

Commercial Fishing Methods in Iran

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Abstract: The Islamic Republic Iran is located in western Asia with area 1 648 000 km² and have a 2700 km of continental coastline. Due to this continental coastline, Iran is considered the biggest fishing nation in the region. There are several commercial fishing methods in Iran like Trawl fisheries, Purse seine fisheries, Gillnet fisheries and coastline fisheries. In this paper, we tried to introduce and explain all the commercial fishing in Iran. Certainly, there are many fishing methods in Iran, but all of them are not commercial and used by fishing fleets.

Key words: Commercial Fishing % Methods % Iran

INTRODUCTION

The Islamic Republic Iran is located in western Asia with area 1 648 000 km². Water area in Iran is 12000 km² and Shelf area is 196000 km². Length of continental coastline in Iran is 2700 km [1]. Iran has a population of around 75 million [2]. The long Iranian coastline, coupled with a diversified climate in the land area suitable for various type of aquaculture system, makes Iran the biggest fishing nation in the region [1]. Commercial fishing in Iran is two categories: Southern fisheries and Northern fisheries. Capture production by principal producers in 2010 Iranian fishery that comprised Fish, crustaceans, mollusks, etc; was 443650 ton [3].

Southern Fisheries: Industrial and semi-industrial fishing fleets owned by private enterprises carry out almost all fisheries in the Persian Gulf and the Gulf of Oman [1]. Persian Gulf is connected to Oman Sea by strait Hormuz. The maximum width of the Gulf is 640 km and average depth is 35m [4, 5]. Oman Sea connects Persian Gulf to Indian Ocean through the Arabian Sea. Area of Oman Sea is 94,000 km² and a depth reaching 3200 m [5] While Maximum depth of the Persian Gulf is 100 meters and an average depth of 60 meters [4]. Lying in the subtropical area, entirely between the latitudes of 24° and 30°N and longitudes of 49° to 61°E and average annual rainfall

between 3 and 8 cm per year are specification of the Persian Gulf and Oman Sea [4]. Valinassab *et al.* [5] said that, a review of fishery statistics shows a trend of increasing fishing effort in the Persian Gulf and Oman Sea during the last decade. Thus, the number of fishermen increased from 70,729 in 1993 to 109,601 in 2002 [1].

Fishery management, liberalization and prohibition of fishing in fishing seasons are controlled by Iran Fisheries Research Institute. In addition, licensing for fishing in Iran waters is done by this institute and Iran fisheries. The amount catch of fish in southern of Iran was declared by FAO [1]: Demersal species (61 271 t), big pelagics (142 065 t), small pelagics (15 197 t) other (11 573 t, including discards and by-catch) and purse seine fisheries for tuna fishes in the Indian Ocean (11 830 t).

Northern Fisheries: The Caspian sea, That located in the north of Iran; is the largest lake with brackish water in the world that Iran is associated with that via the coasts of three provinces named by Gilian, Mazandaran and Golestan [6]. Coastal area of Caspian Sea is shared by Iran, Russia, Azerbaijan, Turkmenistan and Kazakhstan. Volume of Caspian Sea is 77,000 km³ and a surface area is about 436,000 km² [7].

FAO [1] represented the amount catch of fish in northern waters of Iran: Sturgeon (463 t), kilka (15 500 t) and bony fishes (16 573 t).

The aim of this study was to collect comprehensive information of commercial fishing methods in Iran. In this article, we tried to cite all commercial fishing methods in Iran and avoid expressing noncommercial methods. Although there are many articles that explain one method, but a comprehensive reference of fishing methods in Iran seems to be necessary.

Fishing Nets Type

Gillnet: Gillnet is a vertical net that is located against the water current. The stuff of this net is natural and artificial. This is a passive fishing gear. Because of traditional method and not needing to facilities and equipment (compared with advanced fishing methods) and high rate catching versus other traditional methods, Gillnet has high importance in southern of Iran [8]. The major epipelagic species in Persian Gulf and Oman Sea belong to *Scombridae*, *Clupeidae*, *Carcharhinidae* and *Carangidae* and sometimes from *Rachycentridae* were observed in catch composition. These species are valuable marine stocks that have an important role in coastal country [9]. Dastbaz [8] expressed that gillnet (multifilament 210D15, 12cm STR) is used to catch king fish (*Scomberomorus commerson*). Each part of the net has 175-yard length and 100 meshes in height. Depending on vessel capacity, the number of net ranged from 30 to 120 parts.

There is great diverse species among gillnets at ports in Bushehr province [10]. The characteristics of king fish gillnet were described below:

Gillnet material	PA multifilament
Net color	Gray
Number nets gain together	65
Hanging ratio	0.5
Mesh size (STR)	145 mm
Net yarn	210D/30
Number mesh in height	200
Length of each part on net	182.88 m
Width of each part	25 m
Head and Lead line rope	PE

These nets are used for *Tunnus tonggol*, *Euthinis affinis*, *Scomberiodes commersonianus*, *Carcharhinus dussumieri*, *Scomberomorus commerson*, *Rachycentron canadum* and *Sphyrna jello cuvier* [10].

The characteristics of tunas gillnet was expressed [11]:

Net name	Gillnet
Net type	Indo-Pacific king mackerel net
Local name	Tour-e-Qobadi
Fish species of catch	Scombridae, Chirocentridae
length	182.88 m
Color	white and blue
Mesh size	120-90 mm
Net material	PA 152-Monofilament
Head and foot rope	PE
Diameter of head and foot rope	8-10 mm
Hanging ratio	48 to 56 %
Buoyancy	Plastic-Polystyrene
Weight of each float	115.935 gram
Weight of each Polystyrene float	76.15 gram
Buoyancy of each Plastic float	828.1 gram
Buoyancy of each Polystyrene float	768.9 gram
Sinkers	Pb and Cement
Weight of each sinker	400 to 600 gram

Another type of gillnet is used to catch Russian sturgeon, Chip sturgeon and Persian sturgeon with mesh size (bar) 150mm in Caspian sea that called "trap".

Currently, there is a five-month open season for fish trawlers in the Oman Sea whereas (from ten years ago) in the Persian Gulf, trawling for fish is banned and only shrimp trawlers are active [5].

Opening fishing season is based pre-season cruises that appraise the abundance and carapace length (CL) of shrimp, also the closure time is based on the CPUE (Catch per Unit Effort) index when it indicates that only 20% of the shrimp stock has remain [12].

Trawls that used in Iran have two or four layers. Body net is made of PA. The yarns used in codend are thicker. For opening the wings of trawl, we use wooden otter board that surface area range from 2 to 6.5 m². Trawl is the most important fishing gear to catch the shrimp [13]. The shrimps that caught with trawl in the southern waters of Iran specially Persian Gulf consist of *Penaeus semisulcatus*, *Penaeus merguensis*, *Metapenaeus affinis*, *Metapenaeus stebbingi*, *Parapenaeopsis stylifera* and *Metapenaeopsis stridulans* [12, 14-16].

Trawl net that used in Persian gulf are outrigger trawls with 26m length, 7.4m wide and mesh size of cod-end 40mm stretched [12] and 20 mm stretched [13] and 31m headline.

Hosseini *et al.* [17] said that The Iranian trawl fisheries in the Persian Gulf can be divided to bottom shrimp trawling for catching shrimp and cutlass fish, improved trawl for catching cutlass fish,

Trichiurus lepturus [18, 19]. The cutlass fish trawl fisheries have been used since 2005 in fishing grounds of Iranian waters of the Persian Gulf. All commercial vessels for catching *Trichiurus lepturus* were equipped with a trawl net with a 36 m head rope and a 75 mm stretched mesh size in the cod end and 90 to 200 mm stretched mesh size in the body. They operated in depths between 41 and 76 m.

Also Kiaalvandi *et al.* [20] said that they used Mid-Water trawl for catching myctophidae in Oman Sea.

Purse Seine: This fishing gear belonging to encircling nets that used in southern Iranian waters. In Iranian commercial catch fleets, Azadegan vessels 1, 2 and 3 are using purse seine to catch tuna fish [21 and 22]. Salarpour and Darvishi [23] cited that about 88% of total catch of purse seine vessels in Jask coastal waters was *Sardinella sindenisi*. Nowadays Persian Shila [24] is one of the most advanced Iranian purse seiner vessels that work in IOTC regions [3] that its net tonnage, Gross tonnage and Dead tonnage is 989, 3.269 and 3.384 tons respectively.

Salarpuri *et al.* [25] said Sardine purse seine in Qeshm waters in Hormozgan province, Iran:

Statistics of net	Two boat purse seine	Beach purse seine (Jal)
Length (meter)	183	90
Height (meter)	16	15
Mesh size (knot to knot) in wings (millimeter)	20	300
Mesh size (knot to knot) in bag (millimeter)	5	10

Set Net: Set nets are used in Iran named by Moshta (Fig. 1), to catch the littoral migratory fish like *Mujilidae* and *Sillaginidae* and also *Metapenaeus affinis* and

Penaeus mergueinsis [26-28]. The nets that used in this method do not follow specific rules. The height of body net depends on high tide. The lower part of body net hold under bottom and like a wall covers the whole water from bottom to surface. Set net consist of three parts: leader, body net and pocket. When littoral migratory fish swim toward the leader, after doing 8-shape movement, goes to the pocket.

Pot: Pot is type of trap that used in Persian Gulf and Oman Sea named by Gargoor (Figs. 2, 3, 4, 5). This fishing gear was used more than 50 years by fishermen in Bushehr Province [29, 30]. Pot is one the oldest trap that used in the Persian Gulf [31].

This trap is semi sphere form that consists of three parts: body of pot, bottom of pot and a semi conical entrance that have 1.7m height, 2m diameter and 35-50mm mesh size [21-33]. For body of pot and bottom of pot it used wire No.18 and No.17 respectively [11].

Shabani *et al.* [34] declared that in the past, pot is used in the coastal waters of Persian Gulf that were rocky [32] but with increasing fishermen's demand due to restriction of bottom trawl [35] and because of improper management on this method, it showed a 400% development since [35] that covered all coastal waters from depth 10m to 50-55m. During conducted investigations until 2006, the number 46590 pots were used in Bushehr Province [35]. Shabai *et al.* [34] determined that five species: *Sparus spinifer*, *Pomadasys kaakan*, *Acanthopagrus latus*, *Epinephelus coioides*, *Lutjanus malabaricus* included 92.32% of catch composition.



source: www.qeshmonline.com

Fig. 1: View of Moshta in Qeshm waters



Fig. 2: View of semi conical of Gargoor



Fig. 3: View of a vessel of Gargoor fishing. www.mehrnews.com.



Fig. 4: View of knitting Gargoor. www.mehrnews.com.



Fig. 5: View of knitting Gargoor (top view). www.mehrnews.com.



Fig. 6: View of Stake-Net [38].

Stake Net: Stake net is a fishing gear that set in the entrance or at the end of creek with the tall steel or wooden stake and ropes (Fig. 6). Indeed, in high tide stake net is down and before low tide this net set with the ropes and prevent to escape fish and catch them [36]. In terms of type of use, stake nets are various.

Safikhani [36] Cited Characteristics of *Pampus argenteus*

Net: In *P. argenteus* stake, net mesh size of net is 44mm (bar). Length and width of net are 600m and 7m approximately.

Stakes: generally is made of wood with 10-15cm diameter and distance between 2 stakes is 2-4m.

Wooden Nails: length of nails is at least 50cm to connect lower part of net with the bottom and prevent to escape fish.

Ropes: consist of main rope (that is fastened at the highest of stake and connect the end of stakes together), head rope, foot rope, rope for setting the net in high tide and ropes to holding stakes.

Catch composition of stake net consist of *Pampus argenteus*, *Pseudotriacanthus strigilife*, *Otolithes ruber*, *Epinephelus coioides*, *Carangidae*, *Tenualosa ilisha*, *Trichiurus sp* and *Chirocentrus dorab* [36].

Stake net is the most important fishing gear used in southwest coastal waters of Iran that work with tide and in Khuzestan, fishing of fish and shrimp in creek is done



Fig. 7: View of Beach seine (Pareh)



Fig. 8: View of Conical lift net (Kilka net). www.farsnews.com

widely with this method. Set net is like stake net in performance with this difference that set net is used in Hormozgan and in the coastal waters (near shore) [36].

Beach seining, or fishing with beach hauling nets, is a very old fishing method in coastal fisheries. The setting of the gear from the beach, maybe by means of a single boat, is mostly carried out in such a way that the drag line of one wing remains fastened to the beach, while one wing, the net bag and then the other wing with its drag line are taken out in a wide arc and then brought back to the beach. Sometimes the second line is longer than the first one in order to encircle a wider area. Then the hauling lines are towed simultaneously from the beach, herding the fish opposite the bag or bunt of the gear. Also the ground-rope is sometimes made shorter, to make the bag

net more voluminous. The ground-rope has to be always in touch with the bottom and should reach the shore before the headline [37].

Beach Seine: Beach seine is renowned beach towing net that used near shore in northern Iran waters to catch teleosts named Pareh (Fig. 7). Fishing operation begins from October and finish in April [38]. Setting net is done by boat that towed with a vessel. Fishing duration continued 3-4 hours and in day-night there is 2-5 times towing beach seine in each cooperative fishing. Beach seine belong to beach encircling fishing gears without bag [39] but in the center of beach seine, there is small mesh size that play role of bag and about 90% of catch is done by this part [38].

Conical Lift Net: These fishing gears are like a conical net that there were 2 lamps at the entrance net to attract Kilka toward the net (Fig. 8). Setting net operation is done at night and off shore. To catch the Caspian Kilka, when fish herd were seen by echo sounder, the vessel anchor and in terms of experimental catch, the best depth to set the net is defined. Vessels usually have two conical lift nets that used successively. When the lamps were turn up, the nets placed to the suitable depth. Depending on density of fish, the net is hold 1-8 minutes. Then the net was hauled with the maximum speed and before going out the net, the lamps are turned off. After hauling, the codend rope was opened and empties the catch. While hauling the first net, the second net on the other side of vessel is gone down to the suitable depth. At each night, there is 100 times operation catch maybe done and at each hauling 100-120kg, Kilka is caught.

All three kilka species (*Clupeonella engrauliformis*, *C. cultriventris caspia* and *C. grimmi*) are targeted by the local commercial fisheries that use underwater electric lights and fish pumps [40]. Annual catches of kilka in the Caspian Sea reached about 423,000 mt in 1970 [41]. Fazli *et al.* [42] said that the diameter of the hoop of a conical lift net is 2.5-3 m. There are two underwater electric lamps (~2 kW) and the length of the net bag is at least $1.25 \times$ greater than the diameter of the hoop [43].

Although there are other fishing methods like, Sardine Jal or conical traps that used in Iran, but these methods are not economical and are most used by individual anglers.

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