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**Estimation of Bycatch and Discard by Iranian fishing vessels (Gillnets)  
In IOTC competence of area in 2012**

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**Abstract:**

In order to assess the level of bycatch and discard of Iranian tuna fishing vessels (Gill nets) in the IOTC competence of area, observers (port samplers) were placed in three main fishing harbors; where tuna vessels landing there. We also carried out interviews with some fishermen of the vessels. Finally the log books of the vessels were controlled and compared against the information which was collected by the port samplers. In this study we assessed the amount of catch, bycatch and discard for ten Iranian vessels. Data collection was carried out by observers who are professional in identification of species and were familiar with the Iranian tuna fishing fleets. The period of study was from 10 October to end of December 2012. The areas fished by the vessels were the north-west Indian Ocean (latitude 5-25° (N) and longitude 50-70° (E)).

Base on current study results, around 86.4% (211381 Kg) of catch comes from Tuna and Tuna like species while, around 13.6% (33273 Kg) catch belong to bycatch and discards. According to the results, target species composition mainly were Skipjack, yellow fin, Kawakawa and big eye respectively. In total the catch composition of the vessels contained 49.8% (121838 Kg) of Tuna species, 36.6% (89543 Kg) Tuna like species, 7.5% (18349 Kg) different species of sharks and 6.1% (14924 Kg) other species and discard. This is considerably important that, we have never seen any mammals or marine Turtles in catch composition as a bycatch, but we received some information from fishermen about them.

The total navigation of the vessels was 566 days, in average 56.6 days for a vessel. Because of sailing to destination, location surveys and weather conditions, there was no catches during 15 days and active fishing days for each vessels were 41.6 days in average. The average catch for each vessel was about 24.5 Tons during the navigation. Normally only one gill net installed into the Sea and investigated during a day by fishermen, so the amount of CPUE (Catch/Days) was calculated 589 Kg.

Base on received information, there are some problems on identification of species. So I.R.Iran recommend allocation funds by IOTC or other competence authorities for technical and financial assistance of the region by developing a regional plan to train the related experts and implement some researches to monitor gill net fishing activities bycatch and discard.

**I-Introduction:**

According to sustainable fisheries, through the 1995 agreement for implementation of the provisions of the United Nation convention on law of the sea (1982) relating to the conservation and management of straddling fish stocks and highly migratory fish stocks and Food and Agriculture Organization (FAO) code of conduct objectives for implementation responsible fisheries, also related resolutions of IOTC about developing and implementation of management measures for conservation ecosystem and fish stocks, such as 05/05, 10/06, 10/02, 11/04, Iran Fisheries Organization (IFO) has been trying to monitor and control all fishing fleets through the IOTC competence of area. Although some deficiencies and difficulties have seen in develop and

implementation monitoring and control measures on Iranian fleets, but compliance to regulations and resolutions of IOTC have had a progressively trend and IFO intent to continue procedure up to complete implementation of all regulations.

Because of some reasons where we discussed during WPEP08 and 15<sup>th</sup> SC meetings, IFO has not achieved to implement on board observer plan until 2013. Also there are no historical data around bycatch and discard in Iran. The other problem is miss-identification of some bycatch and discards species by observers (port samplers). In spite of these preventative problems, in order to review the status of none targeted species catch on tuna fisheries by Iranian vessels and provide information for 9<sup>th</sup> Working Party on Ecosystem and Bycatch (WPEB) we had tried to collect related data and analyze them through a pilot project. In conclusion current paper is a survey on bycatch evaluation by implementing a port monitoring project and need more improvement.

### **Materials and methods:**

Base on IOTC existence resolutions and in order to estimate of bycatch and discard in Iranian gill net vessels, we have chosen some experienced and professional experts as observers (port samplers). We specified three fishing harbors in west of Oman sea in Sistan-Balouchestan Province where the area is very important because of tuna catch. Sampling did by 10 fishing vessels which they were selected randomly. The lengths of vessels were between 22-29 m, with 77- 100 GT. The period of the sampling was from 10 October 2012 to end of December 2012.

The observers had responsibility for identification of species which all of them were freeze. Also survey on catch composition including tuna, tuna like species, bycatch and discards (Sharks, Mammals, and Turtles) were the other duties of observers. Some species such as sharks and Billfish mostly were cut into small pieces on board before investigation on port, so the observers calculated the number of fish by counting of heads or survey on pieces of their bodies. Also identification of Sharks mostly did by survey on fish fins. Discards information were collected by interview with fishermen and their self declaration. The information was registered in a briefed questionnaire which was prepared base on observer report from before.

Base on collected information from log books, the days of catch, amount of catch and CPUE calculated. According to available information the amount of unit effort (UE) was 1/day, because normally only one gill net installed and investigated during 24 hours (Setting net in the Sea 4h, expecting time 9h, and gathering nets 7h). Because of sailing to destination, location surveys and weather conditions, there was no catches during some days so only active fishing days calculated for efforts. The position of the vessels were obtained from GPS and the additional information collected by interview with crews. The vessels fishing areas were the north-west Indian Ocean (latitude 5-25° (N) and longitude 50-70° (E)).

### **Results:**

In this study port state observers controlled 10 vessels catch which their total landing were 244654 Kg. Base on our study results, around 86.4% (211381 Kg) of catch belong to Tuna and Tuna like species while around 13.6% (33273 Kg) catch, were bycatch and discards. Also, target species composition including Tuna (49.8%) and Tuna like species (36.6%) mainly were Skipjack (31.2%), Indo pacific sailfish (19.8%), Black marlin (11.2%), yellow fin (10.8%), Kawakawa (6.4%), Swordfish (3.1%), Short bill spearfish (1.7%), big eyes (1.4%) and Striped Marlin (0.8%)

respectively. While the contribution of bycatch and discard in catch composition were 13.6% including different species of Sharks (7.5%), Common Dolphin fish (4.5%) and the other species (1.6%). Base on this study five species of Sharks were seen mainly in catch composition including Silky Sharks (5.2%), Oceanic white tip Shark (0.4%), Hammerhead Shark (0.4%), Short fin Mako Shark (0.3%), Thresher Shark (0.2%) and some the other Sharks (1%). The period of study was from 10 October 2012 to the end of December 2012, so these results surely will changeable if we cover our sampling during different seasons. Table 1 shows the detail port state monitoring results and catch composition of Iranian gill net fishing vessels, through the IOTC areas in 2012.

Sample Catch Composition / %	Sample Catch / Kg	English Name	Group	
10.8	26423	Yellow fin Tuna	<b>Tuna</b>	<b>Tuna &amp; Tuna Like Species (IOTC List)</b>
1.4	3425	Big eye Tuna		
6.4	15658	Kawakawa		
31.2	76332	Skipjack Tuna		
49.8	121838	Total Tuna Catch In Sampling		
3.1	7584	Swordfish	<b>Tuna Like</b>	
1.7	4159	Shortbill spearfish		
0.8	1957	Striped Marlin		
11.2	27401	Black Marlin		
19.8	48442	Indo Pacific Sailfish		
36.6	89543	Total Tuna Like Catch In Sampling		
86.4	211381	Total Tuna & Tuna like species Catch In Sampling		
5.2	12722	Silky Shark	<b>Sharks</b>	<b>By catch &amp; Discard</b>
0.3	734	Short fin Mako Shark		
0.4	979	Oceanic white tip		
0.2	489	Thresher Shark		
0.4	979	Hammerhead Shark		
1	2446	Other Sharks		
7.5	18349	Total Sharks catch In sampling		
4.5	11009	Common Dolphin fish	<b>Other Sp.</b>	
0.01	24	Marine Turtles	<b>Discard</b>	
0.01	24	Dolphins		
1.6	3867	Other spp.		
6.1	14924	Total Discard In sampling		
13.6	33273	Total by catch and discard In Sampling		
<b>100</b>	<b>244654</b>	<b>Total Tuna, Tuna like, By catch and Discard In Sampling</b>		

Table1: Composition of Iranian gill net fishing vessels catch, through the IOTC areas in 2012

Source: Port state monitoring project 2012

According to this study 50% of total catch belong to tuna species and the rest belong to tuna like, bycatch and discard species. Regarding to bycatch with 13.6% share from total catch, Silky Shark with 5.2% share from total catch (38% share in bycatch and discard) and Common Dolphin fish with 4.5% of total catch (33% share in baycatch and discard) is the main bycatch

respectively. Figure 1 shows Iranian tuna gill net vessels catch composition per percent and figure 2 shows bycatch and discard composition which shared only 13.6% of total catch.

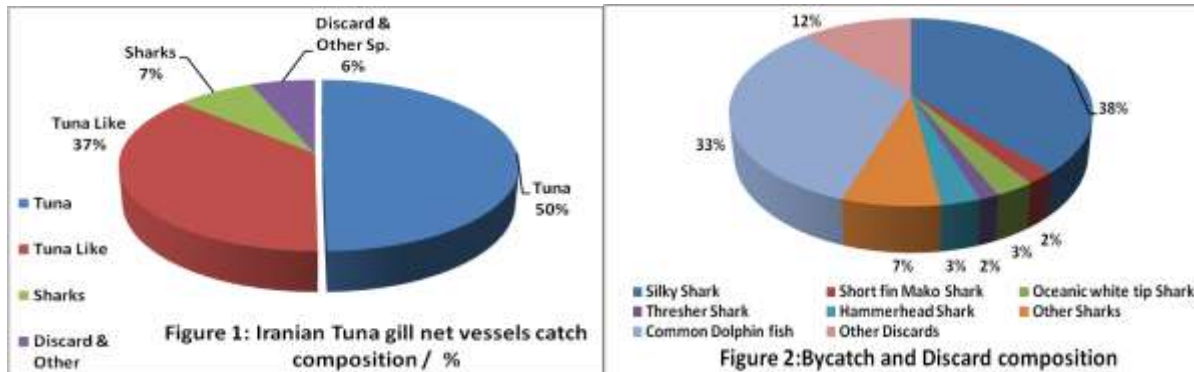


Figure 1: Iranian gill net fishing vessels catch composition and Figure 2: Iranian gill net fishing vessels Bycatch and Discard composition Through the IOTC competence of area in 2012 (Source: Port state monitoring project).

Base on current study results, Tuna species are dominated in the catch composition. Also skipjack with 31.2% share is the main tuna in catch composition and Big eyes located in the end with 1.4%. Regarding to Tuna like species, Indo pacific Sailfish with 19.8% is pioneer and striped marlin catch are seen in the end of catch composition. A small comparison of this study results with annually catch reports of IFO in 2012, shows some differences in 2012, because of many reasons. For example, base on IFO official report, tuna species share, has been 77.2% from total catch in 2012, while this amount was calculated 50% in this study. Also long tail tuna with 33.7% share from total catch is dominated in 2012, while base of this study Skipjack with 31.2% share, is the main species which are seen in port sampling project.

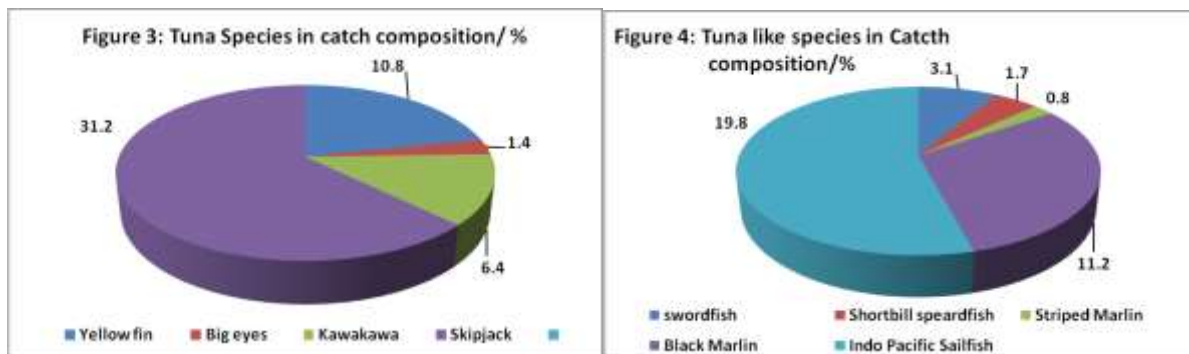
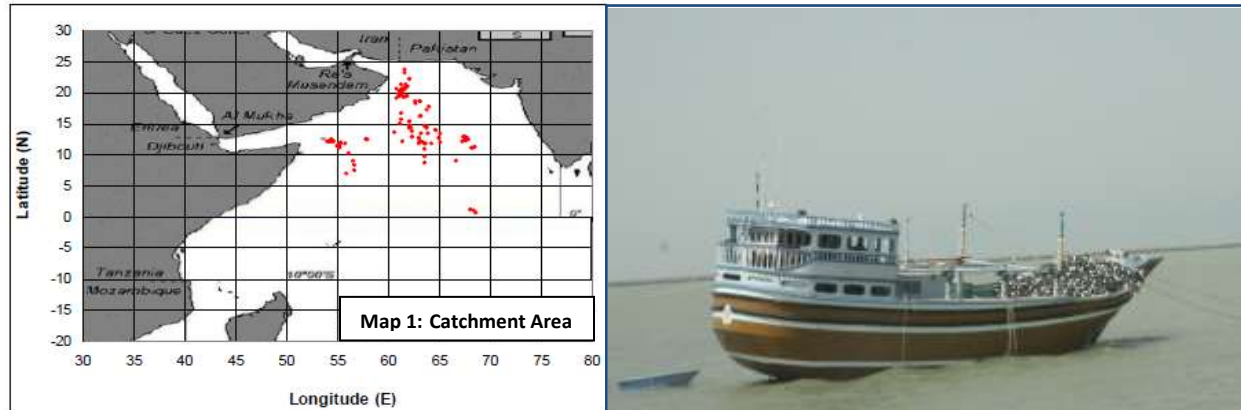


Figure 3: Composition of Tuna species catches in Iranian gill net fishing vessels, Figure 4: Composition of Tuna like species in Iranian gill net fishing vessels, Through the IOTC competence of area in 2012 (Source: Port state monitoring project).

Active days of catch, amount of catch and CPUE was calculated base on collected information from log books. According to available information the amount of unit effort (UE) was 1/day, because normally only one gill net installed and investigated during 24 hours (Setting net in the Sea 4h, expecting time 9h, and gathering nets 7h). The total navigation of the vessels was 566 days and in average 56.6 days for a vessel. Because of sailing to destination, location surveys and weather conditions, there was no catches during 15 days and active fishing days for each

vessels, were 41.6 days in average. The average catch for each vessel was about 24.5 Tons during the navigation. Normally only one gill net installed and investigated during a day, so the amount of CPUE (Catch/Days) were calculated 589 Kg. The position of the vessels were obtained from GPS and the additional information collected by interview with fishermen. The vessels fishing areas were the north-west Indian Ocean (latitude 5-25° (N) and longitude 50-70° (E)). Map 1 shows the vessels catch areas during our study.



*Map 1: Catch position of vessels during study*

This is very important and considerable that, we have never seen any mammals or marine Turtles as a bycatch in catch composition, but we received some information about them by fishermen. Base on self declaration if some Marine mammals, turtles, rays or endangered species such as Thresher Shark entangle in nets, fishermen release them immediately into the sea. In some cases they have to cut their nets and released the species. Base on self declaration of fishermen they have never faced with entangling Sea birds in their gill nets.

### **Discussions:**

As we mentioned before, there are some problems on identification of different species, especially in port sampling, because all the landing fish were freezed on board and lost their natural type and colors. Also most of the bycatch cut into smaller pieces and the landing fish mostly have no head or fin. In addition low level records are seen about discards, so self declaration of fisherme and available information did not enough valid. Beside these, there is low level of on board facilities in Iranian gill nets vessels for acommodate observers and it is very difficult to cover 5% of vessels by on board monitoring plan. However in currently, port state sampling look like the best way to collect valid information about Iranian gill net vwssels. For solving the problems, I.R.Iran recommend allocation funds by IOTC or other bodies for technical and financial assistance of the region by developing a regional plan to train the related experts and implement some researches to monitor gill net fishing activities bycatch and discard.

In spite of that, gill nets conflict with none targeted species but a bereife review on result of this study (86.4% of targeted and 13.6% none targeted species) shows the use of standard gill nets for catch of big pelagic species such as Tuna and Tuna like species, is one of the good methods that is available now. The study results shows gill nets gears have more big selectivity than some other gears and give the furtune to smal, young and imatures fish to scape from the net.

Survey on historical data shows small amount of big eyes tuna while current study shows around 1.4% of catch composition belong to big eyes tuna. Base on current study there is miss identification among yellow fin tuna and big eyes. In the other hand the results of this study show one out of seven (1/7) yellow fin tuna in fact are big eyes and mistakenly record as a yellow fin. Also the amount of shark species is registered between 3- 4% in annually official records while this study shows 7.5% sharks in catch composition. In addition there is low level data and information about discards and there is no possibility to collect valid information by port state sampling or self declaration of fishermen. For these developing some research project plans and implementing of them by support of IOTC is inevitable in the region (Pakistan, Iran and Oman).

A review on past decade catch information shows significance differences between amounts of catch in Iranian shorelines ( EEZ) and open sea of the Indian Ocean . These changes are seen not only in composition of catch, but also in percentage of catch per each area. For example in 2005 around 38.5% of tuna and tuna like species are caught in Iranian EEZ but in 2011 this percentage intensively changed and increased to 57.2%. Although this shows the interest of fishermen for doing their fishing activities in Iranian territorial waters because of some problems ( such as Piracy and economical), but surely there are significant differences between composition of catch in Iranian territorial waters and Indian Ocean and also between small scale vessels and big vessels (less and More than 24m). These variations in composition of catch in different years show significant changes in species composition during different years and seasons. For these we need more monitoring and researches in a period of time to collect long term data.

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