Status and prospects of Large Pelagics fishery in Tamil Nadu and Puducherry

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Abstract

The status of the landing of large pelagic fishery including the resource-wise contribution and their species composition in Tamil Nadu and Puducherry is presented based the on the estimated fish landings data for the period 2007-2019. The large pelagics landing in Tamil Nadu varied from 30,659 t to 83,620 t with an average of 45,330 t. In Puducherry, it varied from 254 t to 5,453 t with an average of 2,515 t. Various crafts and gears involved in the fishery are described while the future prospects and management issues are flagged.

***Keywords**: Large Pelagics, Tamil Nadu, Puducherry, fishery*

Introduction

The total marine fish landings in Tamil Nadu in 2019 was 7.74 lakh tonnes and state was ranked second in marine capture fish production in India. The upgrading in the craft and gear, change in fishing pattern, extension of fishing ground and market demand have played an important role in the increase in landings. These changes are visible in the large pelagic (LP) fishery also. Tunas, billfishes and seer fishes are the most important groups among large pelagics in terms of their importance in the domestic as well as export markets. Earlier the large pelagic coastal resources like seer fishes, coastal tunas, carangids, barracudas etc were targeted mainly but now there is a targeted fishery for oceanic tunas, billfishes which has made changes in the species composition of the landings. Except in the magnitude of landings, the fishery and the marine fisheries regulation of Puducherry are almost similar to Tamil Nadu. The status of the large pelagics fishery in Tamil Nadu and Puducherry based on the landings data for the years 2007-2019 provided by the Fisheries Resource Assessment Division of ICAR-Central Marine Fisheries Research Institute is detailed.

Fishery trends in Tamil Nadu

The large pelagic resources of Tamil Nadu-Puducherry coast comprise of tunas, billfishes, barracudas, seer fishes, queen fishes, dolphin fishes, rainbow runner, cobia and needlefishes. With a targeted fishery all along the coast the major fishing harbours and landing centres include Chennai, Cuddalore, Nagapattinam, Pamban, Rameswaram, Tharuvaikulam, Tuticorin, Chinnamuttom, Thengaipattinam and Colachel in Tamil Nadu; Puducherry and Karaikal in UT Puducherry. Various crafts and gears such as gillnets, hooks and lines, trawls and seines are deployed for fishing large pelagics.

1. Gillnetters: Gillnets are generally operated during late afternoon or night hours depending on the lunar phase. In general there is only one operation, but depending on the presence of fish shoals, more operations may be made. Based on the crafts and mode of operation they are categorized as

Non-motorized or motorized single day gill netters: These use small gillnets of about 1000 m length with mesh size of 65-100 mm targeting mackerel, scads, medium sized

tunas, seer fishes etc. They are operated from fiberglass boats of 9-10 m Overall length (OAL) and if motorized, are fitted with outboard motors of 10 -14hp and manned by five to six crews. They go for fishing in the afternoon or night and return the next morning.

Motorized double engine gillnetters: Relatively large gillnets of 1000-1500 m length and mesh size of 130-140 mm operated from FRP boats of 14 to 15 m OAL fitted with 2 OBM engines of 10 hp capacities. They are targeting manly tunas and seer fishes. The crew strength in these units is either five or six.

Drift gillnetters for Needle fish (*Murrel valai*): These are green coloured drift gill net of 50 mm mesh size known as '*Irupiruppu*' and 55 mm mesh size locally known as '*Muppirivu*'. The former targets smaller sized needle fishes and the latter one bigger needle fishes. Each piece of the net is 70 m long and 2.8 m wide and six to seven pieces of both nets in 50:50 ratio form one set. Each boat may carry 25 to 30 sets. These nets are provided with floats but do not have any foot rope and weight. When set, the net will be just floating on the surface. They are operated from wooden boats of 16 to 20 m OAL fitted with engines of 68 to 98 hp with separate space for fish hold and manned by 6 to 7 crews. They undertake single or multiday day fishing and are mainly based at Tharuvaikulam in Thoothukudi.

Multiday gillnetters: Gillnets of 9-10 km length and mesh size of over 120 mm targeting seerfishes, tunas and billfishes are operated from wooden boats of 20 to 23 m OAL fitted with inboard engines of 150 hp or more, with mechanical winches to haul the net and separate spaces for fish hold and net storage. These vessels are provided with GPS and communication systems and have crew strength of eight to ten (Fig.1). One fishing trip lasts for 5 to 20 days depending on the availability of the resource nearer or farther from the shore. Although gillnets are operated almost throughout the coast, gillnet based targeted fishing for large pelagics is mainly in places such as Chennai, Puducherry, Cuddalore, Nagapattinam, Rameswaram, Thoothukudi and Kanyakumari.

2. Hook and Line: Both long lines and trolls are operated targeting mainly large pelagic resources.

Long line: They are operated from Chennai coast mainly targeting seer fishes. FRP boats of 13 to 15 m OAL fitted with single or double 10 hp OBM with crew strength of five are used for fishing. In a basket, 800 to 1000 hooks of size number 7 are used. They generally undertake single day fishing and fishing occurs almost round the year. The most common bait used in the long lining is rainbow sardines.

Handlines: Hand line with hooks of size number 7-8 is used seasonally along the Kanyakumari coast, targeting yellow fin tunas. They are operated from multiday trawlers and the operation is similar to the trolling. The non-edible by-catch of previous day's trawling is used as bait. Once the tuna shoal is located, bait is broadcast into the sea and along with it the hand- line is also dropped into the water while the boat keeps moving slowly. The fishing ground is within the shelf area and the fishing season is February –April. Along the Gulf of Mannar, hand lines are operated from FRP boats targeting seer fishes, carangids, cobia etc. They use scads (*Decapterus* sp.) or caesionids as the bait which is single day fishing and operation is during day time.

3. Multiday Ring seiners: The ring seines have an overall length of 2000 to 2100 m and width of 100 to 120 m with mesh size of 110 mm each. They are operated from mechanized crafts of $>$ 23 m OAL with engine power of $>$ 500 hp. Each unit has crew strength of 50 to 60 men for fishing. Targeting tunas, they fish in deeper waters beyond 1000 m depth, approximately 90 to 140 km away from the shore along Cuddalore coast. Fishing days vary from 3 to 4 days.

4. Trawlers: Mechanized trawlers operated along the coast vary in their size and engine power. OAL of these crafts ranges between 14-25 m and engine power between 140-480 hp. Mostly, cod end mesh is 35 to 40 mm and in some areas it is as small as 20 mm. The total length of the net depends on the size of boat and engine power. The multiday trawlers from Chennai operate between off Kovalam in Chennai and off Nizamuddin in Andhra Pradesh at 20 to 25 nautical miles (nmi) away from the shore. The multiday trawlers from Cuddalore and Nagapattinam operate between off Chennai and off Nagapattinam in the Bay of Bengal in depth ranges from 50-200m depending on the availability and abundance of targeted fishes. The single day trawlers operate near the coast with those from Pamban operating in the Gulf of Mannar in southeast direction up to a distance of 60 nmi from the shore where the depth varies from 40–150 m. The mechanized trawlers operated from Palk Bay side go for fishing to a maximum depth of 16 m. The mechanized

Fig.1. A multiday gillnetter based at Thoothukudi (left) and Nagapattinam (Right)

trawlers from Thoothukudi operate between off Erwadi and off Kanyakumari, while those from Chinnamuttom and some from Colachel, mainly fish in the Wadge Bank area. In Chennai, Cuddalore, Nagapattinam and Colachel, both singe day and multiday trawling is practiced, Single day fishing is normally very near to the shore and large pelagic resources are not a significant component of these fish catches. The multiday fishing trip may vary from 3 to 20 days depending on the availability of the resources. In Tuticorin and Chinnamuttom, the trawlers are allowed to do one day fishing through token system and the boats have to leave the harbor by 5am and return by 9pm. In Rameswaram and Pamban also, trawling is permitted through token system and the fishing is allowed only three days in a week. The boats have to leave by morning and return the following morning.

Landings of large pelagics in Tamil Nadu during 2007 to 2019 ranged from 30,659 t in 2011 to 83,620 t in 2019 with an average of 45,330 t (Fig.2). While production remained almost steady till 2011 and increased to 46,344 t in 2012, subsequently catches fluctuated and reached the peak in 2019. The increase in the landing was mainly due to the increased contribution of barracudas, seerfishes and tunas. The average annual landings of different large pelagic resources showed that tuna was the major contributor (42%) with 19,115 t. The barracudas with 11,399 t constituted 25.2% followed by seerfishes (7,349 t) contributing 16.2%. The other groups were billfishes at 2563 t (6%), queenfishes 1,931 t (4.3%) and needlefishes at 1829 t (4%).

The outboard motor operated gillnets (OBGN) contributed major share (24.1%) of the LP landings followed by single day trawlers (MTN) with 22.8%. Mechanized gillnet (MGN-19%), multiday trawlers (MDTN -9.8%), Outboard hook and line (OBHL–8.9%), mechanized ringseine (MRS) and outboard

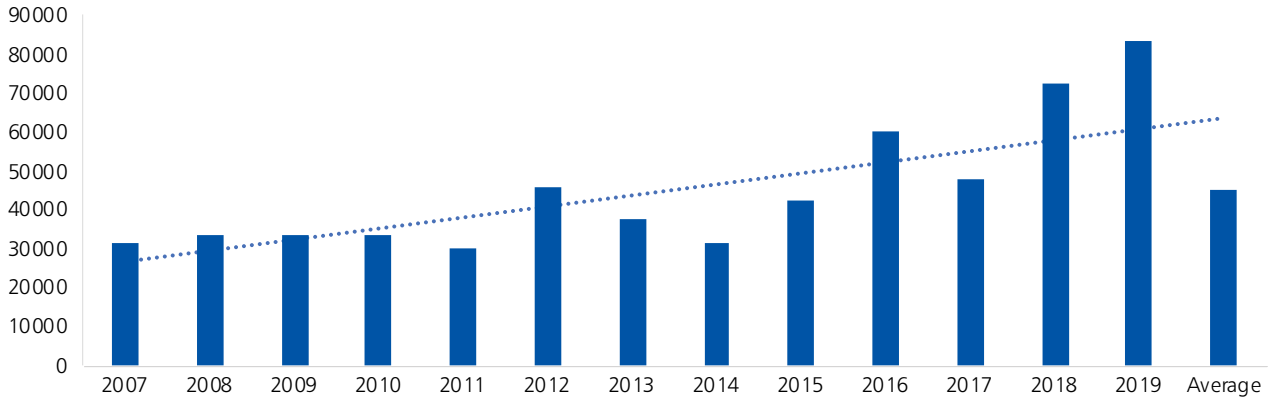

Fig.2. Annual landings (t) of large pelagics in Tamil Nadu (2007 -2019)

motor operated ringseine (OBRS) also contributed (Fig.3). In the case of barracudas and seerfish, major part of the catch during June to July-August was comprised of juveniles and were caught by trawlers. For tunas, billfishes and dolphinfish, MGN was the most important gear while other resources including seerfishes, mechanized trawlers dominated. LP fishery occurred throughout the year along the Tamil Nadu coast with two peaks noted during June-September (major) and January-March (minor) periods (Table 1).

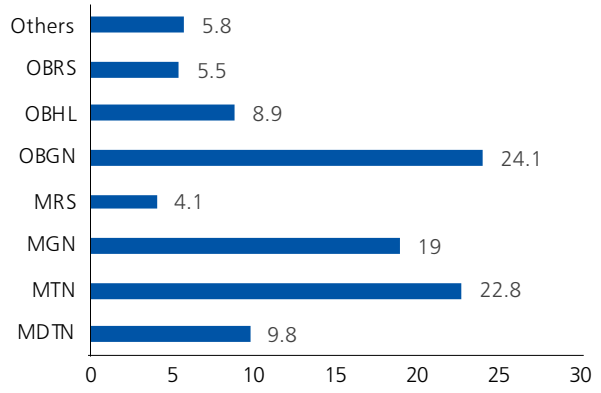

Fig.3. Average contribution (%) of large pelagic by different gears in Tamil Nadu

Fishery trends in Puducherry

The major landing centres are Puducherry and Karaikal Fisheries Harbours and fishing crafts and gears are similar to those deployed in Tamil Nadu. The LP landing during 2007 to 2019 ranged from 254 t in 2011 to 5,453 t in 2015 with an average of 2,515 t (Fig.4). Unlike Tamil Nadu, barracudas with a landing of 744 t are the highest contributor (30.4%) while other major contributors were seerfish 740 t (29.2%) and tunas 711 t (29%).

Table 1. Temporal dominance of different large pelagic resources in Tamil Nadu

Resource	% of catch	Months
Barracudas	73	June-November
Billfishes	75.1	March-April & July-September
Cobia	36.8	February, September & October
Dolphinfish	57.7	February-March & June-August
Needlefish	62.4	June-August & October-December
Queen fish	66.9	June-November
Seerfish	62.9	July-November
Tunas	68.5	March & June-September

The major gears contributing to LP landings were MDTN (52.6%), MGN (20.7%) and OBGN (10.7%) while MTN, OBH and OBRS contributed around 5% each (Fig.5). The MGN was the most important gear contributing to tunas, billfishes, dolphinfish and cobia landings while barracudas, queen fish and seerfish were mainly landed by mechanized trawlers. More than 95% of the needlefish landings were contributed by OBGN. The LP fishery occurred throughout the year. Two peak seasons occurred in the landing with the major one during June-September and minor during November or December.

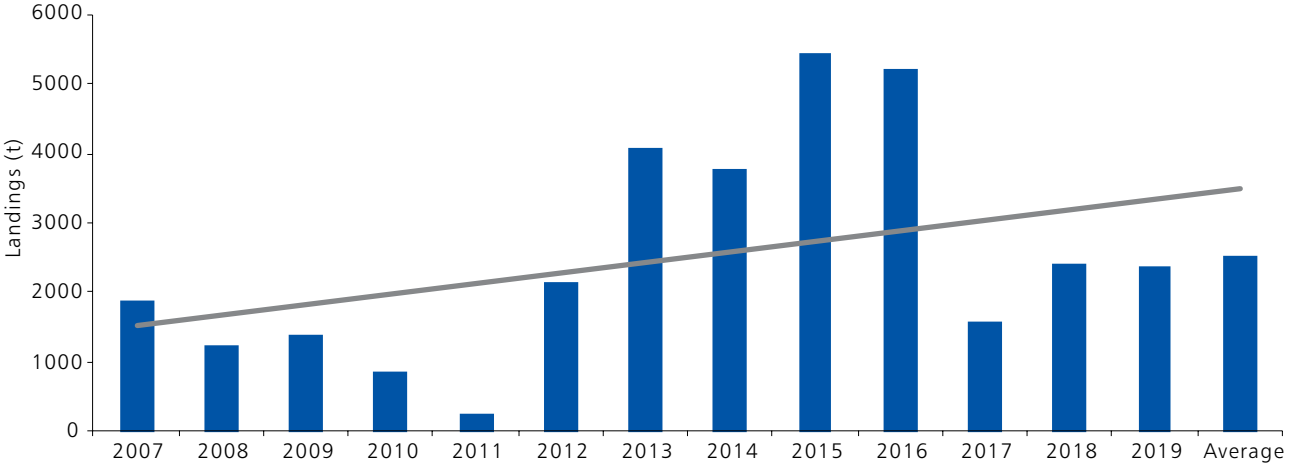

Fig.4. Annual landings (t) of large pelagics in Puducherry

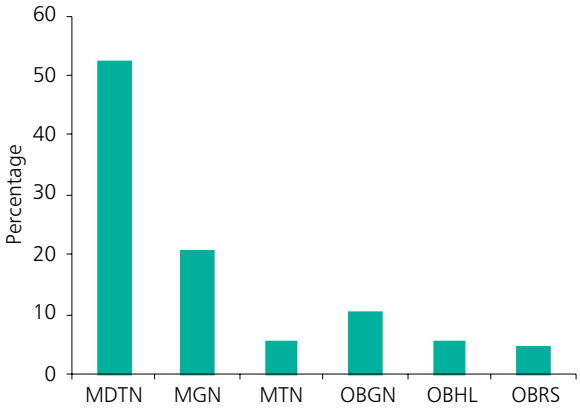

Fig.5. Average gearwise contribution to landing of large pelagics in Puducherry

Species composition in the tuna fishery indicated eight species, of which five species support regular fishery. *Euthynnus affinis* was the most dominant one forming 37.5% followed by *Thunnus albacares* (28.4%), *Katsuwonus pelamis* (24.7%) and *Auxis* spp. (7.5%). Occurrence of *Sarda orientalis, Gymnosarda unicolor* and *Thunnus tonggol* were very much seasonal. The fishery for barracudas comprised *Sphyraena barracuda, S.putnamae, S.obtusata, S.forsteri* and *S.jello*. *S.putnamae* was the dominant species (44.6%) followed by *S.barracuda* (30.5%), *S.obtusata* (24.4%) and *S.forsteri* (0.6%). *S.obtusata* and *S.forsteri* were mainly landed by trawl during June to September and were dominated by juveniles. Seerfish landings comprised of *Scomberomorous commerson, S.guttatus, S.lineolatus and Acanthocybium solandri.* While *S.guttatus* was mainly landed in trawl net, *A.solandri* was mainly landed by hook and line and drift gillnet operated in deeper areas. Queen fishes comprised *Scomberoides commersonianus, S.lysan, S.tol* and *S.tala*. Larger fishes were landed by hook and line and drift gillnets while juveniles were landed by trawlers and gill nets. Rainbow runner (*Elagatis bipinnulata)* was mainly landed by large meshed drift gillnets and hooks and lines targeting tunas and billfishes. Cobia (*Rachycentron canadum*) comprising mostly juveniles were landed in multiday trawlers and larger ones by hook and line. Dolphinfishes such as *Coryphaena hippurus* and *C.equiselis* were landed with the latter species only occasionally and in few numbers. The adults were landed mainly by drift gillnets and hook and lines. Among billfishes, *Istiophorus platypterus*, *Istiompax indica* and *Xiphius gladius* constituted the regular fishery by multiday deep sea gillnetters and long liners. *Makaira mazara, Kajikia audax* and *Tetrapterus anguistirostris* were also landed occasionally in small numbers (Table 2). Generally juveniles of *I.platypterus* and *X.gladius w*ere landed during June-September in surface gillnets (Fig.6).

By-catch in targeted large pelagic fishery varied with the type of gear, area of operation and season. The by-catch in major gears targeting large pelagics such as drift gillnets and hooks and lines were mainly mobulid rays, sharks, carangids etc. The ray *Mobula japonica,* different species of sharks including *Alopias* spp. with no regularity in landing or dominance of any particular species and carangids comprised of trevallies like *Caranx ignobilis, C.heberi, C.sexfasciatus, C.tille* and *C.melampygus* were recorded. In addition to these, other resources like catfish, milkfish (*Chanos chanos*), ten pounder (*Elops machnata*), Indo-Pacific tarpon (*Megalops cyprinoides*), Escolar (*Lepidocybium*

Table 2. Temporal dominance of different large pelagic resources in Puducherry

Resource	Average% of catch in LP	Dominant months
Barracudas	33.2	July, August & December
Billfishes	2.6	July-September
Cobia	0.6	August-September
Dolphinfish	2.9	January, May-July & December
Needlefish	0.5	July & December
Queenfish	3	August-September
Seerfishes	29.2	July-August & November
Tunas	28.0	January, June-August

Fig.6. Sword fish catch by a multiday gillnet unit landed in Nagapattinam

flavobrunneum), Triple tail (*Lobotes surinamensis*) also landed as by-catch in small quantities especially when the gear was operated in coastal grounds targetting seerfish.

The catch utilization depended on the species and the market demand. Seerfish being a highly sought after fish the landing centre price itself is very high. Barracudas are also in great demand in Tamil Nadu and hence sold in fresh condition within the state. Other resources like dolphinfish, needle fish, cobia etc are also sold locally after purchase by local merchants or from neighboring districts or state through public auction. In the case of tunas and billfishes, demand from domestic market within Tamil Nadu is almost absent. Hence catches are mainly taken by processing industries within the state itself and exported mainly as frozen loins, to countries like Tunisia, Middle East etc. Major share of these landings are bought by merchants either from Kerala or from Tamil Nadu and sent to Kerala for domestic market or export units. Of late, some big hotels in Chennai have shown interest in sword fish. Fishes which are landed in poor condition are sold locally to merchants engaged in dry fish business. The price of seerfish varied from ₹200 to 800 per kg depending on the freshness and size of the fish. Larger fishes especially those which weighed over five kilogram fetched very high price of ₹700-800 per kg at landing centre itself. The landing centre price for skipjack varied from ₹50 to 60 per kg and that of yellow fin tuna from ₹90 to 100. The landing centre price for billfishes ranged from ₹90 to 140 per kg. The price for dolphinfish, queenfishes and needlefish ranged from ₹40 to 60 per kg.

Future prospects

The multiday drift gill-netters from Nagapattinam and Chennai have extended their fishing ground beyond the traditional grounds. The drift gillnetters from Tharuvaikulam, Thoothukudi have increased the size of their boat and gear including fish hold capacity to 20 t since late 2016 aiming at extension of fishing ground and increasing the number of fishing days in a fishing trip. Recently, the deep sea multiday gillnetters from Chennai and Tharuvaikulam have introduced fishing net tracking buoys to enable a hassle free fishing. This installation also helps the fishermen to divide the net into two or more each consisting of 30 pieces instead as a single net consisting of 60 pieces. The IOTC (Indian Ocean Tuna Commission) has prohibited the use of large drift nets (gillnets that are more than 2.5 km in length) in the high seas. Multi-day ring seiners have already been introduced from 2018 in Cuddalore, to exploit oceanic tunas. In order to diversify the fishing from inshore to offshore waters, Tamil Nadu government introduced a scheme for the procurement of new long liner cum gillnetters during 2010-2011 period as part of phasing out of trawling in Palk Bay. With the assistance of the Government of India, Tamil Nadu has already initiated a scheme for the trawl owners of Palk Bay to purchase new long liners/drift gillnetters for exploiting oceanic tunas and billfishes. Fishing boats constructed under this scheme are in operation from Nagapattinam and Kochi (Kerala state) as a temporary arrangement. Construction of new harhours identified for berthing these in Gulf of Mannar is in progress. Construction of a dedicated landing centre for the multiday tuna drift gillnetters/long liners is also in progress near Chennai Fisheries Harbour. These developments have the prospects of augmenting the large pelagic landing, especially tunas and billfishes of the state in the coming years.

Issues in the LP fishery development are also flagged. In the existing and newly introduced fishing fleets, use of ice remains the mode of preservation of catch. In multiday drift gillnetting, this often results in the deterioration of the quality of the tunas and billfishes caught and stored, especially those which are caught in the first few days of the fishing trip. These fishes command very low prices resulting in considerable economic loss to the fishermen. Hence, better preservation techniques should be adopted in the boats. At present, the marketing avenues are very much limited which acts as a major impediment in the expansion of LP fishery. Yellow fin tunas above 7 or 8 kg are rarely caught in drift gillnet and the government is advocating the use of longlines to target large sized yellow fin tuna. There is lukewarm response to this proposal from the fishermen who perceive it as economically unviable. So dedicated efforts to motivate fishermen to exploit larger yellowfin tunas combined with use of proper preservation techniques is needed. The State Government's move to restrict the size of the craft, engine power and size of the gear may curtail the capability of fishing vessels to venture for long duration distant water fishing for large pelagic resources like oceanic tunas and billfishes and thus affect LP production.