A Review of IRAN Fisheries Data & Statistics with emphasis tuna fishes

Present to 10th **Session of the Working party on Data Collection and Statistics (WPDCS10) Seychelles, Victoria**

2-4 December 2014

Title: A Review of Iran Fisheries Data & Statistics with emphasis tuna fishes

BY: Sabah Khorshidi Nergi

Head of Data & Fishing Economic Group
Iran Fisheries Organization (IFO)

Abstract

This document presents summary information about fisheries statistical data in Iran, according to IOTC resolutions and recommendations concerning mandatory minimum data submit to IOTC.

In 2013 total catch amount in Iran was 514,000 tons, which comprised 474,000 tons (95%) from southern waters, and 40,000 tons (5%) from northern waters. Of 474,000 tons in southern waters, which can be distribute as 368, 000 tons (95%) attributed to Persian Gulf and Oman Sea, 105,000 tons (22 %) from Overseas (western Indian Ocean) by around 10000 fishing vessels.

Fishery for tuna and tuna-like species is a major component in large pelagic fisheries in Iran and one of the most important activities in the Persian Gulf and Oman Sea. Therefore, fishery management requires comprehensive data statistics been established system in terms of capture fishery status, Iran Fishery Data Collection System (IFDCS) has been established and formulated since 1994. In addition, size frequency data has been complied since 2001. Over the years, variety of options has been add to the software structure accompanied with some training courses for field samplers and simultaneously the Software has been upgraded to the modern software.

For better collaboration with IOTC, much effort has done to extract all necessary outputs required to meet the concerned IOTC, Resolutions. We are developing our data collection systems and software under Web with English and Persian version to meet mandatory minimum statistics requirements. We have taken various actions to implement the Scientific Committee and IOTC Resolutions and recommendations. In this respect, after 2012 we proceeded with some actions and now reporting provide for Billfishes, Big eye tuna, Sharks and some other groups of species. It is noteworthy to say that since 2012, we could identify and include swordfish, different species of marlines and other bycatch for gillnet and purse seine in our Database. We have implemented logbook system for gillnetter (fishing Dhows), particularly to determine geographical distribution of their fishing operation in IOTC area of competence.

CONTENTS

1-BACKGROUND/GENERAL FISHERY INFORMATION

Fishery for tuna and tuna-like species is a major component in large pelagic fisheries in Iran and one of the most important activities in the Persian Gulf & Oman Sea. There are 4 coastal provinces in that areas about 11 thousand vessels consist of fishing boat, dhows and vessel which are engaged in fishing in the coastal and offshore waters. Gillnet and purse seine are two main fishing methods used by Iranian vessels to target large pelagic species (especially tuna and tuna-like) in the IOTC area competency and some of small boats used trolling in coastal fisheries. Iran has taken various actions to implement the Scientific Committee recommendations and IOTC Resolutions.

One of them is national actions to improve data collection system for Tuna fishery since 2012 until now. We have implemented for Iranian industrial purse seiners and artisanal gillnets modification of logbook template to meet mandatory minimum statistic requirement, particularly concerning data recording of vessel position in IOTC area for target species, By-catch including 9 species of sharks and 5 species of billfish, non targeted, associated and dependent species and discard.

In 2013 total fish catch & aquaculture production in Iran was 885,000 t, which has distributed as 53% from southern water, 5% from northern water and 42% through inland water. The total catch in 2013 was 514,000 t; out of which about 210,000 t was of Tuna &Tuna like Species; however, in the year 2006, the tuna and tuna-like species catch was 207,000t that around 50 percent belonged to skipjack. . Resultantly After this year due to Tsunami and phenomenon of piracy in the IOTC region, the vessels changed the fishing grounds and operated in coastal areas. This caused extreme decrease of skipjack catch at the ratio of 103,000 t, in 2006 and 33,000 t, in 2013 and inverse increase of longtail catch at the ratio of 25,000t in 2006 and 67,000 t, in 2013. The effort in coastal areas increased; as a result, an increase of longtail tuna in 2013, as compared with the data of 2006. As I mentioned before Tuna and tuna-like species fisheries is one of the most important activities in the Persian Gulf & Oman Sea. Those catch consist of Yellowfin tuna 32,000t, Skipjack tuna 33,000 t Bigeye tuna 1,700t, Longtail tuna 67,000t, Kawakawa 28,000t, Frigate tuna

7,000t, Billfish(contain Sailfish and Marlin)14,000t, Indo-pacific king mackerel 6,000t, Narrow-barred Spanish mackerel 20,000t,Sharks 7,000t and other species 9,000 t .
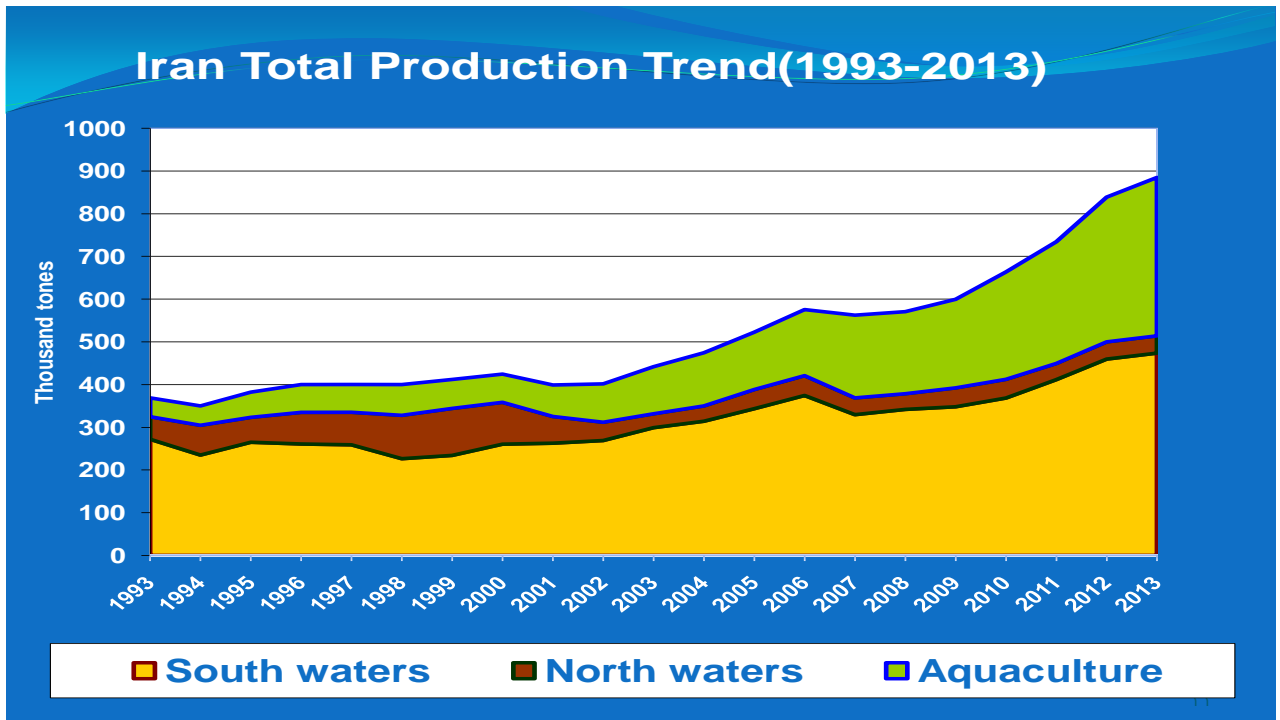

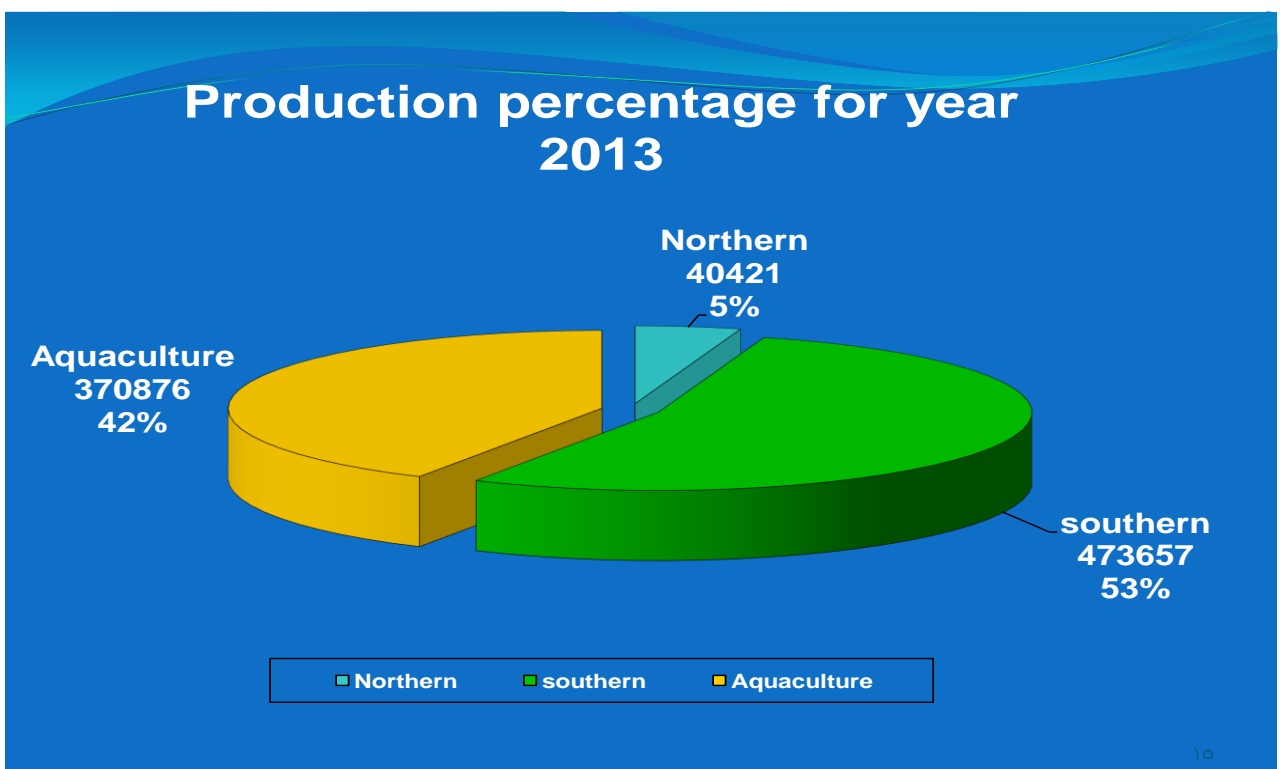*Figure1.1. Annual total fish catch & production from 1993 to 2013 (metric tons)*

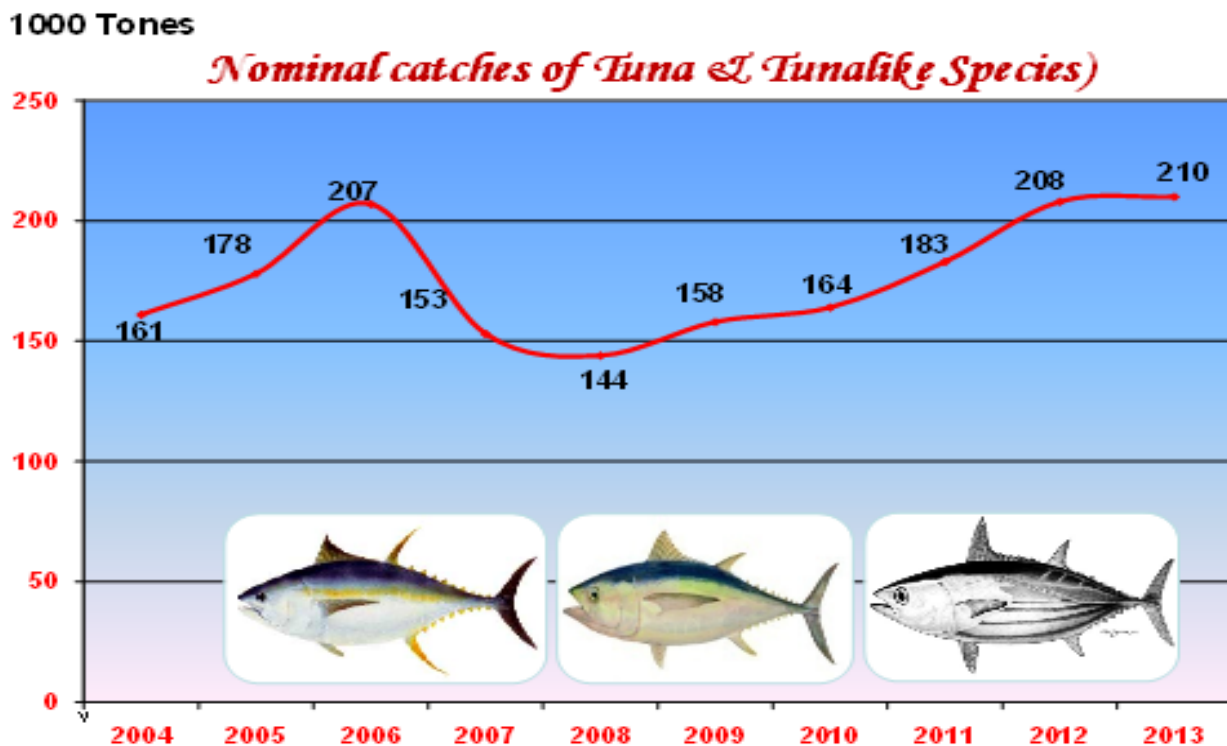*Figure1.2. Annual total fish catch & production for 2013 (metric tons)*

Figure1.3. Annual total Tuna & Tuna-like catch from 1993 to 2013 (metric tons)

2-FLEET STRUCTURE:

Fisheries activities in the southern waters of Iran by 11500, vessels are ongoing. Around 6752 vessels of this fleet are engaged in large pelagic species fishing in 2013, which four of them are industrial purse seiners, 2202 Artisanal vessels (dhows) and 3741 fishing boats. Around 1200 vessels are active in tuna and tuna like fishing in the Oman Sea, and offshore waters. This means more than 80 percent of crafts operate in the coastal areas and about 20% of the fishing vessels operating in distant waters. Those fishing crafts and GRT of purse seiners is up to1000 t and GRT of Gillnetters ranges from less than 3 t to more than 100 t. Gillnet and purse seine are two main fishing gears for catching tuna and tuna-like species in the IOTC area and also some of small boats used trolling method in coastal fisheries.

Table 2.1 shows the fishing fleet disaggregated into the following (GRT) categories during 2009 to 2013.

Table 2.1: Number of vessels operating in the IOTC area of competence, by gear type and size, for the history of the fleet (2009-2013)

GEAR	GRT	No. of vessels by year				
		2009	2010	2011	2012	2013
No. of Active Purse Seiners	1000-2000	6	5	5	4	4
Gillnet	<3	3828	3444	3340	3784	3741
	3-20	753	702	586	282	270
	20-50	667	911	941	1021	1060
	51-100	534	580	479	527	534
	>101	278	283	260	329	338
Trolling		426	634	854	810	805

3- CATCH AND EFFORT (BY SPECIES AND GEAR)

Table 2.1 and figure 3.1 to figure 3.4 shows the total yearly catch by gear type and species reported for the all fleet. The Catch quantity of tuna and tuna-like species in 2013 was equal to 210,000 t, of which 127,000 t, belongs to coastal waters and the rest (83,000 t,) belongs to offshore fishery. In 2005 and 2006, the amount of catch from offshore fishery were exceeded the coastal waters catch, but in recent years due to the piracy and insecurity related to this issue, the trend has completely reversed and Since 2007, the tropical tuna catch declined and the neritic tuna catch has increased. This decline of tropical tuna catch which has caused by the phenomenon of piracy; fishermen relocate their fishing grounds from offshore to coastal areas in Persian Gulf and Oman Sea and concentrate on traditional coastal fishing grounds. This shift of fishing grounds caused fishing effort increasing in coastal areas, as a result increasing in longtail catch from 25,000 t, in 2006, to 67,000 t, in 2013 (168%). Figure3.1. shows the amount of catch for different fishing methods of purse seine, Gillnet and trolling was estimated 5,735 t, 215,795t and 4,879, respectively.

The total catch recorded by the purse seine fleet during 2013, estimated at 5,735t, the amount of catch for purse-seiners showed an ascending trend in 2013, comparing to recent 5 years.

Figure3.1. Annual Catch by Gear Type

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2013
Purse Seine	12,601	9,712	14,566	5,156	4,858	3,846	3,377	4,621	5,154	5,285	2%
Longline	0	0	0	0	0	0	0	0	0	0	0%
Gillnet	147,806	167,535	191,669	146,736	137,920	153,837	159,286	176,956	215,551	215,795	96%
Trolling	0	760	745	1,283	854	1,005	1,328	1,522	5,169	4,879	2%
Total	160,407	178,007	206,980	153,175	143,632	158,688	163,991	183,100	225,874	225,960	100%
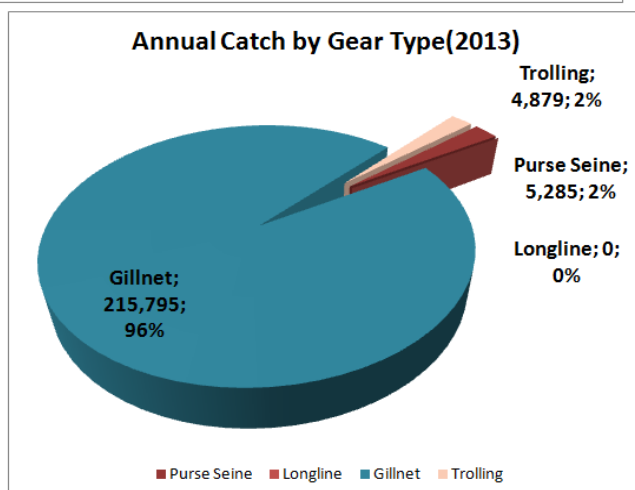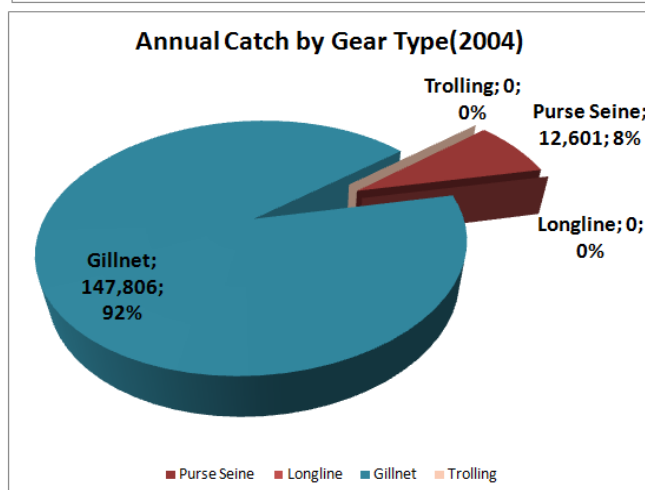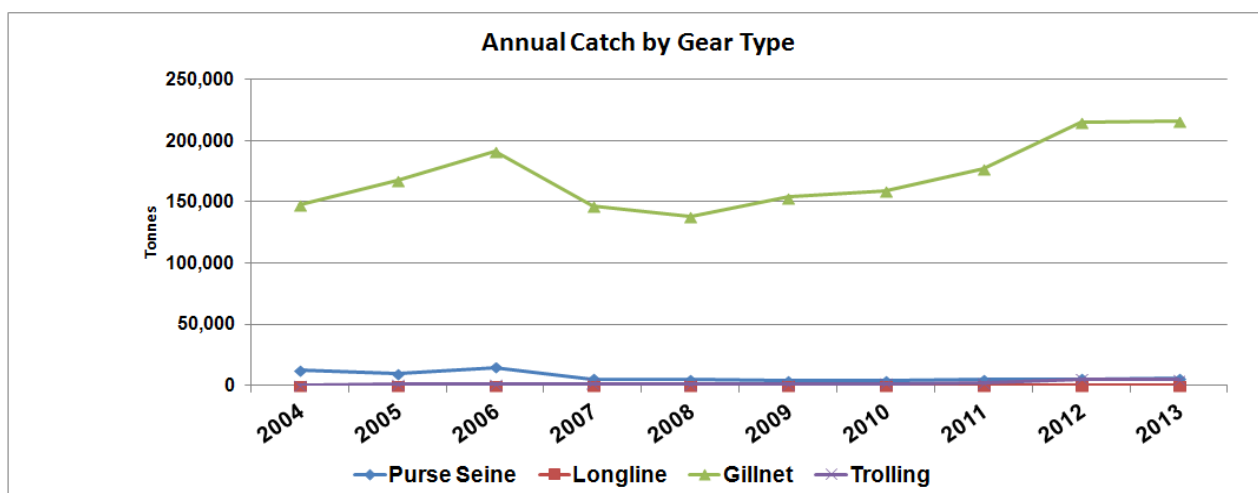
Figure3.2. Annual Catch of Purse Seiners by Species

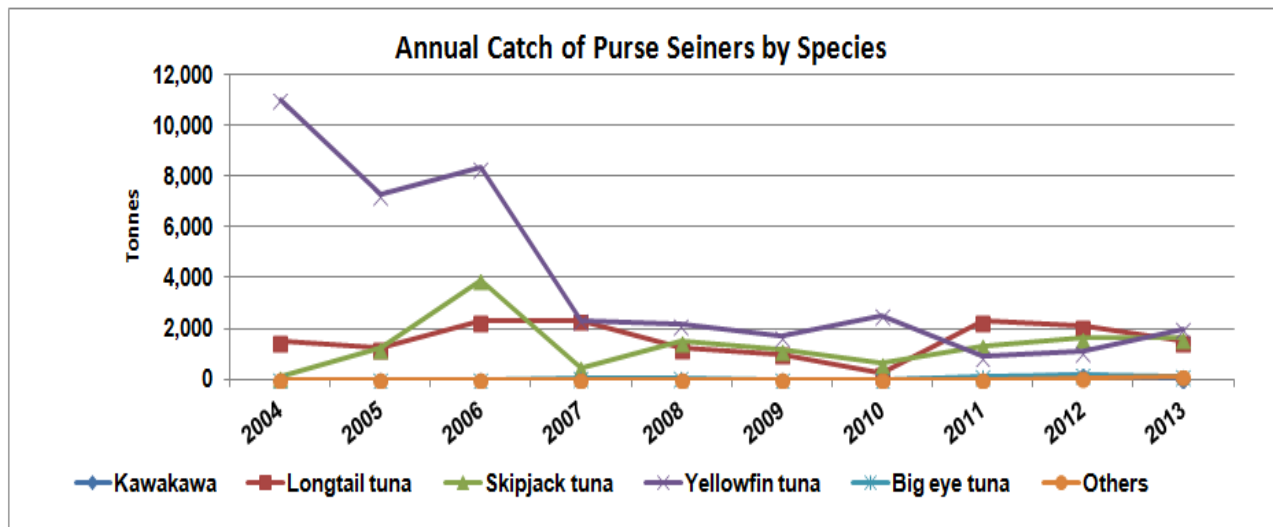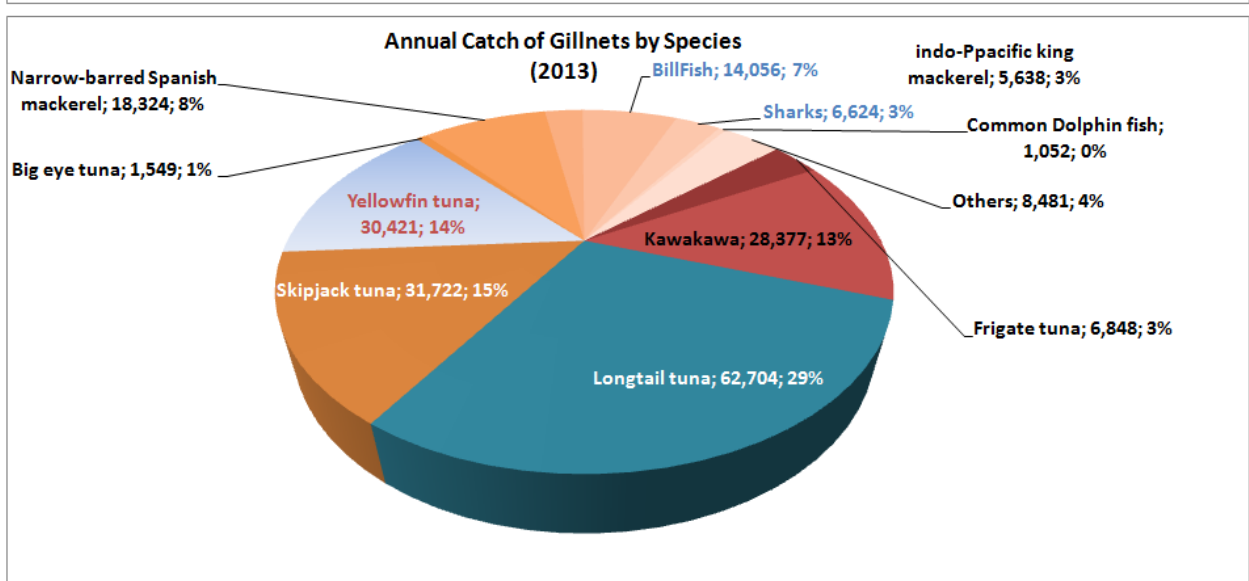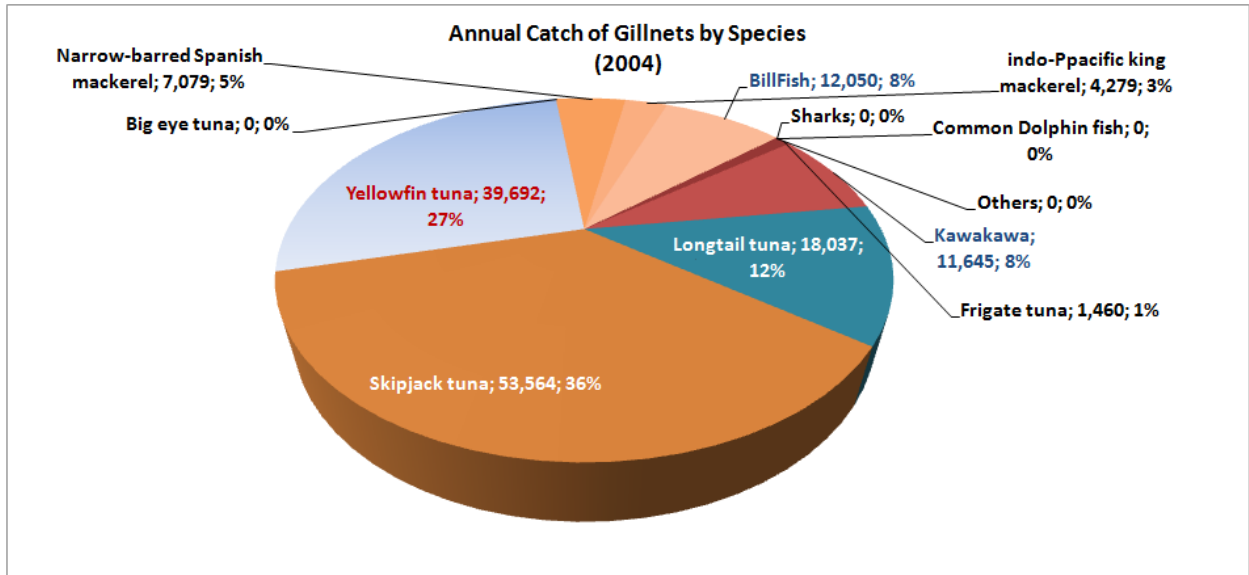|	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2013
Kawakawa	0	0	0	0	0	0	0	24	162	0	0%
Longtail tuna	1,491	1,227	2,303	2,321	1,205	994	220	2,280	2,074	1,520	29%
Skipjack tuna	82	1,214	3,909	450	1,489	1,159	628	1,336	1,621	1,605	30%
Yellowfin tuna	11,028	7,271	8,353	2,330	2,141	1,693	2,529	876	1,103	1,980	37%
Big eye tuna	0	0	1	55	23	0	0	105	161	100	2%
Others	0	0	0	0	0	0	0	0	34	80	2%
Total	12,601	9,712	14,566	5,156	4,858	3,846	3,377	4,621	5,154	5,285	100%
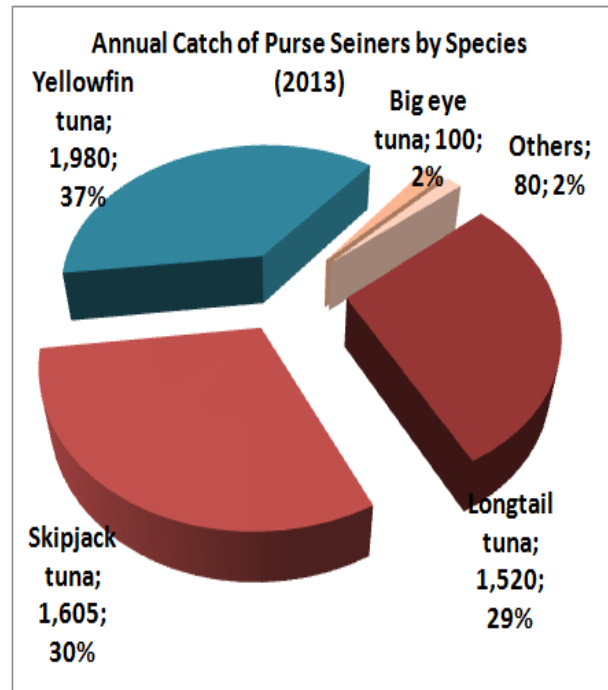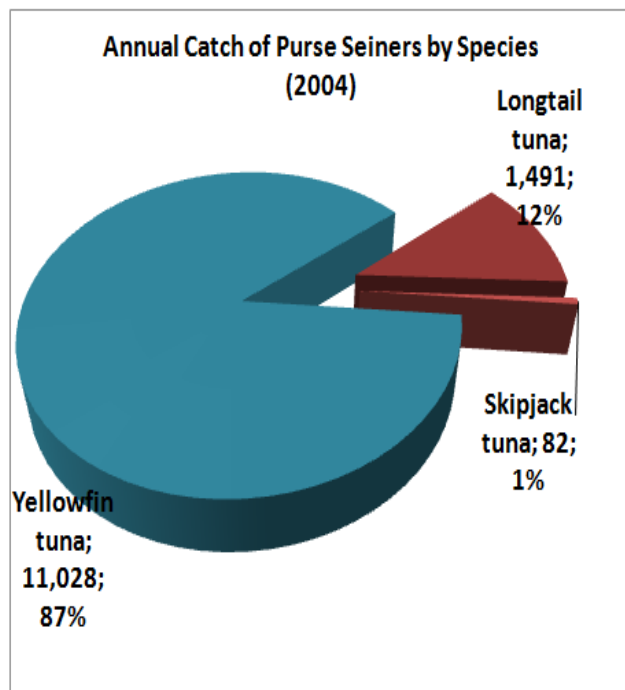
## Figure3.3. Annual Catch of Gillnets by Species

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Frigate tuna	1,460	1,616	2,444	5,197	7,164	5,178	6,172	5,970	8,175	6,848
Kawakawa	11,645	11,803	12,596	15,556	20,439	17,827	16,336	22,208	25,984	28,377
Longtail tuna	18,037	17,300	22,840	25,900	31,186	47,260	63,761	78,080	71,242	62,704
Skipjack tuna	53,564	79,436	98,759	67,618	42,411	45,935	21,657	16,137	25,430	31,722
Yellowfin tuna	39,692	35,769	32,064	13,615	17,085	19,749	28,522	27,646	33,834	30,421
Big eye tuna	0	0	0	0	0	0	0	0	1,483	1,549
Narrow-barred	7,079	5,936	8,339	8,860	9,975	7,279	10,523	14,248	14,980	18,324
indo-Ppacific	4,279	3,088	4,049	3,747	4,026	2,633	3,106	3,801	5,127	5,638
BillFish	12,050	12,587	10,578	6,243	5,634	7,976	9,209	8,866	11,297	14,056
Sharks	0	0	0	0	0	0	0	0	6,736	6,624
Common Dolphin f	0	0	0	0	0	0	0	0	1,804	1,052
Others	0	0	0	0	0	0	0	0	9,458	8,481
Total	147,806	167,535	191,669	146,736	137,920	153,837	159,286	176,956	215,551	215,795

Annual Catch of Gillnets by Species

Legend:
- Frigate tuna
- Longtail tuna
- Yellowfin tuna
- Narrow-barred Spanish mackerel
- BillFish
- Common Dolphin fish
- Kawakawa
- Skipjack tuna
- Big eye tuna
- indo-Ppacific king mackerel
- Sharks
- Others 0

Annual Catch of Gillnets by Species (2004)

- Narrow-barred Spanish mackerel; 7,079; 5%
- Big eye tuna; 0; 0%
- Yellowfin tuna; 39,692; 27%
- Skipjack tuna; 53,564; 36%
- BillFish; 12,050; 8%
- indo-Ppacific king mackerel; 4,279; 3%
- Sharks; 0; 0%
- Common Dolphin fish; 0; 0%
- Others; 0; 0%
- Kawakawa; 11,645; 8%
- Longtail tuna; 18,037; 12%
- Frigate tuna; 1,460; 1%

Annual Catch of Gillnets by Species (2013)

- Narrow-barred Spanish mackerel; 18,324; 8%
- Big eye tuna; 1,549; 1%
- Yellowfin tuna; 30,421; 14%
- Skipjack tuna; 31,722; 15%
- Longtail tuna; 62,704; 29%
- BillFish; 14,056; 7%
- indo-Ppacific king mackerel; 5,638; 3%
- Sharks; 6,624; 3%
- Common Dolphin fish; 1,052; 0%
- Others; 8,481; 4%
- Kawakawa; 28,377; 13%
- Frigate tuna; 6,848; 3%

Figure3.4. Annual Catch of Trolling Method by Species

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Frigate tuna	0	0	0	0	0	0	0	43	35	25
Kawakawa	0	0	0	0	0	0	0	34	76	387
Longtail tuna	0	0	0	375	229	239	469	523	2,884	2,348
Yellowfin tuna	0	532	305	338	256	318	434	277	28	2
Narrow-barred Spanish r	0	228	440	535	317	412	361	546	1,461	1,687
indo-Ppacific king macke	0	0	0	35	52	36	64	99	371	114
Indo-Ppacific Sailfish	0	0	0	0	0	0	0	0	18	0
Sharks Various nei	0	0	0	0	0	0	0	0	295	317
Others	0	0	0	0	0	0	0	0	0	0
Total	0	760	745	1,283	854	1,005	1,328	1,522	5,169	4,879
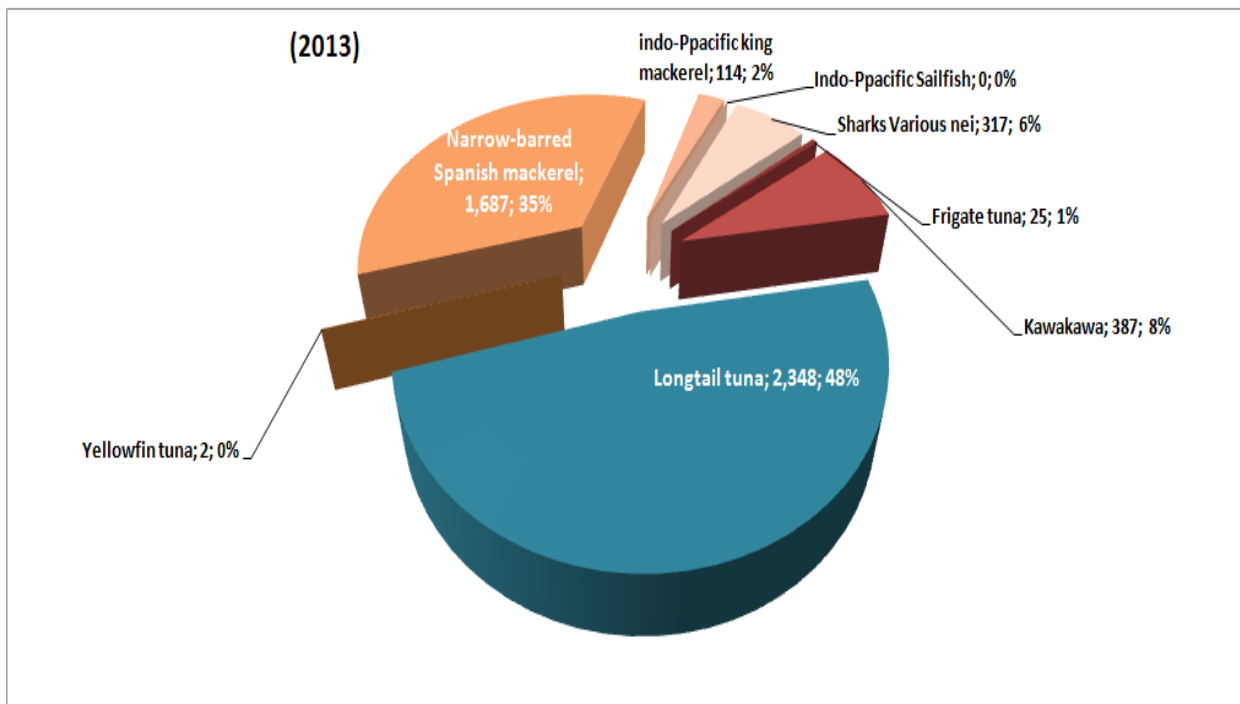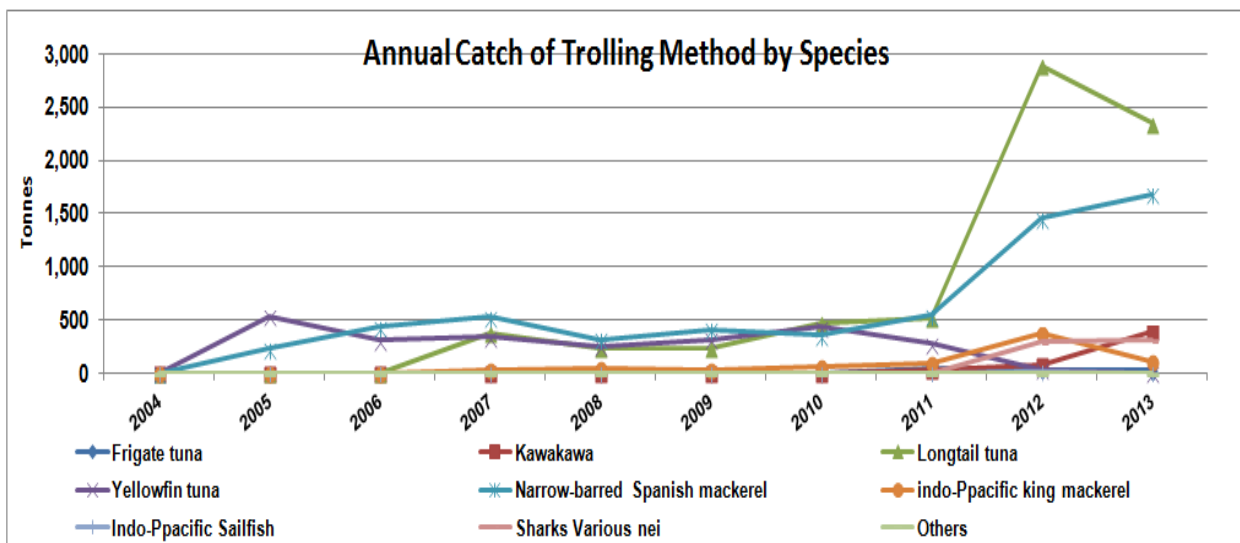
4. National data collection and processing system

Data Collecting System

Iran's fisheries activities consists two parts that their fishing methods and fishing geographical features are quite distinct from each other:

1-northern coastal provinces (Caspian Sea)

2- Southern coastal provinces (Persian Gulf & Oman Sea & Overseas)

4.1. Caspian Sea

There are three coastal provinces in northern waters, which are fishing in their territorial waters with around 40,421 tons and 943 vessels and with three different fishing methods (Figure 4.1.1, 4.1.2.):

4.1.1. Sturgeon Fishing

Around 600 fishermen with 231 fishing boats in 33 fishing ground by gill net method are engaged in sturgeon fishing (five major species) and total enumeration carried out by field sampler (observers)

Note: Iran voluntarily has banned commercial fishing of sturgeon species since March 2012.

4.1.2. Kilka (anchovy) Fishing

Around 719 fishermen with 73 fishing vessels in 4 fishing ground by Light-Conical Nets(funnel-shaped net) are engaged in anchovy fishing(3 major species) and total enumeration carried out by field sampler(observers)

4.1.3. Bony Fishing

Around 10,000 fishermen within 125 fishing cooperatives in 125 sites by beach seine method are engaged in 14 bony species fishing (three major species) and total enumeration carried out by field samplers (observers) per each shot

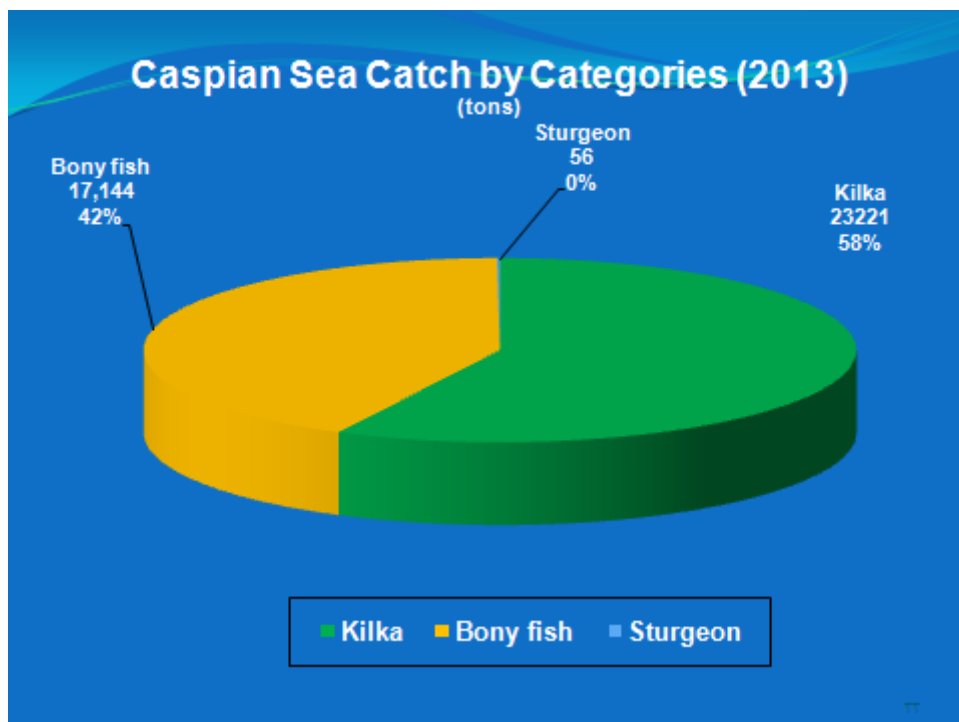Figure4.1.1. Caspian Sea Fishing Method & Active Fleet (2013)

Figure4.1.2. Caspian Sea Catch by Categories (2013)

4.2. Persian Gulf & Oman Sea & Overseas

— There are four coastal provinces in southern waters, which are fishing in their territorial waters with about 10700 vessels.

- **Gillnet fishing** method is used by fishing Boats and Dhows for Large Pelagic

- **Ships use bottom trawl fishing method** for Cuttlefish, lantern fish (mictophids) and Hair tail (Ribbon) in time-area closure.

- **Artisanal boats, dhows, and industrial vessels use shrimp trawl fishing method** for Shrimp in time-area closure.

- **Trap** (Gargoor) **fishing** method is used by boats and Dhows for Grouper, Cuttlefish and other Demersal species

- **Trolling, pole & line fishing** method is used by boats for Tuna species, Mackerel , Long tail Tuna,yellowfin Tuna and some Demersal species

- **Purse-seine(pair-boats) fishing** method by boats for Sardine and Industrial vessels Tuna

All of them needs fish license (permit) when they are going to sea for fishing operation. There are 63 basic landing centers in southern coastal waters. All of 63 basic landing, issue, fishing permit for vessels. Fishing permits form, also used for total enumeration in all landing sites for statistics on total effort of active fleet.

— And also following fishing methods and total enumeration carried out by fishermen fishing cooperatives :

- **Beach-seine fishing** method is used by fishermen in limited area of Hormozgan province for Sardine

- **Set net** fishing method is used In tidal regions of Hormozgan province   for shrimp, crap, …

4.3. *Logbook program has implemented for Iranian artisanal gillnets and industrial purse seiners as follows:*

In 2011, we have implemented logbook program for Industrial purse seine fishery and designed a new logbook template according to IOTC Resolutions and Four Iranian purse seiners were active in 2013, and their fishing operations reported in logbook format.

In 2011 for the first time, a number of 50 logbooks distributed among gillnet fishing vessels as a pilot plan in the Sistan-Bluchestan provinces and received some completed logbooks from fishermen. There are some mistakes during filling the forms by captain of vessels. For this problem Iran fisheries organization reviewed the logbook in 2012, and designed a new Logbook template in 2013 according to IOTC format for 150 active Gillnetters engaged in tuna and tuna like species in offshore fisheries. In accordance with the resolutions and recommendations of IOTC implemented the training courses for gillnet fishery to train fishermen on how to collect and fill out the logbooks, identify and report by-catch and discards species specifically for those fishermen operating in IOTC area of competence. *(Figure 4.1.)*

Figure4.1. Logbook template for Gill net vessels (active in overseas for tuna and tuna-like species)

5- SIZE DATA (BY SPECIES AND GEAR)

There are 11 important commercial species in Iranian southern waters, which their size frequency data compiled. The species comprised of,

1. **<u>Narrow-barred Spanish mackerel</u>** (*Scomberomorus Commerson*),
2. Tigertooth croaker (*Otolithes ruber*),
3. Silver pomfret (*Pampus argenteus*),
4. Black pomfret (*Parastromateus niger*),
5. Javelin grunter (*Pomadasys kaakan*),
6. Longtail tuna (*Thunnus tonggol*),
7. Kawakawa (*Euthynnus affinis*),
8. Fourfinger threadfin (*Eleutheronema tetradactylum*),
9. Yellowfin tuna (*Thunnus albacores*),
10. Skipjack tuna (*Katsuwonus pelamis*),
11. Bigeye tuna (*Thunnus obesus*),

There are the length and weight frequency data of species since 2001. Sampling in southern waters carried out in 13 landing centers consist of: Choebdeh and Hendijan in Khozestan Province, Daylam, Dayer, Jofreh & Bandargah in Bushehr Province, Jask, Javad'el'aemeh, Salakh , Kong & Kohestak in Hormozgan Province, - Ramin, Pozm & Pasabandar in Sistan & Bluchestan Province.

At each landing center, there are fish measuring board and precise Balance (scales). A number of biometry equipments have been provide by the IOTC-OFCF project and disseminated among the nominated landing centers and size data compilation is in progress.

All of Port samplers are training on how to measure different fishes. Fishing vessels catches were irregular for all species, but biometry carried out on-board from time to time to get

precise data. The raw data will be process with some statistical Software like SPSS, Excel, MiniTab and FiSat. The output results are in the form of some indicators, which show the present status of fish exploitation.

Figure 5.1 to figure 5.3 shows the total yearly size data by gear type and species reported for the all fleet including length frequencies, Mean for Tuna and Tuna-like species from 2004 until 2013. This figure shows an increase in the collection of size data, and developing data collection system for coverage another gear type like trolling.

Figure5.1.Length of Frequency of Tuna species by Gillnet fishery

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Frigate tuna	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Kawakawa	8,958	10,686	9,177	10,574	5,237	10,944	8,255	7,553	20,299	15,467
Longtail tuna	13,867	15,668	17,470	13,743	9,779	14,576	12,802	12,232	25,481	24,680
Skipjack tuna	8,624	1,979	4,754	2,687	Nil	Nil	97	5,156	3,761	13,212
Yellowfin tuna	4,455	1,279	2,289	683	Nil	Nil	Nil	1,215	4,070	11,146
Big Eye tuna	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	655	435
Narrow-barred	15,110	15,778	16,052	14,672	13,286	18,060	11,019	14,586	20,907	16,435
Total	51,014	45,390	49,742	42,359	28,302	43,580	32,173	40,742	75,173	81,375
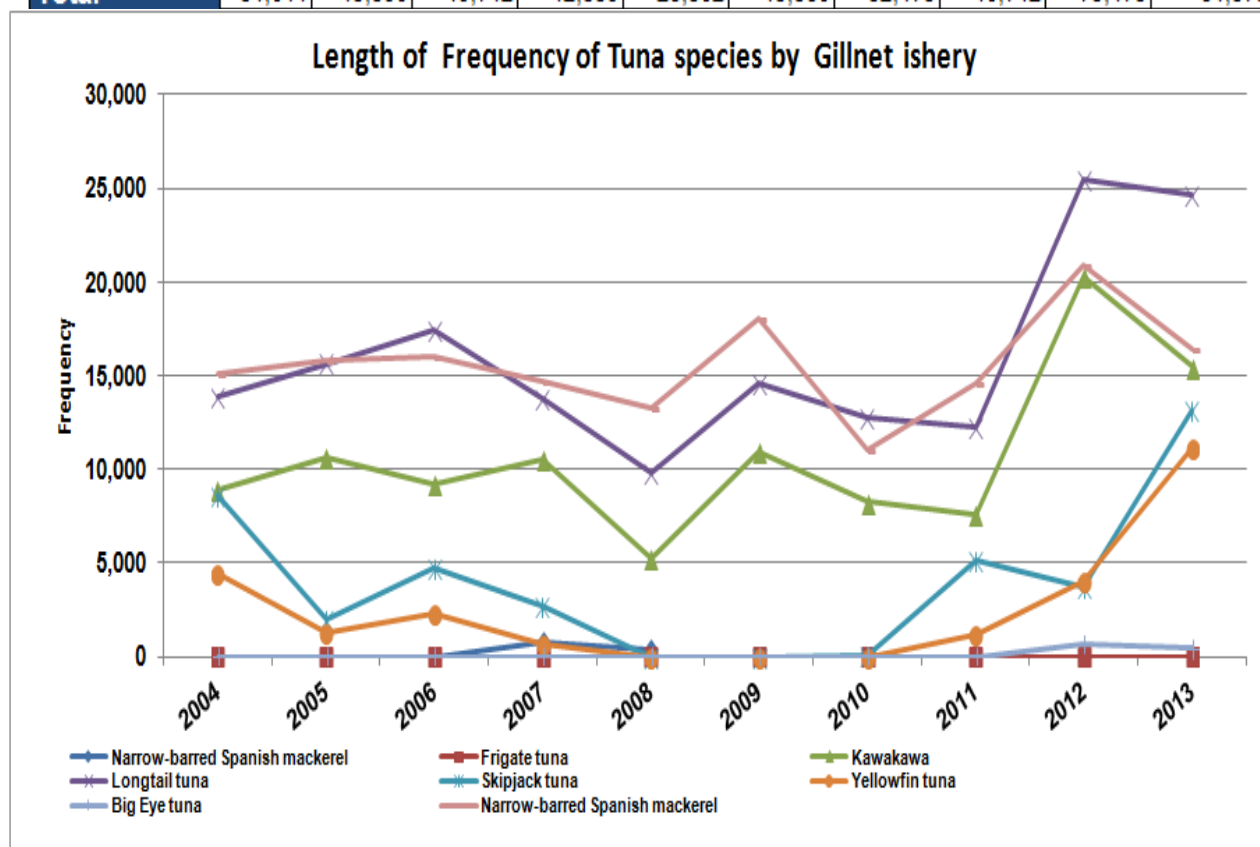
Figure5.2. Length of Frequency of Tuna species by Purse seine fishery

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Kawakawa	Nil	193	Nil	122	Nil	Nil	Nil	420	416	0
Longtail tuna	635	1,758	998	3,675	3,686	2,315	Nil	2,358	2,822	433
Skipjack tuna	Nil	Nil	1,206	676	1,300	359	484	424	964	957
Yellowfin tuna	1,363	2,255	3,949	1,093	2,318	2,113	1,220	727	445	1,296
Big Eye tuna	Nil	Nil	Nil	Nil	Nil	Nil	Nil	442	424	777
Total	1,998	4,206	6,153	5,566	7,304	4,787	1,704	4,371	5,071	3,463

Length of Frequency of Tuna species by Purse seine fishery
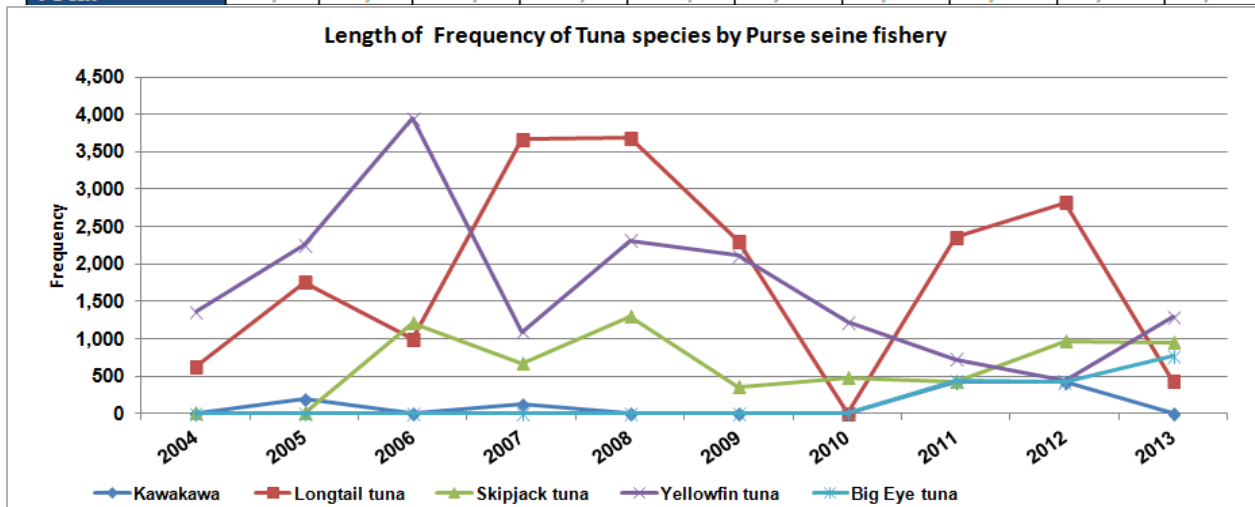
Figure5.3 Length of Frequency of Tuna species by Trolling fishery

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Narrow-barred	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	821	407
Total	0	0	0	0	0	0	0	0	821	407

Length of Frequency of Tuna species by Trolling fishery
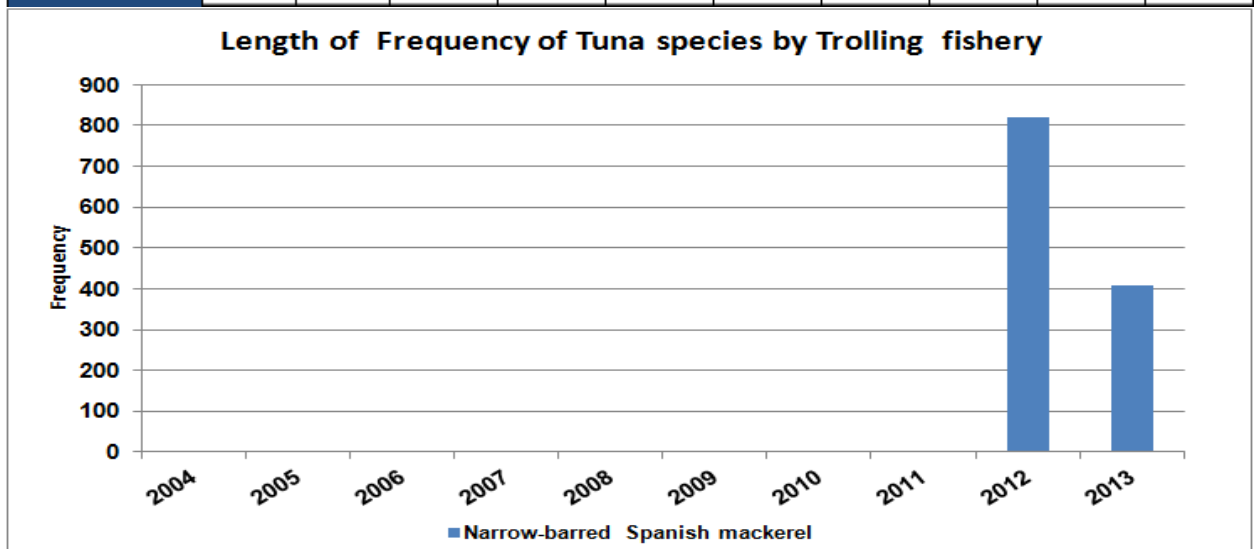
6. Implementation of IOTC Recommendation Resolution Relevant to the Data Collection System

1. Improving data collection system for Big eye tuna, Sharks, Billfish including species identification.

2. Iran Fisheries Organization implemented the training courses for port samplers in this way Identification cards for billfish, sharks and big eye was Translated in Persian language and disseminated among port samplers and fishermen to identify different species.

3. Incorporate logbooks in database (it's ongoing)

4. Amending Database to generate reports for the IOTC

   Note; this database active for two parts including fleet data, issue of vessel permit

5. Upgrading and modifying of database for provide required reports to Iran fisheries organization and other national and international entities.

6. Extending database capabilities to enhance Reporting (partially done)

7. Improving Size frequency data on purse seine and gillnet fisheries for big eye tuna and long tail tuna and trolling fisheries for Narrow-barred Spanish mackerel. We recommend IOTC to publish ID card for Billfish & Sharks in Persian language.

— 7. Main Issues

1. Multi-species fisheries in the region

2. Illegal Catch

3. Shortage of manpower and funding for data collection section

8. Suggestions:

1. To maintain a pilot project by each member country to determine offshore fishery by-catch species by identifying the billfishes, sharks, tuna and other species and percentage of discard.(It's going in Iran)

2. To maintain a training course by IOTC and related entities, specific for observers & field samplers on data collection and statistics base on IOTC relevant resolutions & recommendations.