

In the name of Allah

Estimation of By-catch from Iranian Fishing Vessels in the IOTC Area of Competence during the 20th Session of the Working Party on Ecosystems and By-catch (WPEP20) in 2023

09- 13/ Sept /2024

BY: Hamid Reza Bargahi

(Deputy Director General of the Marine Resources protection and improvement office of Iran fishery organization)

Email: Hr.Bargahi@Gmail.com

Abstract:

In the western Indian Ocean, Iran is one of the countries benefiting from marine resources. More than 15,000 fishing vessels, including fishing boats, floats, and ships, operate in the coastal, marine, and offshore waters of southern Iran. There are three main fishing methods targeting tuna and tuna-like species in the IOTC area: gillnetting, purse seining, and trolling, with the latter primarily used by small boats in coastal fisheries. The production of large pelagic fishes amounted to approximately 332 thousand tonnes, representing about 43% of the country's total catch in 2023. The estimated total quantity of tuna and tuna-like species caught is approximately 274 thousand tonnes.

To assess the level of by-catch from Iranian tuna fishing vessels in the IOTC area of competence in 2023, data collected through the Iran Fishery Organization's Data Collection system were used. Based on this information, around 30 different species—including tuna, tuna-like species, and others—are caught by Iranian fishermen during tuna fishing activities. In total, Iranian fishing vessels in the IOTC area of competence catch 285,669 tonnes of tuna and tuna-like species, 80,746 tonnes of billfish, 3,670 tonnes of sharks, and 36,838 tonnes of other species.

According to the IOTC's target species list (covering 16 species under the IOTC agreement), 80% of Iran's catch comprises target species, while 20% consists of non-target species in 2023. The non-target species caught as by-catch (20%) included 1% different species of sharks and 19% of other species, compared to the total catch. The vessels' Catch Per Unit Effort (CPUE) was calculated based on the gear used per day (Vessel Catch/Day). According to our estimation, the CPUE for purse seiners was 15.9 kg/day, for trolling boats 70.8 kg/day, for gillnetters 399.3 kg/day, and for long lines 91.3 kg/day. Additionally, the CPUE for sharks caught with gill nets was calculated at 5.6 kg/day.

Introduction:

In order to enhance tuna fisheries management and integrate ecosystem considerations, the Iran Fisheries Organization (IFO) has been adhering to IOTC data collection requirements,

scientific advice from the Scientific Committee, and IOTC resolutions. This is achieved through its fisheries monitoring system, utilizing various methods. While the monitoring and control quality of Iranian fishing fleets require further improvement, compliance with IOTC regulations and resolutions has been progressively improving. The IFO intends to continue this trend to achieve full implementation of all related resolutions.

However, increasing fishing pressure, marine pollution, coastal development, by-catch, habitat destruction, and unsustainable fishing practices pose significant threats to the survival of sharks, rays, and pelagic fish populations, as well as aquatic habitats. The reduction in their numbers not only disrupts the balance of marine ecosystems but also threatens the livelihoods of countless communities that depend on these fish for sustenance and income. Conservation efforts are essential to address these issues. Implementing stricter responsible fishing regulations and sustainable fisheries practices is necessary to protect shark and cartilaginous fish populations and to enhance habitat resilience. To achieve these goals, education and awareness initiatives are also vital.

Materials and methods:

Data were extracted and analyzed through the IFO data collection system at fishing docks, landing sites, using logbooks, and offline VMS information to estimate the bycatch of Iranian fishing vessels in 2023. Based on the information collected through Iran's data collection system, a day of catch was considered as a unit of effort, and the CPUE (Catch Per Unit Effort) was calculated based on the amount of catch per day. According to the recorded information, the majority of Iranian fishing vessels use gillnets. Typically, these nets are operated over a 24-hour cycle (setting the net at sea takes 4 hours, waiting time is 10 hours, separating fish from the net mesh takes 6 hours, and maintenance and preparation for the next setting take 4 hours). Due to the logistics involved, such as trips from ports to fishing grounds, weather conditions, and locating fish schools, there are often no catches on some sailing days. An active day for gillnets is thus considered an effort day. Additional information was collected from the offline vessel monitoring system, logbooks, and interviews with some crew members. The vessels primarily fished in Iranian coastal waters, the EEZ, and the western part of the Indian Ocean, particularly near the eastern coast of Africa. To identify species and survey catch composition, a port state observers scheme was implemented at fishing harbors and landing sites. In addition, ten years of data on the investigation of bycatch species and discards from gillnet vessels and other fishing vessels were utilized.

In the research conducted by Bargahi (2020) during a 10-year period from 2010 to 2020, 20 randomly selected fishing ports along the coastal strip of Iran in the Persian Gulf and the Gulf of Oman were monitored to assess the discharge of sharks. This was carried out by examining and identifying shark species using biometric methods and valid identification keys, including regional and FAO identification keys. The study revealed that 38 species of sharks are inadvertently caught during fishing operations.

Results:

In 2023, Iran's total fish production amounted to 1.4 million tonnes. Of this, 741 thousand tonnes (representing 52% of the total) were derived from the Persian Gulf, Oman Sea, and High Seas; around 37 thousand metric tonnes (3% of the total) were sourced from the Caspian Sea; and 640 thousand metric tonnes (45% of the total) were produced through aquaculture (Fig. 1).

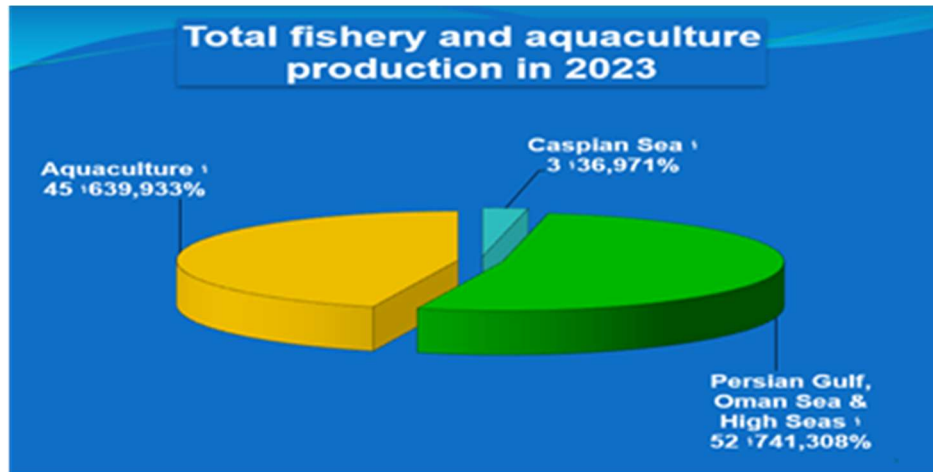


Fig- 1: Total marine capture fisheries and aquaculture production of Iran (2023)

In 2023, the total capture fisheries production in Iranian southern fisheries (IOTC area) was approximately 741 thousand tonnes. However, capture fisheries in the Persian Gulf, Oman Sea, and High Seas have exhibited a declining trend since 2018. The following chart (Fig. 3) illustrates the total catch harvested from these regions from 2001 to 2023. The data reveal a substantial increase, culminating in a peak of 731 thousand tonnes in 2018. Subsequently, a notable decrease of approximately 58 thousand tonnes occurred by 2021. While a slight recovery was observed in 2022, the overall trend remains concerning (Fig. 2).

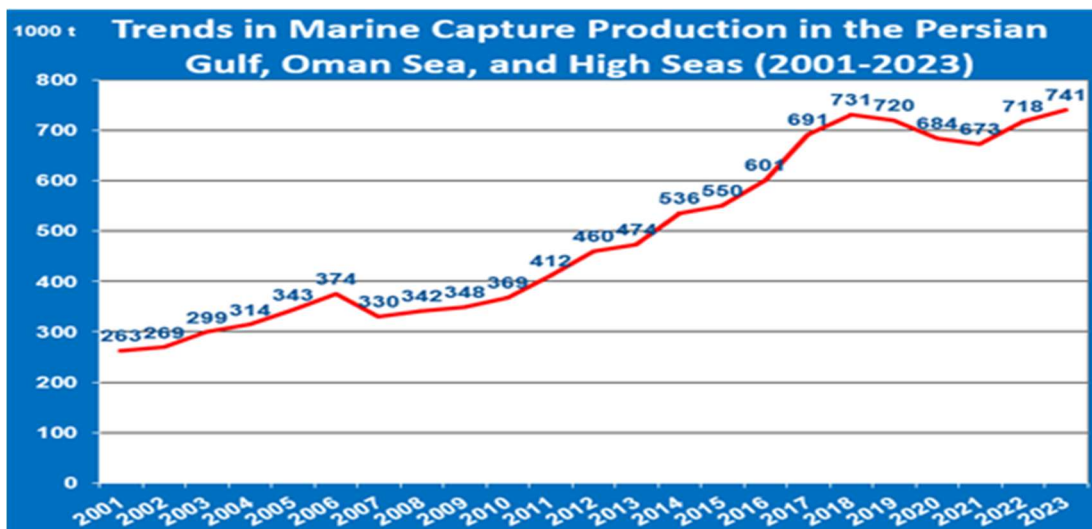


Fig 2: Trends in catch data for Iranian Southern Fisheries (2001-2023)

The following chart displays the large pelagic catch by different fishing gear from 2012 to 2023. The majority of the catch, accounting for 93%, was captured by the gillnet fishery. Trolling ranked second in terms of the amount of catch harvesting (4%). Furthermore, the harvesting activity by traditional longline accounting for 2% of the total catch and purse seine (PS) was approximately equivalent to 1% of the total catch (Fig. 3).

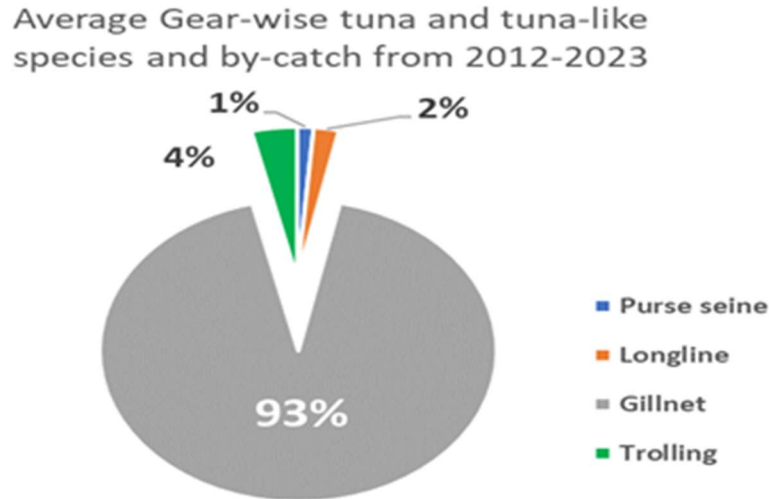


Fig-3: Average Gear-wise tuna and tuna-like species and by-catch from 2012 to 2023.

The ten-year average estimate of catch, including tuna with 197 thousand tonnes (72%), seerfish with 33 thousand tonnes (12%), billfish with 21 thousand tonnes (7%), **sharks with 5 thousand tonnes (2%)**, and other species with 19 thousand tonnes (7%) in total, demonstrates its importance as an economic resource. (Fig. 4)

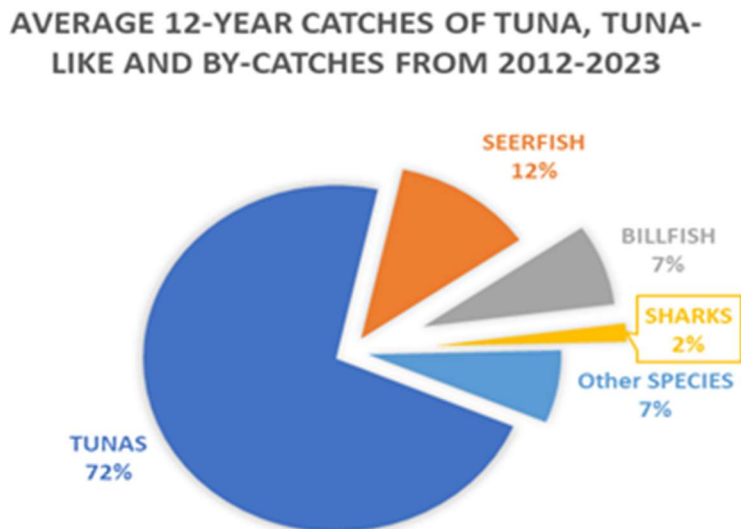


Fig-4: The average 10-year catches of different species of large pelagic from 2012 to 2023.

Shark Species

Over the past 10 years, monitoring conducted at 20 fishing ports and catch landing site centers across different fishing seasons has resulted in the observation and identification of 46 shark species at these ports and unloading centers. These sharks were not only caught in the Persian Gulf, the Gulf of Oman, and Iranian waters but were also sourced from the waters of the Arabian Sea and the Indian Ocean within the IOTC region. Among these, 38 species were predominantly observed as bycatch during fishing operations.

Of the 38 species of sharks recorded during the catching and unloading processes, 12 species represent a significant percentage of the catch composition, prevalent in most fishing methods employed in coastal areas. Figure 1 illustrates these twelve species, showcasing the percentage of catch composition over the past ten years. During the study period, five shark species emerged as the most abundant and are considered the dominant species in the region. These species and their respective abundance percentages are: *Rhizoprionodon acutus* at 21%, *Carcharhinus falciformis* at 18%, *Carcharhinus sorrah* at 15%, *Rhizoprionodon oligolinx* at 12%, *Carcharhinus dussumieri* at 10%, and *Carcharhinus limbatus* at 8%.

The majority of sharks caught are small, with a length ranging between 50 and 100 cm, as depicted in Figure 5.

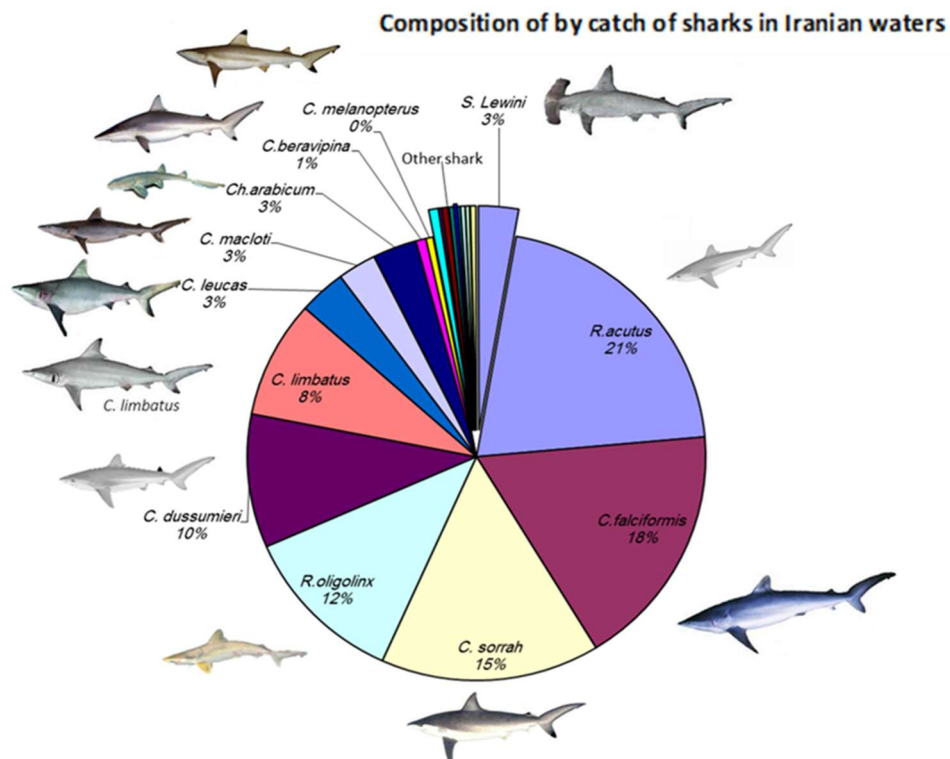


Fig 5: The percentage of bycatch sharks unloaded at ports and landing site centers in the Persian Gulf and the Gulf of Oman in Iranian waters

The fishing of sharks in Iranian waters, as regulated by IOTC resolutions, has shown a decreasing trend. The estimated implicit catch of sharks in 2023 was 3,670 tons, marking the lowest amount in the last 20 years (Figure 6)

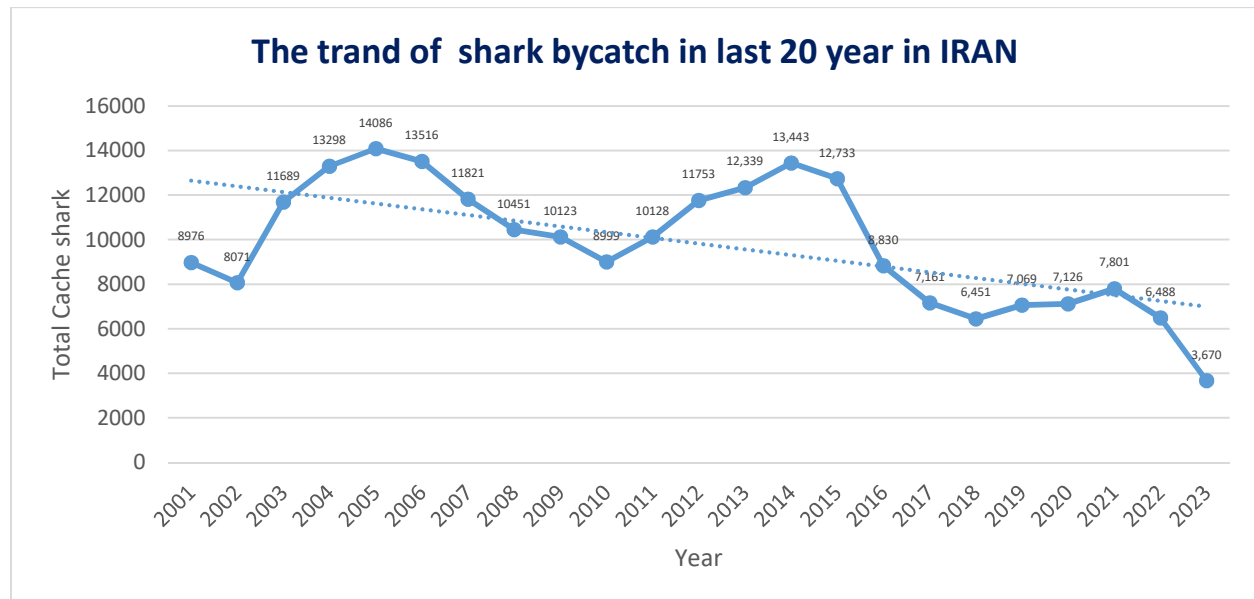


Fig 6: The trend of shark's by-catch in the last 20 year of the ports and Landing site centers in the Persian Gulf and the Gulf of Oman in the waters of Iran.

Based on the estimated annual shark catch over the past five decades and the latest IUCN rankings in 2021, four shark species in the Persian Gulf and the Gulf of Oman are now classified as critically endangered. Additionally, thirteen species are on the Red List of endangered species. Furthermore, twelve other shark species have become vulnerable due to the illegal fishing of their stocks. Given the ecological importance of shark populations, the existence of national and regional sensitivities, the presence of the Iranian fishing fleet in the Indian Ocean, the incidental catch of oceanic species, and the attention of international organizations, a national action plan for the protection of cartilaginous fishes has been set on the agenda by the Iran Environmental Protection Organization and the Iran Fisheries Organization.

Discussion:

Shark stocks in Iranian waters of the Persian Gulf and the Gulf of Oman are declining sharply. Despite the implementation of bans and heavy fines by relevant organizations, bycatch remains an issue in some fishing methods, including neritic and oceanic gillnetting, trawling for fish and shrimp, longlining, and trolling, which continue to catch sharks. Over the past 23 years, there has been a downward trend in shark catches. Since the ban on targeted shark fishing in Iranian waters was announced in 2001 based on IOTC resolutions, the decline has continued. In 2020, Iran further banned the fishing of cartilaginous fish, with Iran's Environmental Organization imposing substantial fines for violations. This is in contrast to other countries in the region, which have yet to implement similar bans on shark fishing (Figure 6).

To maintain optimal fisheries management, Iran has formulated a plan to reduce fishing effort by a number of fishing vessels, with the ultimate goal of enhancing the sustainable exploitation of tuna and other bycatch species stocks. Iran has introduced supplementary conservation and management measures, including regulations governing fishing gear and techniques, promoting selective methods like longlining and trolling, establishment of closed seasons, and oversight of fishing license issuance.

Over the past year, we have organized several training practically and theoretically sessions focused on the identification of bycatch species and shark species for our fishermen and field samplers, with a particular reference on tuna species. Through these sessions, we have gathered field samplers with the intent to identify various species of Sharks and other bycatch species. This has helped us to improve the accuracy of our catch data and ensure that we are complying with regulations on sustainable fishing practices. By continuing to invest in training and technology, we hope to further improve our ability to manage these valuable resources for generations to come.

The Iran fisheries organization has established a system for monitoring and enforcing the fishing regulations in the country. This includes regular monitoring of Fishing trips landings and processing facilities. Efforts are undertaken to enhance the processes of controlling and customizing tuna fishing through port controls, monitoring of catch unloading, regulations governing fishing gears and tackles, and other measures implemented in the fishing grounds. Iran has taken additional measures to promote a monitoring system by equipping some distant-water fishing dhows with a Vessel Monitoring System.

The penalties for violating fishing regulations are cartilaginous fishes such as: sharks - guitar sharks - sawfish and rays is severe. In this regard, actions are being taken to address fishing violations committed by vessels in the tuna fishing sector, and a commission is in place to deal with such violations. This commission is also implementing deterrent policy measures, and if necessary, it refers the violations to judicial authorities.

International Plan of Action for Conservation and Management of shark (IPOA) is being compiled this year with the cooperation of Iran's fisheries organizations and Iran's Environmental Protection Organization. Its results led to the confirmation of 3 Important Shark and Ray Area (ISRA) in Iranian waters in the Persian Gulf and the Gulf of Oman.

Since 2018, in Iran, we have been commemorating Shark Awareness Day on July 14th with the help of NGOs, experts, and shark enthusiasts. On this day, we organize workshops, meetings, film screenings, and distribute educational content ranging from booklets to brochures and educational clips to raise awareness among fishermen and coastal communities. The outcomes of these educational programs have been an increase in the release of sharks and other cartilaginous fish that are incidentally caught.

Reference:

- Bargahi H.R, Shokri MR, Kaymaram F, Fetemi MR. 2020. Changes in reef fish assemblages following multiple bleaching events in the world's warmest sea (Kish Island, the Persian Gulf). *Coral Reefs* 39: 603–624. <https://doi.org/10.1007/s00338-020-01945-3>.
- Bargahi H.R, 2021. Five decades of decline in sharks of Iran. *Ichthyological Research*, University of Gonbad Kavous. 2021, 8(5): 168-178.
- R.Shahifar, R.Noori.D, H.Barghahi, Assessment of bycatch in Iranian gill net vessels in Indian Ocean, Mission Report, 2012.