Iran tuna fisheries by-catch in IOTC competence of area in 2016
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Abstract:

In order to assess the level of Iranian tuna fishing vessels By-catch in the IOTC area of competence in 2016, tuna fisheries data which are collected through the Iran Fishery Organization data Collection system are used. Base on the information, about 30 different species of Tuna, Tuna-like and some others are caught by Iranian fishermen through the Tuna fishing activities. Base on the information in total, 250359 tons of different species including, 217675 tons Tuna and Tuna-like species, 14825 tons Billfish, 4797 tons of Sharks and 13062 tons the other species, are caught by Iranian fishing vessels in the IOTC competence of area. According to IOTC list, 92.9% of Iran catch has belonged to target species (16 species covered by IOTC agreement) and only 7.1% of catch has belonged to non-target species, in the 2016.

Group of Fish		Species	Weight / T	%	Weight/ T	%
Target Species 92.9%	Tuna & Tuna like	Frigate Tuna	10244	4.1	217675	87
		Kawakawa	33907	13.6		
		Longtail Tuna	55147	22		
		Skipjack	39158	15.6		
		Yellowfin	45110	18		
		Bigeye	3069	1.2		
		Narrow-barred Spanish mackerel	23681	9.5		
		Indo-pacific king mackerel	7359	3		
	BillFish	Indo Pacific Sailfish	7277	2.9	14825	5.9
		Black Marlin	4148	1.7		
		Striped Marlin	746	0.3		
		Swordfish	1044	0.4		
		other	1610	0.6		
None Target Species 7.1%	Sharks	Silky Shark	1372	0.6	4797	1.9
		Spottail Shark	606	0.2		
		Whitecheek Shark	303	0.11		
		Oceanic Whitetip Shark	103	0.04		
		Hammerhead Sharks	51	0.02		
		Mako Shark	86	0.03		
		Whale Shark	1810	0.7		
		Other Sharks	466	0.2		
	Other Species	Carangidae Species	3928	1.6	13062	5.2
		Mujilidae Species	2425	0.9		
		Rachycentridae	2912	1.2		
		Common Dolphin Fish	3797	1.5		
Total Catch		Target & none Target	250359	100	250359	100

According to 2016 information, non target species which are caught as by-catch (7.1%) included 1.9% different species of sharks with and some other species with 5.2% in compare with total catch. The vessels CPUE was calculated, base on different gears catch per day (Vessel Catch/Day). According to our estimation, Purse Seiners CPUE is calculated 4191.6 Kg/D, Trolling (Boats) 17.8 Kg/D and gillnetters 321.4 Kg/D. Also the amount of Sharks CPUE was calculated 6.5 Kg/D for gill nets, while there are no reports for other gears.

I- Introduction:

In order to review and analyze matters relevant to by-catch and non-target species which are caught incidentally by Iran fisheries for tuna and tuna-like species (i.e. sharks, marine turtles, seabirds, marine mammals and other fishes) and developing a mechanisms which can be used to better fishery management and integrate ecosystem considerations based on provided scientific advice by the Scientific Committee or the IOTC Commission, Iran Fisheries Organization (IFO) has following the purposes through its fisheries monitoring system by different methods.

Although the level of monitoring and control of Iranian fishing fleets need more improvement, in quality but compliance to regulations and resolutions of IOTC it has had a progressively trend and IFO intent to continue this trend, up to complete implementation of all related regulations. Base on IOTC evaluation the compliancy of Iran with IOTC regulations, has had a progressively trend from 2011and it has increased from 11% to 76% in 2016. This evidence shows a big progress in implementation of compliancy by Iran during recent years. Also prepared identification cards by IOTC translated in Persian now and are going to distribute among fishermen and observers, which help us in better collection of data. Current paper is a review on Iran tuna fisheries by-catch in IOTC competence of area in 2016. The information extracted from IFO statistics system and concentrate on catch composition of the vessels in 2016.

II- Materials and methods:

In order to estimate different types of Iranian fishing vessels by-catch in 2016, official data which comes through IFO data collection system are used. Also some other information is collected by Port and landing places sampling, through the Logbooks and offline VMS information and analysis of them.

Base on collected information from the Iran data collection system, the days of catch are supposed as a unit effort and CPUE was calculated base on amount of catch for each effort. According to recorded information most of Iranian fishing vessels gears are gill net and normally only one gill net installed and investigated during 24 hours (Setting net in the Sea 4 hours, waiting time 10 hours, separation of fish from the net mesh 6 hours and maintenance and preparing for next setting takes 4 hours time). So an active day was accepted as a unit effort for a gill-net vessel. Because of sailing from ports to fishing areas, location surveys, weather condition and finding fish concentration area, normally there is no catches during some days, so only active fishing days calculated for efforts.

Some other information collected from offline vessel monitoring system, logbooks also by interview with crews. The vessels fishing areas mostly were Iranian coastal waters and EEZ and western part of Indian Ocean especially eastern part of Africa continent. In order to identification of species and survey on catch composition, port state observers carried out in fishing harbors and landing places.

III- Results and Discussion:

Base on IFO statistics system output, about 30 different species of Tuna, Tuna like, Billfish, Sharks, turtles and some other species were caught, by Iranian fishermen in 2016. According to this information around 250359 tons of different species including 217675 tons of Tuna and Tuna like species (87%), 14825 tons Billfish (5.9%), 4797 tons different species of Sharks

(1.9%) and 13062 tons some other species (5.2%) are caught by Iranian fishing vessels in the IOTC competence of area in 2016 (Figure 1).

Also in 2016 about 92.9% catch belong to IOTC target species included Tuna, Tuna like and Bill-fish and only 7.1% of the catch belong to none target species which are caught as by-catch. Base on IFO statistic system, 94.4% of Iranian fleet catch comes from Gillnet gear, while around 2% of catch belongs to Purse seiner, 1.8% comes from Trolling and 1.8% are caught by long-line method. During 2016, Tuna and Tuna-like species which are caught by Iranian fishermen included, long tail tuna with 22%, Yellow-fin Tuna with 18%, Skipjack with 15.7%, kawakawa with 13.6%, Narrow-barred Spanish Mackerel with 9.5%, Frigate tuna with 4.1%, Indo Pacific king Mackerel with 2.9% and Big eye with 1.2% in compare with total catch (Figure 2).
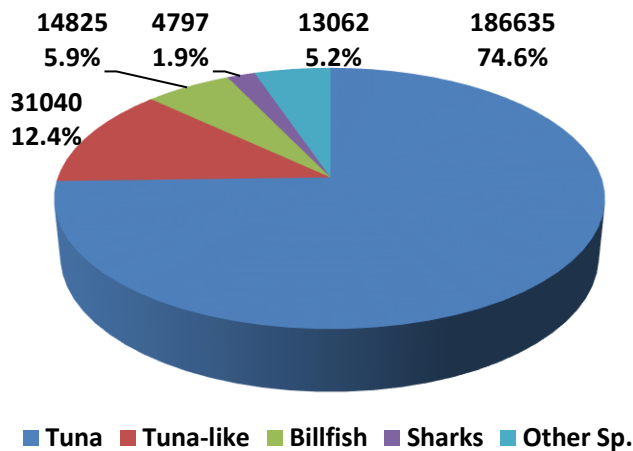
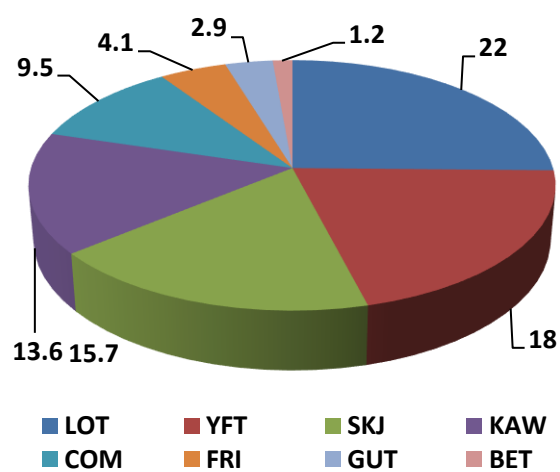Fig 1: Amount of different group of fish/T By Iran Tuna fisheries in 2016

Fig 2: Different Tuna and Tuna like species / % By Iran Tuna fisheries in 2016

During the year, Bill fish with 14825 tons which assigned 5.9% of total catch included Indo-pacific Sailfish with 2.9%, Black Marlin with 1.7%, Swordfish with 0.42%, Striped marlin with 0.3% and other Billfish 0.65%, in compare with total catch (Figure 3).
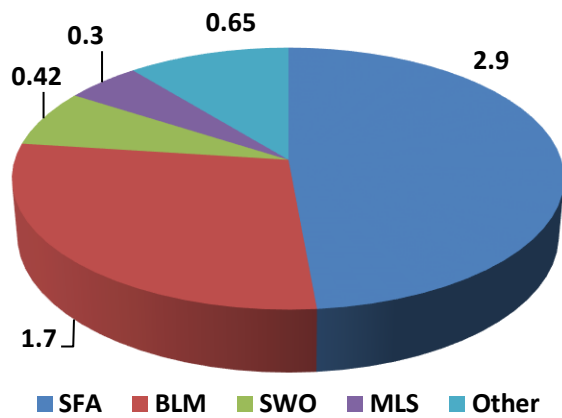
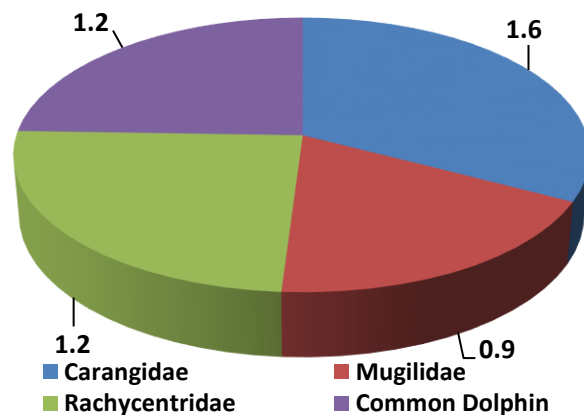Fig 3: Different Bill fish species / % By Iran Tuna fisheries in 2016

Fig 4: Other common By-catch families / % By Iran tuna fisheries in 2016

Base on collected data the other bycatch species which are seen in catch composition mainly belonged to Carangidae family with 3928 tons (1.6%), Mugilidae family with 2425 tons (0.9%), Rachycentridae family with 2912 tons (1.2%) and Common Dolphin fish with 3797 tons (1.5%). In total this species catch's quantities were 5.2% in compare with total catch (Figure 4).

Also base on 2016 data, in total 4797 tons equal to 1.9% of total catch of different species of Sharks are caught in Iran Tuna fishing activities as a by-catch. These species are included Silky sharks with 1372 tons (0.6%), Spot-tail Sharks with 606 tons (0.2%), white-cheek Shark with 303 tons (0.11%), Oceanic white-tip Shark with 103 tons (0.04), Mako Shark with 86 tons (0.03), Hammerhead Shark with 51 tons (0.02), Whale Shark with 1810 tons (0.7) and other Sharks with 466 tons (0.2%) (Figure5).
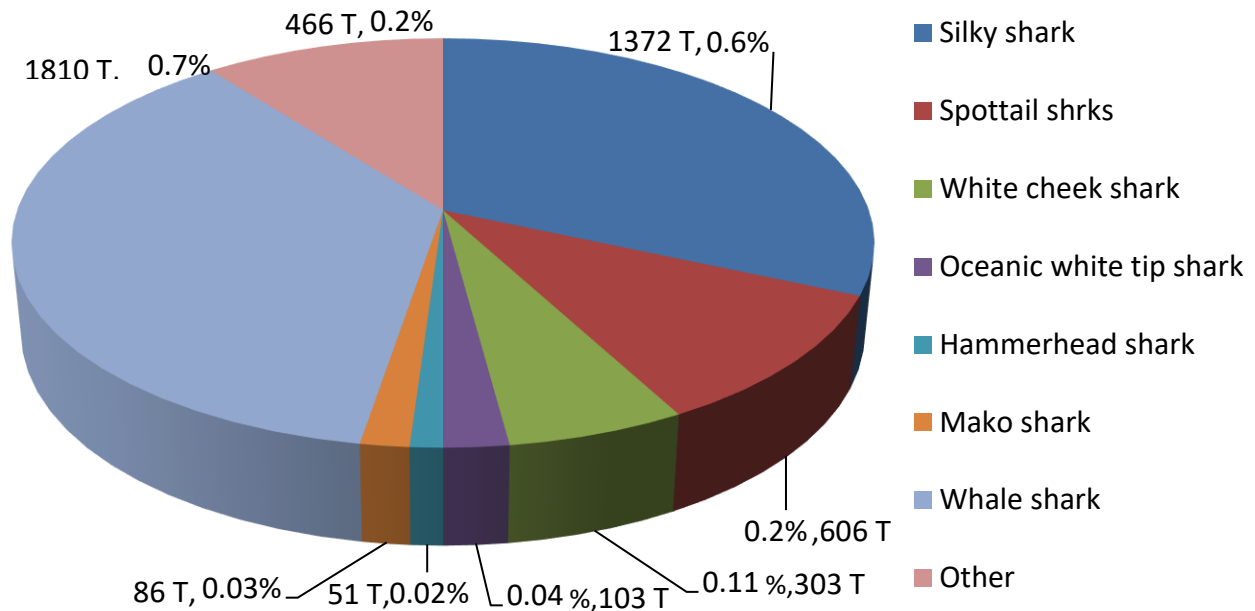

Fig4: Different Sharks species catch by Iran Tuna fisheries in 2016

This is considerable that, we have never received any reports about mammals or sea birds in catch composition as a by-catch through the logbooks or sampling reports in landing places. But we have received some reports including photos and movie about incidental catch and safe releasing of four sea Turtles in Iranian territorial waters as below. (Table 1)

No	Species	location	Date	Size/cm	sex	Destiny
1	olive ridley	Pasabandar_Oman.S	24/07/2016	40	♀	Safely Released
2	Green turtle	Jofreh- Persian Gulf	3/08/2016	60	♀	Safely Released
3	Green turtle	Bandar abass- P.G	26/08/2016	58	♂	Safely Released
4	Green turtle	Jask- Oman sea	13/09/2016	62	♀	Safely Released

Table 1- Reported sea turtle that are caught incidentally through tuna fisheries in 2016

IV- Conclusion:

As mentioned above, CPUE (Vessel Catch/Day) was calculated, base on total amount of catch for each vessels (C) and their navigation days (Unit Efforts). Also the fleet has had different type of vessels with varied GT that gives them different ability to catch. In order to calculate CPUE for Gill net by vessel class, we have faced with lack of information because the amounts of catch are not recorded for each trip. So, I normally use sampling methods or receive self declaration of fishermen and the system needs some improvement and corrective measures. Also the amount of Sharks CPUE was calculated only for gill nets, while there are no reports for other gear types. In conclusion the condition of catch base on gear types are as a below.

During 2016 only five purse seiners were active in Iran tuna fisheries, while their total active fishing days have been 1164. That means Iran purse seine vessels effort have been 1164 days. Base on available information in total Iran purse seiners are caught 4879 tons different species of fish in 2016. So the amount of CPUE for Iran purse seiners are calculated 4191.6 Kg fish per a day. Also around 2% of Iran tuna catch comes from purse seine fisheries while the amount of their effort has been 0.2% of total efforts of Iran tuna fisheries. These vessels are mechanized industrial ships and normally are operated in open sea and out of Iranian coastal waters.

Second type of Iran tuna fisheries are, gill net which assigned majority of catch for itself. The length and power engine of the vessels are varied from small boated with less than 3 GT up to more than 100 GT and 30 m lengths. While there are about 4545 different type of gillnet vessels active in Iran fisheries but it is difficult to talk about their CPUE because there is limited information about amount of catch for each group. In total Iran gill net active vessels have caught 236450 tons of different fish by 735685 days efforts. So the amount of CPUE for all types is 321.4 kg for a day. But this CPUE does not show a clear evaluation about catch quantity and need to calculate separately for each group of vessels. Base on current information around 94.4% of tuna and tuna like fisheries catch comes from gill net fisheries while the 74.2% of total efforts belong to these vessels. On this way around 4545 vessels equal to 69.2% are active in tuna fisheries by use of gill net gears.

Trolling gear is third type of tuna fisheries where majority of small boats are active by use of this method. Around 2019 small boats with less than 3 GT engine power were caught 4531 tons of different species of tuna through the 254934 days efforts by use trolling gears have been active in 2016. So, the amount of CPUE for Iran tuna trolling gear is calculated 17.8 Kg fish per day. Also around 1.8% of Iran tuna catch comes from the trolling gears fisheries while the amount of these vessels efforts have been 25.7% of total efforts of Iran tuna fisheries. Around 2019 vessels (30.7%) are active in tuna fisheries by use of trolling gear. That means, in spite of high level of efforts of these boats their catch have been very low. They are none mechanized small boats and normally are operated by 1-2 fishermen as small scale fisheries in Iranian coastal waters.

Also only a one logline vessel has been active in 2016, which the total catch of it has been 4500 ton, while there is no information about the vessel efforts. So it is not possible to calculate the long line vessel CPUE. All above mentioned are reflected briefly in Table 2.

Also the amount of Sharks CPUE was calculated 6.5 Kg/D for gill nets fisheries, while there are no reports about sharks catch for other gear types.

Gears / Fleet	GT	Number of active vessels	Efforts/ Day	Catch/ T	CPUE Kg/ Day
Purse seine	1000 - 2000	5	1164	4879	4191.6
Long line	------	1	-----	4500	-----
Trolling	Less than 3	2019	254934	4531	17.8
Gill net	Less than 3	3430	531903	Insufficient Data	Insufficient Data
	3-20	260	43642		
	21-50	382	75444		
	51-100	181	33435		
	More than 100	293	51260		
	Total Gill net group	4545	735685	236450	321.4
Total	3> Vessels ≥ 2000	6572	991783	250359	----

Table 2- CPUE of different type of Iran tuna fisheries gears in 2016

V- References:

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