuna landing was 51% of the total pelagic landing. Among the total tuna landing, the species Kawakawa dominated the catch with 37.7% followed by Frigate and Bullet tuna (13%), Skipjack (4.8%) and other tunnies with 44.9%. The state Andhra Pradesh landed 34.1% of Yellowfin tuna followed by 28.8% of Kawakawa, 28% of Skipjack tuna and 9.1% of Frigate mackerel among the total tuna landing during the year 2012 (CMFRI-2013). The Odisha and West Bengal state data was not available.

The A&N Island group landed tuna belongs to the species Kawakawa, Long tail tuna, Bonito, Dog-tooth tuna, Yellowfin, Skipjack, Big eye tuna by deploying hook and line, long line, troll line, gill net etc. Over all, the tuna contributes less than 5% of the total marine landing. The species wise landing details are not available.

DISCUSSION:-

The coastal tuna fishery is exploited by using different crafts and gears mostly in the depth range up to 100 m since decades. However in recent years the area of exploitation has been extended up to 500 m due to mechanisation. Neritic tuna is being caught in Indian waters as bycatch along with other targeted species. As tuna is not having good domestic market demand, it is mostly being exported in different value added products as per the buyers demand. In the South-west Coast of India, small scale fishing using purse seines and ring seines target coastal pelagic resources including neritic tuna. In the Lakshadweep waters targeted fishing is conducted in an organised manner only for the Skipjack tuna by pole and line fishing. In the Andaman & Nicobar group of island tuna is caught only by gillnet, hook and line and troll line. The estimated potential projected for the neritic tunas and seer fishes up to 100 m depth zone are 1,56,049 tonnes. The total production of tunas and tuna-like fishes including neritic and oceanic tunas and seer fishes during the year 2012 was 1,37,544 tonnes against a total production of 1,26,609 tonnes during 2011, whereas the total production of neritic tunas (59,045 tonnes) and Seer fishes (56,101 tonnes) during the year 2012 was 1,15,146 tonnes. The average tuna and seer fish landing during 2008-2012 is 1,26,282.6 tonnes. This implies that there is an increase in the tuna landing by coastal sector and also oceanic sector.

Coastal tuna in Indian Ocean indicates that Kawakawa is the dominant species followed by Long tail tuna. Frigate tuna is caught in equal percentage from the Indian waters which indicates that it is uniformly distributed all along the Indian coast. The neritic tuna being caught by multi-gear and multiday fishing, operated from the respective coastal states and the availability of the gear wise data on the resources still needs to be strengthened and the access to the data also requires special attention so as to develop the tuna fishery in an organised manner. The species wise and area wise landing details are the need of the hour.

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REFERENCES :-

- Abdussamad, E.M., Koya, K.P.S., Ghosh, S., Rohit, P., Joshi, K.K., Manoj Kumar, B., Prakasan, D., Kemparaju, S., Elayath, M.N.K., Dhokia, H.K., Manju, S. and Bineesh, K.K. (2012). Fishery, biology and population characteristics of longtail tuna, *Thunnus tonggol* (Bleeker, 1851) caught along the Indian coast. Indian J Fish 59 (2): 7-16.
- CMFRI.2013. Annual report 2012-13. Central institute of Marine fisheries Research Institute, Cochin. 204 pp.
- Ghosh, S., Sivadas, M., Abdussamad, E.M., Rohit, P., Koya, K.P.S., Joshi, K.K., Anuleksmi, C., Rathinam, M., Prakasan, D. and Manju, S. (2012) Fishery, population dynamics and stock structure of frigate tuna *Auxis thazard* (Lacepede, 1800) exploited from Indian waters. Indian J Fish 59(2):95-100.
- James, P. S. B. R., Pillai, P. P., Pillai, N. G. K., Jayaprakash, A. A., Gopakumar, G., Kasim, H. M., Sivadas, M. and Koya, K. P. S. (1993). Fishery, biology and stock assessment of small tunas. In: Sudarsan, D. and John, M. E. (Eds.), *Tuna research in India*. Fishery survey of India, Bombay, p. 123-148.
- James, P.S.B.R. and Pillai, P.P. (1993) Tuna resources and fishery in the Indian EEZ an update, Proc. National Tuna Conference, CMFRI, Cochin: 19-43.
- John, M.E. and Pillai, N.G.K. (2009) Current status of tuna fisheries in India. IOTC-2009-Sc-INF 05.
- Joshi, K.K., Abdussamad, E.M., Koya, K.P.S., Sivadas, M., Somy, K., Prakasan, D., Manju, S., Beni, M. and Bineesh, K.K. (2012) Fishery, biology and dynamics of dog-tooth tuna, *Gymnosarda unicolor* (Rüppell, 1838) exploited from Indian seas. Indian J Fish. 59 (2):75-79.
- Kasim, H.M. and Mohan, S. (2009) Tuna fishery and stock assessment of component species off Chennai coast. Asian Fish Sci. 22 (1) : 245-256.
- Koya, K.P.S., Joshi, K.K., Abdussamad, E.M., Rohit, P., Sivadas, M., Somy, K., Ghosh, S., Koya, M., Dhokia, H.K., Prakasan, D., Koya, V.A.K. and Manju, S. (2012) Fishery,

biology and stock structure of Skipjack tuna, *Katsuwonus pelamis* (Linnaeus, 1758) exploited from Indian waters. Indian J. Fish., 59(2):39-47.

Modayil, M. J., Pillai, N. G. K. and Ganga, U. (2005). An overview of coastal tuna resources and their fisheries in Indian waters. In: Somavanshi, V. S., Varghese, S. and Bhargava, A. K. (Eds.), Proc. Tuna Meet, 2003, p. 1-10.

Premchand, M.K.Sajeevan and A.Tibutius. (2013) India's National report to the Scientific Committee of the Indian Ocean Tuna Commission. IOTC-2013-SC16-NR 09.

Rohit, P., Rao, G.S. and Rammohan, K. (2012) Age, growth and population structure of the yellowfin tuna *Thunnus albacares* (Bonnaterre, 1788) exploited along the east coast of India. Indian J. Fish., 59 (1) :1-6

Sajeevan, M.K and J.R.Nair, 2006. Distribution and abundance of Non-Conventional deep sea fin fish resources off the South-west coast of India (7°N - 10°N lat.) Indian J. Fish., 53 (3): 345-352.

Silas, E.G. and Pillai, P.P. (1982) Resources of tunas and related species and their fisheries in the Indian Ocean. Bull. Cent. Mar. Fish. Res. Inst., 32, 174 p.

Sivadas, M., Abdussamad, E. M., Jasmine, S., Rohit, P., Koya, K.P.S., Ghosh, S., Joshi, K. K., Dhokia, H. K., Prakasan, D. and Bineesh, K. K. (2012). Assessment of the fishery and stock of striped bonito, *Sarda orientalis* (Temminck and Schlegel, 1844) along Kerala coast with a general description of its fishery from Indian coast. *Indian J. Fish.*, 59(2): 57-61, 2012

Vijayakumaran, K. and Varghese, S.P. (2012) India's National report to the Scientific Committee of the Indian Ocean Tuna Commission. IOTC-2012-SC15-NR09(E)

Vijayakumaran, K. and Varghese, S.P. (2011) India's National report to the Scientific Committee of the Indian Ocean Tuna Commission. IOTC-2011-SC14-NR 09

Vijayakumaran, K. and Varghese, S.P. (2010) Update on the status of tuna fisheries in India. IOTC-2010-SC-Inf.12

Table:- 1 Year wise and Species wise tunas and seer fishes landing during 2008-2012 in Indian waters

	FAO AREA 51					FAO Area 57					India total					Average
Year/Species	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	2008-2012
Yellowfin tuna	4628	6679	3106	1404	1550	8879	6549	6183	8567	14957	13507	13228	9289	9971	16507	12500.4
Bigeye tuna	6	829	1	0	0	11	0	37	0	0	17	829	38	0	0	176.8
Skipjack tuna	19590	13174	1373	1872	1382	2470	2417	3520	6887	4400	22060	15591	4893	8759	5782	11417
Albacore tuna	430	199	42	50	0	621	44	0	330	0	1051	243	42	380	0	343.2
Longtail tuna	7486	6111	6077	11777	14455	28	0	15	0	0	7514	6111	6092	11777	14455	9189.8
Bullet tuna	2839	2548	3301	6178	4339	24	945	1609	928	1891	2863	3493	4910	7106	6230	4920.4
Frigate tuna	3979	3372	3944	2736	2093	2207	1868	2339	2673	1423	6186	5240	6283	5409	3516	5326.8
Kawakawa	16116	12502	11642	19691	19329	16285	12429	9629	13247	13436	32401	24931	21271	32938	32765	28861.2
Striped bonito	2470	519	172	323	1486	1416	281	7	16	593	3886	800	179	339	2079	1456.6
Dogtooth tuna	14	45	12	37	40	0	0	0		0	14	45	12	37	40	29.6
Neritic tunas NEI	0		0	0	0	2640		0	539	0	2640	0	0	539	0	635.8
Narrow barred seerfish,	22985	16248	15765	21854	27284	9170	13778	9628	8441	15132	32155	30026	25393	30295	42416	32057
Indo-Pacific seerfish	14372	6582	7014	6004	8610	9392	15470	9430	12291	5075	23764	22052	16444	18295	13685	18848
Streaked seerfish	8	15	4	11	0	4	2	12	0	0	12	17	16	11	0	11.2
Korean seerfish	0	0	0	0	0	3	0	0	0	0	3	0	0	0	0	0.6
Wahoo	8	138	56	12	13	53	91	63	33	56	61	229	119	45	69	104.6
Seer fishes NEI	95	0	0	708	0	1215	0	0	0	0	1310	0	0	708	0	403.6
Total	95026	68961	52509	72657	80581	54418	53874	42472	53952	56963	149444	122835	94981	126609	137544	126282.6

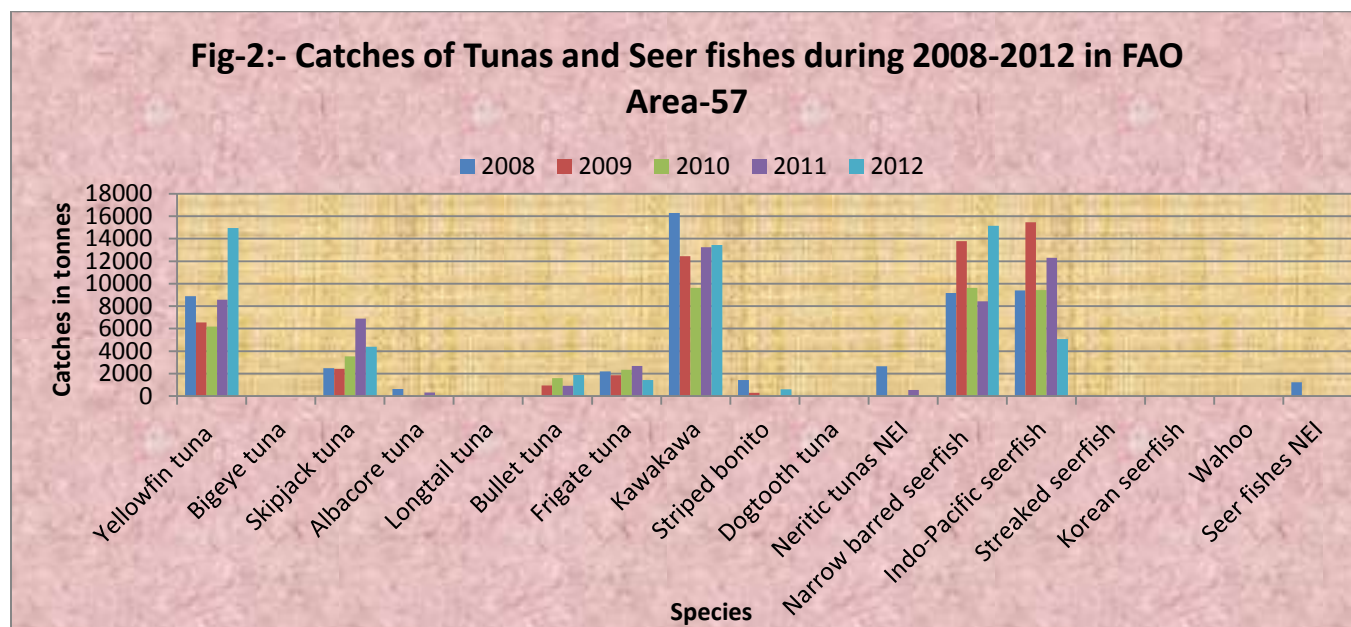
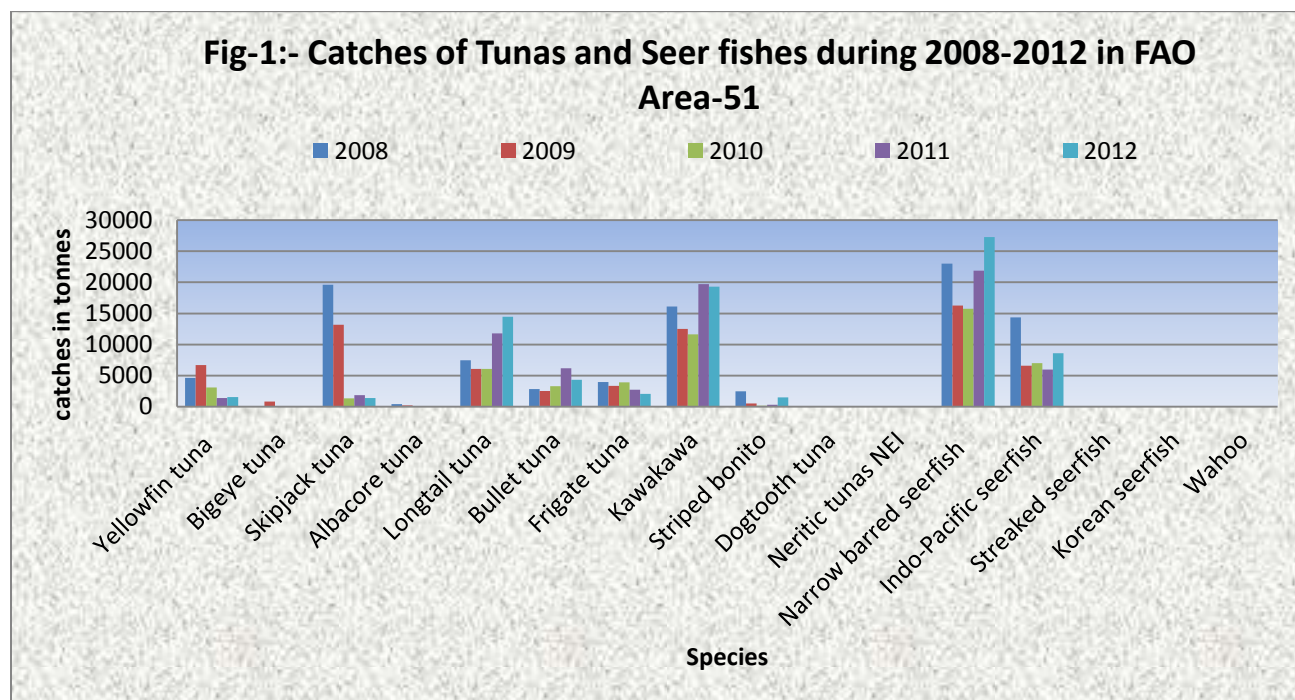


Fig-3:- Catches of Tunas and Seer fishes during 2008-2012 in India

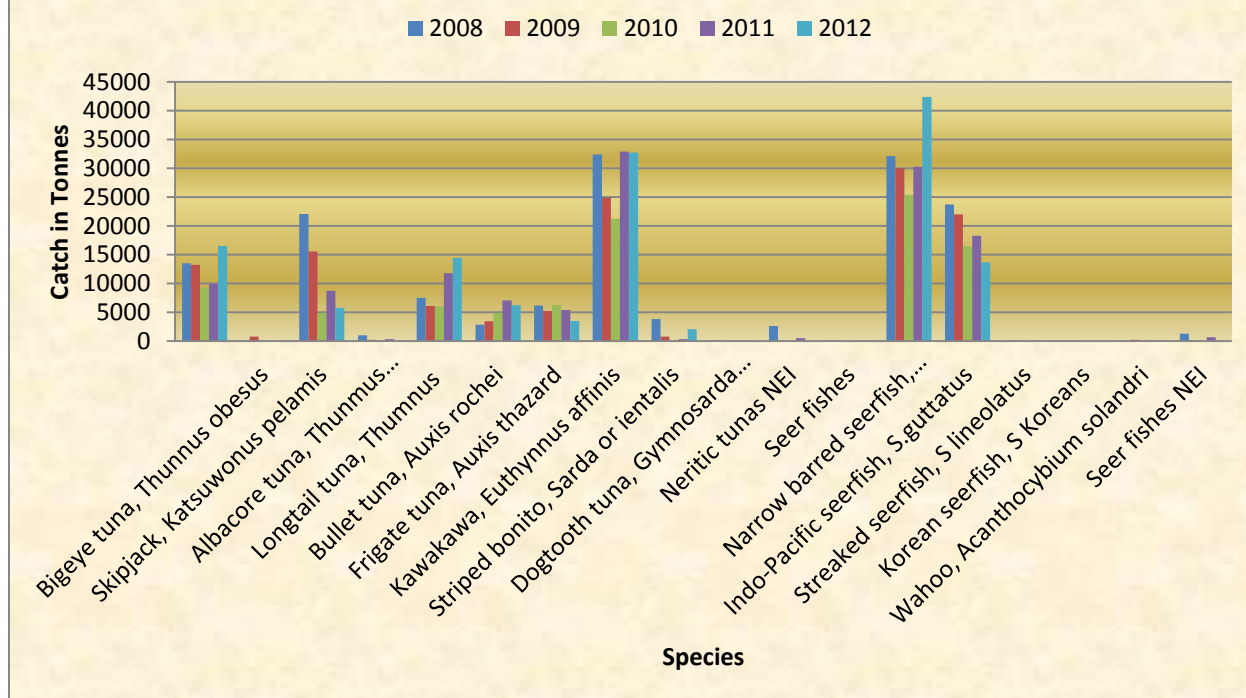


Fig-4:- Average tunas and seer fishes landing during 2008-2012 in India

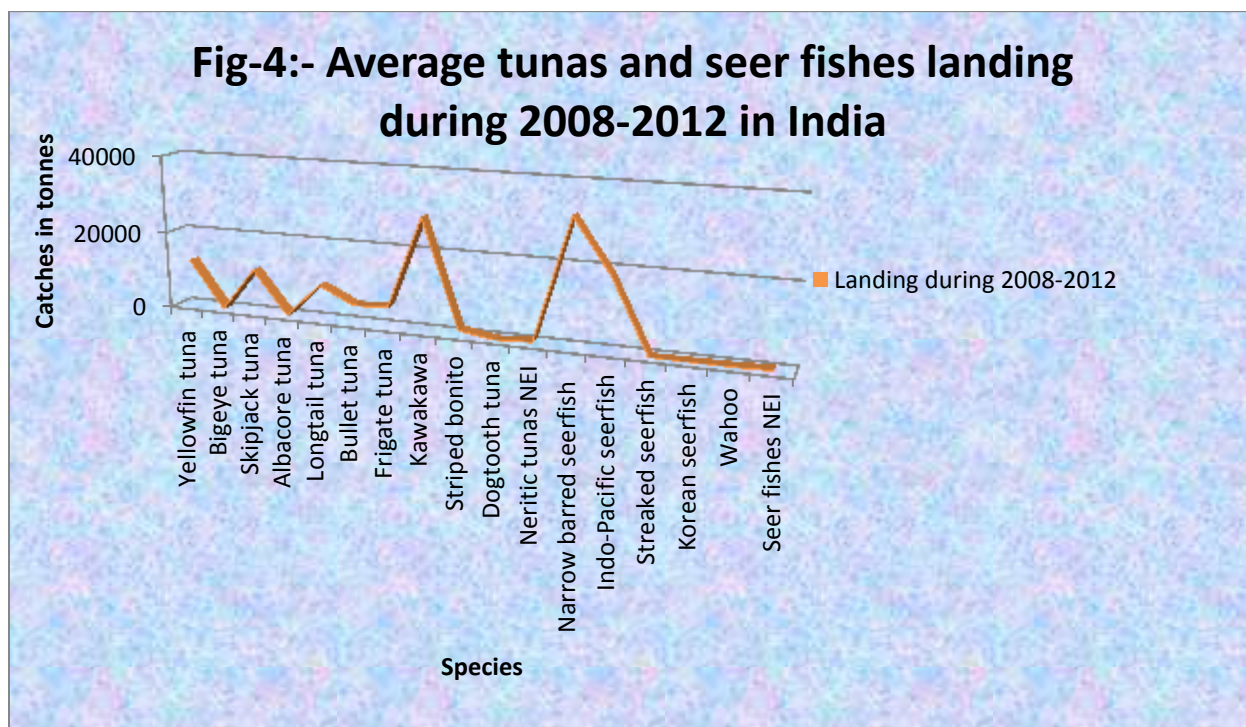


Table-2 Gear-wise Landing of Tunas and Seer Fishes in India during 2008

Sl. No.	Species	Gillnet	Purse Seine	Ring seine	Pole & Line	Hook & Line	Gillnet / HL	Others (*)	Total
1	Yellowfin tuna	4622	227	0	448	4189	994	3027	13507
2	Bigeye tuna	6	0	0	0	11	0	0	17
3	Skipjack tuna	11222	15	297	8522	431	519	1054	22060
4	Albacore tuna	430	0	0	0	0	0	621	1051
5	Longtail tuna	4814	1225	22	0	194	0	1259	7514
6	Bullet tuna	79	147	0	0	2603	17	17	2863
7	Frigate tuna	2373	3387	32	0	272	79	43	6186
8	Kawakawa	14942	5855	5948	0	4038	163	1455	32401
9	Striped bonito	1820	1	571	0	736	3	755	3886
10	Dogtooth tuna	14	0	0	0	0	0	0	14
11	Neritic tunas NEI	0	0	0	0	2640	0	0	2640
12	Narrow barred seerfish	20109	1683	1255	0	4594	164	4350	32155
13	Indo-Pacific seerfish	18914	611	40	0	369	0	3830	23764
14	Streaked seerfish	8	1	0	0	0	0	3	12
15	Korean seerfish	2	0	0	0	1	0	0	3
16	Wahoo	55	0	0	0	2	4	0	61
17	Seer fishes NEI	0	0	0	90	1215	0	5	1310
	Total	79410	13152	8165	9060	21295	1943	16419	149444

(*) Includes bag net, trawl net, trawl/HL.etc.

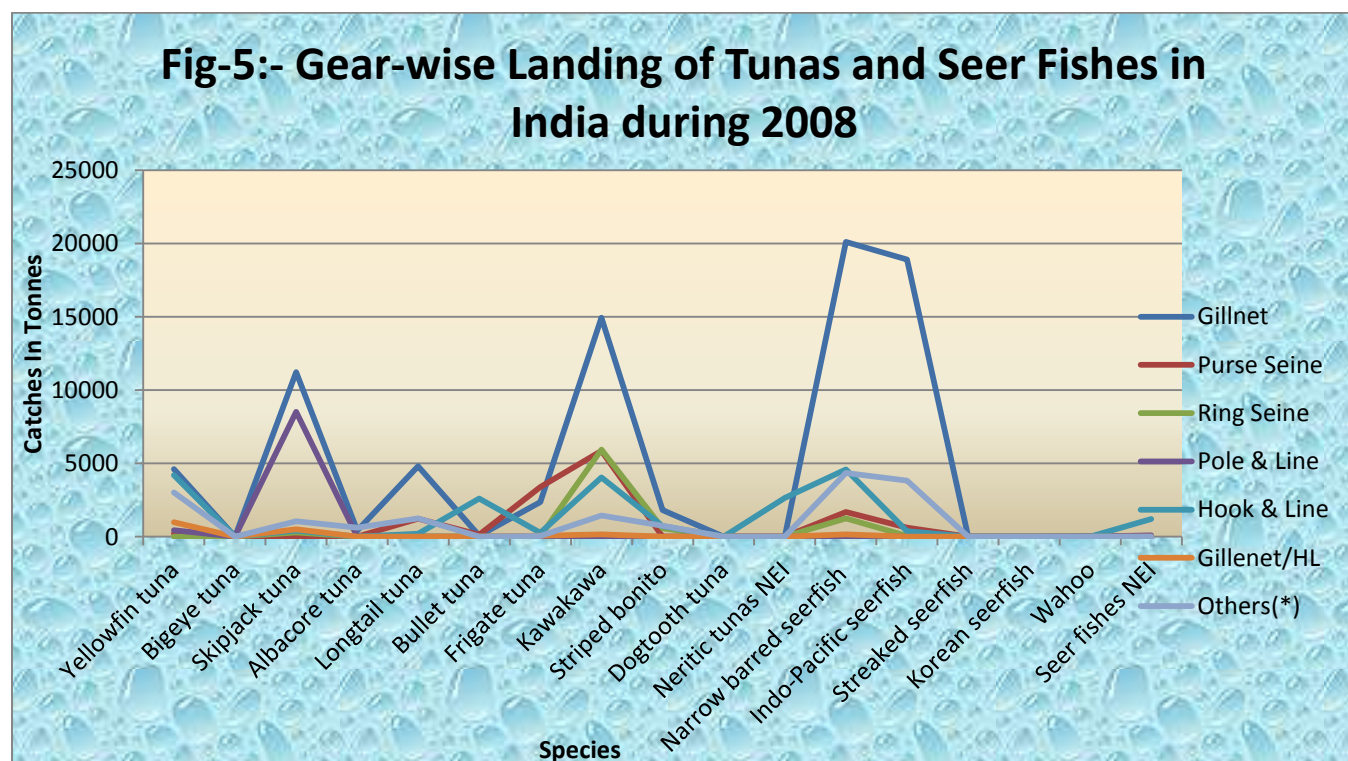


Table-3 Gear-wise Landing of Tunas and Seer Fishes in India during 2009

Sl. No.	Species	Gillnet	Purse Seine	Ring seine	Pole & Line	Hook & Line	Gillnet / HL	Others (*)	Total
1	Yellowfin tuna	4948	84	0	1996	2626	1480	2094	13228
2	Bigeye tuna	805	0	0	0	0	24	0	829
3	Skipjack tuna	6094	5	0	7982	500	690	320	15591
4	Albacore tuna	228	15	0	0	0	0	0	243
5	Longtail tuna	3556	2301	0	0	4	32	218	6111
6	Bullet tuna	928	10	134	0	2305	79	37	3493
7	Frigate tuna	1321	1917	76	0	276	149	1501	5240
8	Leaping Bonito	0	0	0	0	207	0	0	207
9	Kawakawa	13138	2394	2795	0	4231	759	1614	24931
10	Dogtooth tuna	0	0	0	0	0	45	0	45
11	Striped bonito	337	0	1	0	244	142	76	800
12	Wahoo	101	0	0	0	4	124	0	229
13	Narrow barred seerfish	17350	3728	400	0	4775	433	3340	30026
14	Indo-Pacific seerfish	15602	529	14	0	394	9	5504	22052
15	Streaked seerfish	10	5	0	0	0	0	2	17
	Total	64418	10988	3420	9978	15566	3966	14706	123042

(*) Includes bag net, trawl net, trawl/HL.etc.

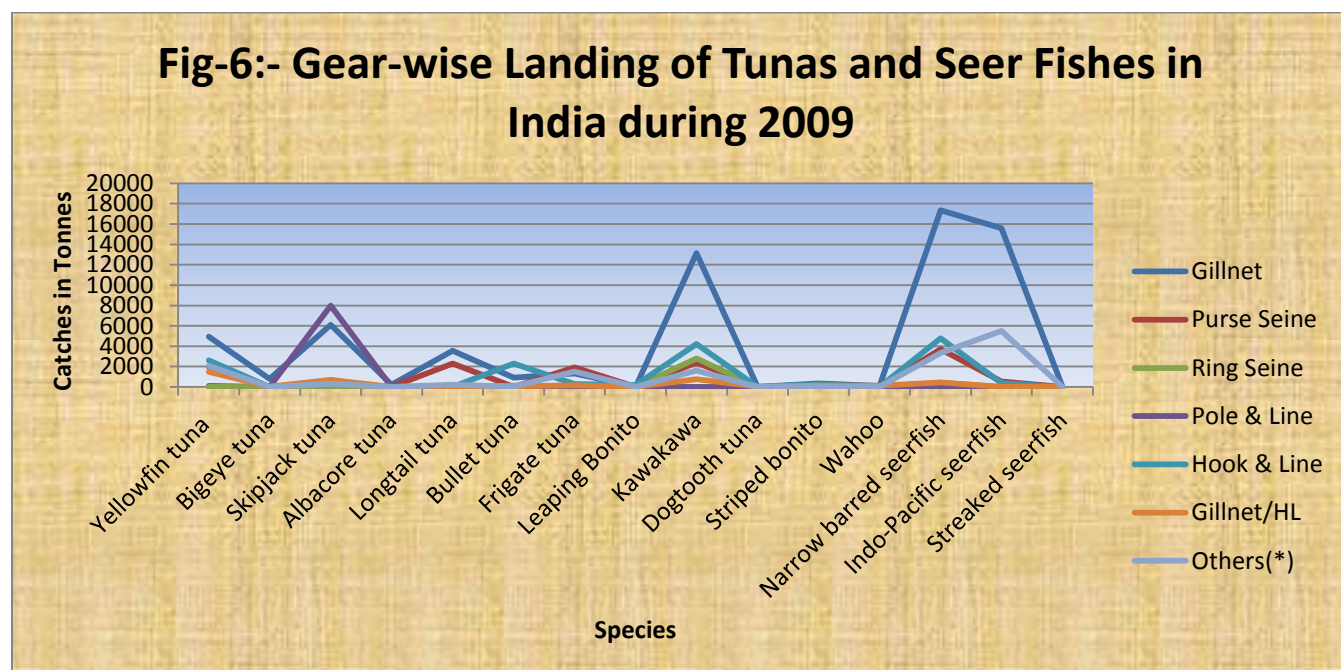


Table-4. Gear-wise Landing of Tunas and Seer Fishes in India during 2010

Sl. No.	Species	Bag net	Gill net	Gillnet /H & L	Hooks & Lines	Mini-Purse seine	Trawl net	Trawl net / H&L	Ring seine	Others	Total
1	Yellowfin tuna	13	5258	1199	1648	575	565	31	0	0	9289
2	Bigeye tuna	0	4	0	0	0	34	0	0	0	38
3	Skipjack tuna	0	3136	671	728	0	353	5	0	0	4893
4	Albacore tuna	0	42	0	0	0	0	0	0	0	42
5	Longtail tuna	0	4731	35	19	1024	283	0	0	0	6092
6	Bullet tuna	0	1603	40	3042	106	119	0	0	0	4910
7	Frigate tuna	0	2284	85	282	2468	0	23	726	415	6283
8	Kawakawa	7	9914	336	1974	2193	1120	77	3812	1838	21271
9	Dogtooth tuna	0	0	12	0	0	0	0		0	12
10	Striped bonito	0	161	5	7	0	0	2	4	0	179
11	Wahoo	0	68	50	1	0	0	0	0	0	119
12	Narrow barred seerfish	119	14402	252	3303	989	6098	176	23	31	25393
13	Indo-Pacific seerfish	72	9583	35	323	355	5764	0	197	115	16444
14	Streaked seerfish	0	7	0	0	0	9	0	0	0	16
	Total	211	51193	2720	11327	7710	14345		4762	2399	94981

(*) Includes bag net, trawl net, trawl/HL.etc.

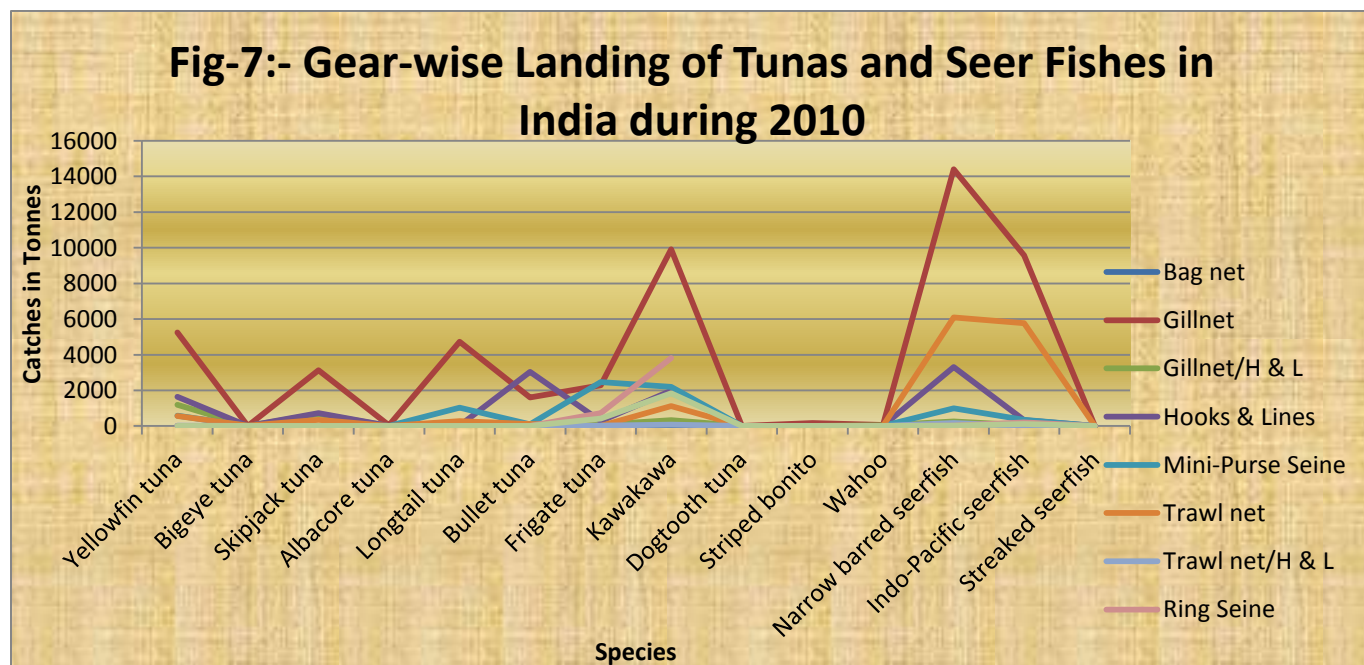


Table.5.Gear-wise Landing of Tunas and Seer Fishes in India during 2011

Sl. No.	Species	Trawl/H&L	Trawl net	Ring seine	Mini-Purse seine	Hooks & Lines	Gillnet /H&L	Gill net	Bag net	Others gears	Total
1	Albacore tuna	0	76	0	0	137	1	166	0	0	380
2	Black Marlin	0	10	0	0	472	607	294	0	0	1383
3	Bullet tuna	0	34	8	376	5712	34	942	0	0	7106
4	Dogtooth tuna	0	0	0	0	5	32	0	0	0	37
5	Frigate tuna	0	6	1089	1738	565	114	1897	0	0	5409
6	Yellow fin Tuna	26	131	0	242	3559	991	4573	0	449	9971
7	Kawakawa	43	3799	7904	4505	4105	617	11903	42	20	32938
8	Long tail Tuna	11	4909	0	1569	63	57	9730	76	0	16415
9	Skip Jack Tuna	11	480	53	49	2161	595	5314	0	96	8759
9	Neritic tunas NEI	0	0	0	0	284	0	255	0	0	539
10	Narrow barred seerfish	222	271	319	0	4557	517	19563	180	28	25657
11	Streaked seerfish	0	9	0	2	0	0	0	0	0	11
12	Striped Bonito	0	0	3	0	23	21	287	0	5	339
13	Wahoo	0	1	0	0	0	11	33	0	0	45
14	Indo-Pacific seerfish	3	6626	1264	543	272	22	9472	80	13	18295
	Total	316	16352	10640	9024	21915	3619		378	611	127284

(*) Includes bag net, trawl net, trawl/HL.etc.

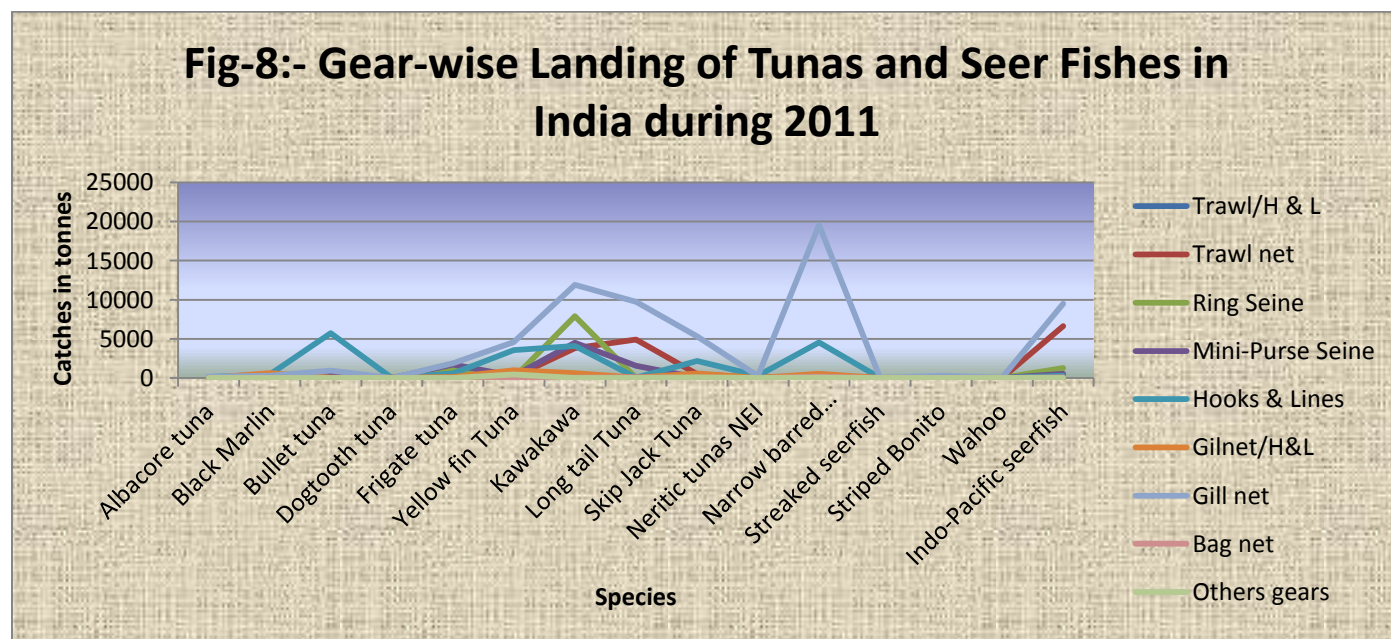


Table..6..Gear-wise Landing of Tunas and Seer Fishes in India during 2012

Sl. No.	Species	Trawl/H&L	Trawl net	Ring seine	Mini-Purse seine	Hooks & Lines	Gillnet/H&L	Gill net	Bag net	Others gears	Total
1	Bullet tuna	0	51	770	179	3143	9	2078	0	0	6230
2	Dogtooth tuna	0	0	0	0	0	40	0	0	0	40
3	Frigate tuna	0	40	651	489	619	58	1580	0	79	3516
4	Yellow fin Tuna	5445	1897	144	0	2380	797	4814	0	1030	16507
5	Kawakawa	435	1192	8325	6466	2865	336	13049	0	97	32765
6	Long tail Tuna	359	237	0	1234	10	35	12578	2	0	14455
7	Skip Jack Tuna	2	673	258	16	347	274	4212	0	0	5782
8	Striped Bonito	9	80	2	0	209	22	1706	0	51	2079
9	Narrow barred seerfish	3383	7618	2488	2867	4276	210	21406	76	92	42416
10	Wahoo	0	0	0	0	0	13	56	0	0	69
11	Indo-Pacific seerfish, s	0	3362	172	628	558	31	8802	64	68	13685
	Total	9633	15150	12810	11879	14407	1825	70281	142	1417	137544

(*) Includes bag net, trawl net, trawl/HL.etc.

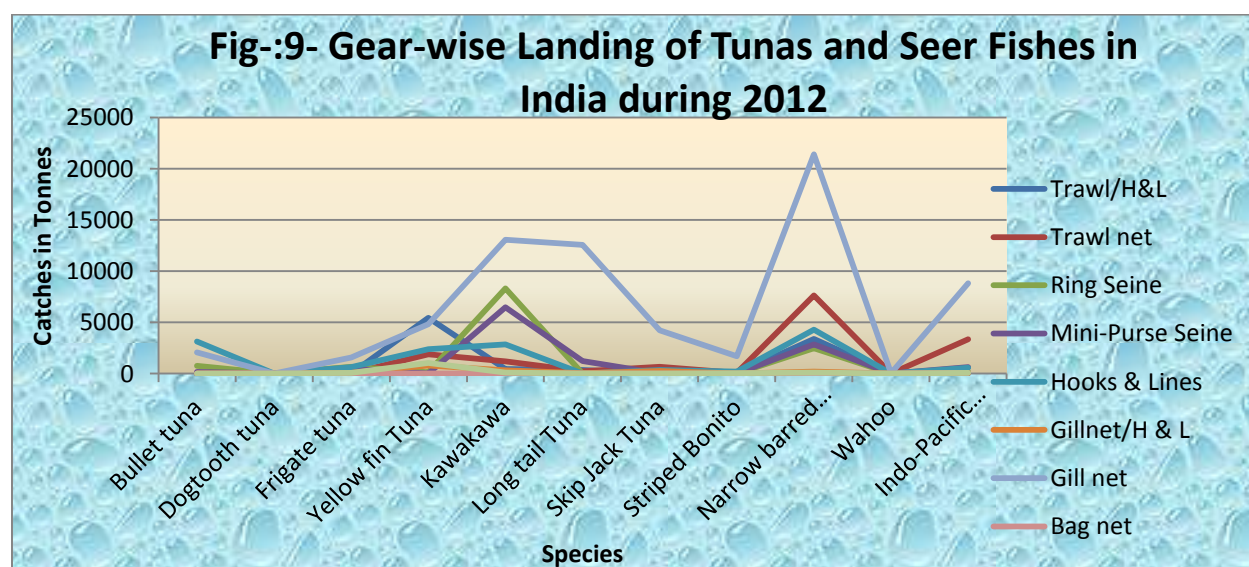


Fig-10:- Average Percentage-wise Neritic tuna landing in India during 2008-2012

