Status of large pelagic fishery in Karnataka

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Abstract

Tunas, seerfishes, barracudas, queenfishes and fullbeaks are the major large pelagic fishes landed along Karnataka Coast, while, landings of cobia, dolphinfish, billfishes and rainbow runner are limited. The fishery trends, crafts and gears operated to tap large pelagics, seasonal pattern of landings, species composition and post- harvest utilization and market chains in Karnataka is detailed.

***Keywords**: Large pelagic fish, Karnataka, fishery trends, post-harvest*

Introduction

Large pelagic fishes (LPF) comprising of several genera and species have a wide ranging distribution and their high market value usually make them a targeted species during fishing. Information on the fishery biology and population status of most large pelagic fishes is limited. Detailed studies on fishery, taxonomy and biology of billfishes, barracudas, queenfishes, fullbeaks, cobia and dolphinfish was taken up to aid in proposing measures for management of these fisheries.

Fishery trends

The estimated landings of LPF in Karnataka over the decade varied from 16,200 t in 2007 to 71,451 t in 2016 and it contributed 9.3% to 30.5% of total LPF landings of the country during the respective years (Fig. 1). Large scale adoption of big meshed purse seine net (mesh size of > 45 mm) locally called as *Kotibale* and light fishing beyond 12 nm on a regular basis could be the reasons for the increased landings of LPF in Karnataka during 2015-17 but later the catch

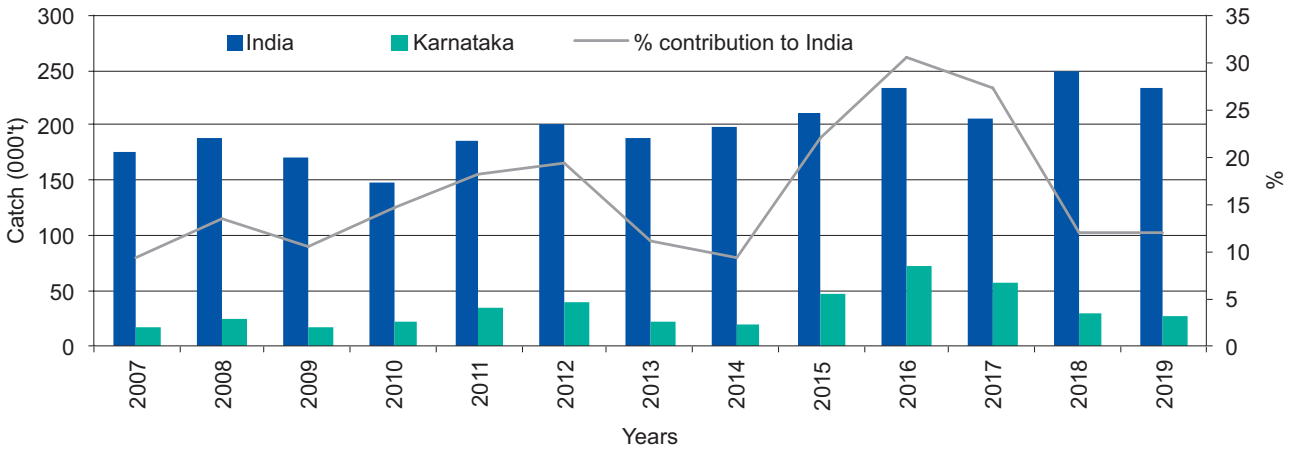

Fig. 1. Large Pelagic fish landings in India and Karnataka

Table 1. Mean landings (%) of large pelagic fishes from different gears during 2007-19

Gears	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Seerfish													
Trawl	35.7	11.2	11.9	65.7	25.7	29.4	36.2	68.4	61.6	71.8	46.4	51.0	52.0
Purse seine	3.2	30.4	45.2	11.5	5.2	27.0	12.6	11.8	16.0	19.2	38.3	37.0	42.0
Gillnet	58.9	57.9	41.5	22.5	68.8	42.6	49.1	18.2	21.3	7.6	15.2	9.0	4.1
Others	2.3	0.6	1.5	0.4	0.4	0.9	2.2	1.7	1.1	1.4	0.1	3.0	1.9
Tunas													
Trawl	0.6	0.4	1.3	0.1	0.6	0.0	0.7	3.7	5.0	8.0	8.0	0.3	7.9
Purse seine	35.2	75.7	65.0	72.3	90.2	67.9	63.4	85.6	86.9	87.5	83.6	90.0	83.6
Gillnet	64.2	23.2	33.7	26.6	9.3	25.0	19.2	8.1	7.9	4.3	8.4	8.0	8.4
Others	0.1	0.7	0.0	1.0	0.0	7.1	16.7	2.6	0.2	0.1	0.0	1.7	0.1
Billfish													
Trawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	80.7	69.7	10.3	35.0	0.0	43.0
Purse seine	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	13.0	4.0	1.0
Gillnet	100	98.7	100	61.9	100	91.7	100	19.3	25.2	84.1	51.5	76.0	41.0
Others	0.0	0.0	0.0	38.1	0.0	8.3	0.0	0.0	5.2	0.0	0.5	20.0	15.0
Barracudas													
Trawl	88.6	86.2	84.1	94.5	90.5	95.5	92.1	96.0	97.3	90.2	90.7	60.5	96.6
Purse seine	2.7	3.9	7.6	2.0	0.1	1.5	0.5	2.0	0.8	9.0	8.4	5.0	3.2
Gillnet	7.2	7.6	4.7	1.6	1.8	2.3	3.7	1.4	1.3	0.6	0.7	0.5	0.0
Others	1.5	2.3	3.4	2.0	7.6	0.7	3.8	0.5	0.5	0.2	0.1	26.0	0.20
Queenfish													
Trawl	27.8	11.3	36.3	30.5	80.7	59.5	53.5	88.9	84.0	78.0	68.2	79.0	73.7
Purse seine	48.3	70.0	56.3	68.8	13.7	21.1	40.7	9.5	8.7	15.6	31.7	20.9	25.0
Gillnet	23.8	16.0	3.7	0.7	5.5	16.0	3.8	1.3	4.5	4.6	0.1	0.1	1.7
Others	0.0	2.6	3.7	0.1	0.0	3.5	1.9	0.2	2.7	1.7	0.0	0.0	0.0
Fullbeaks													
Trawl	3.3	1.8	3.4	11.5	56.4	16.1	73.1	83.1	50.8	40.7	69.5	37.0	69.9
Purse seine	10.9	18.3	12.2	20.6	20.6	38.3	5.4	9.4	34.4	54.1	28.1	59.0	28.0
Gillnet	85.8	76.4	84.0	67.3	21.8	24.1	20.9	7.0	9.1	2.8	2.3	3.0	1.8
Others	0.0	3.5	0.3	0.7	1.1	21.5	0.6	0.5	5.7	2.3	0.1	1.0	0.3
Cobia													
Trawl	56.9	17.7	42.7	71.5	72.3	73.6	61.9	76.6	87.4	80.4	91.7	84.0	83.5
Purse seine	0.0	0.0	0.2	4.2	0.6	0.0	2.1	15.1	2.7	6.6	0.1	2.0	2.0
Gillnet	42.0	82.2	54.0	24.1	27.1	22.9	35.7	7.8	9.8	11.3	8.1	10.0	14.1
Others	1.2	0.1	3.2	0.2	0.0	3.5	0.4	0.4	0.1	1.7	0.0	4.0	0.3
Dolphinfish													
Trawl	21.0	2.0	2.9	50.0	27.6	42.7	34.5	26.4	53.2	43.6	77.5	27.0	54.7
Purse seine	0.0	1.9	2.1	1.7	8.4	0.2	20.1	15.3	9.6	35.4	10.9	25.0	13.6
Gillnet	78.7	96.1	95.1	47.7	64.0	56.4	45.5	46.5	37.0	20.0	11.5	33.0	26.5
Others	0.2	0.0	0.0	0.7	0.0	0.8	0.0	11.8	0.1	1.0	0.0	15.0	5.2
Rainbow runner													
Trawl	-	96.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Purse seine	-	0.0	100.0	41.4	0.0	0.0	0.0	100	0.0	93.2	0.0	100.0	100.0
Gillnet	-	3.9	0.0	12.6	100.0	100.0	0.0	0.0	100.0	6.8	100.0	0.0	0.0
Others	-	0.0	0.0	46.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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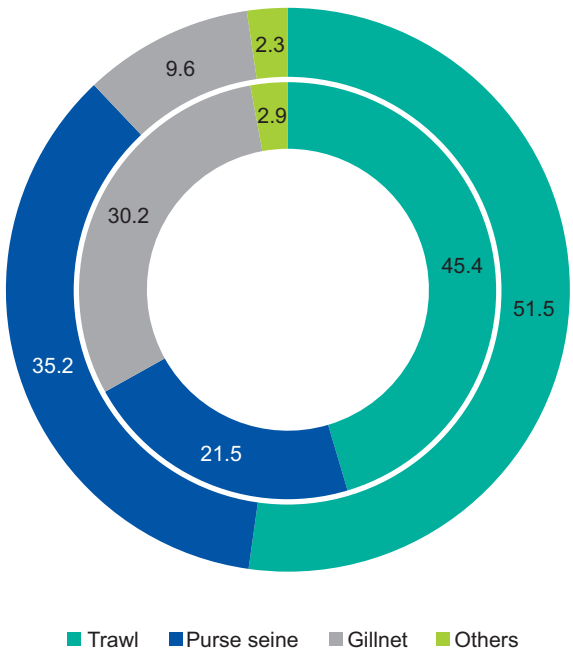

Fig. 2 Comparison of Large pelagic landings from different gears during 2007-2012 (Phase-I, Inner circle) and 2013-2019 (Phase-II, Outer circle) in Karnataka

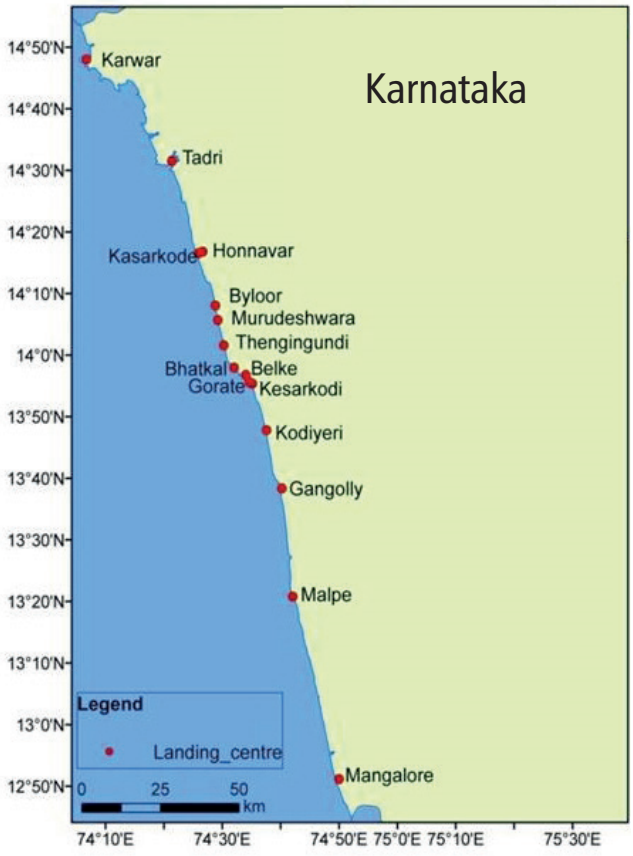

Fig. 3. Major and minor landing centers for large pelagic fishes in Karnataka

was reduced due to the ban imposed on light based fishing in the state.

Gears operated from multiday fishing vessels such as trawlers (MDT), purse seiners (MPS) and gillnetters (MGN) operate beyond the 12 nautical miles or territorial waters, at depths ranging from 40 to 250 m. The landings since 2007 reveal trawl net as the major gear, except during 2008, 2016 and 2017 when the large meshed purse seines emerged as the dominant gear landing LPF (Table 1). The gearwise average landings from 2007 to 2012 (phase I) and 2013 to 2019 (phase II) indicated that the landings by trawlers increased from 45.4% in phase I to 51.5% during phase II. The landings of LPF by purse seines increased from 21.5% to 35.2% during Phase I and Phase II respectively. However, the gillnet landings reduced to 9.6% during Phase II from 30.2% in Phase I. The contribution of ring seines and other indigenous gears did not exhibit much variation between the two phases (Fig.2). The increased landings from trawl net during the second phase could be due to the operation of pelagic trawls and speed engines for the exploitation of LPF. Similarly, the increased landings of LPF from purse seine were mainly because of the operation of big meshed *Kotibale* and exploitation by attracting the fishes using lights.

Seasonal pattern of landings indicated a maximum (49.6%) during the post-monsoon period of September-December followed by pre-monsoon period of January-May (40.5%) and monsoon period of June-August (9.9%). Post-monsoon period was the major fishing season for seerfish (43.7%), tunas (52.9%), billfish (39.5), barracudas (51.5%) and queen fishes (55%). However, the landings of fullbeaks (51.8%) and cobia (40.5%) were maximum during pre-monsoon season (Table 2). The annual species composition of large pelagic fish landings are indicated in Table 3.

Landing Centres

The multiple crafts engaged in catching the LPF landed them at both major and minor landing centres (Fig. 3 & Table 4). However, as most LPF are valued high both in the domestic and export market, fish brought in considerable quantity to minor landing centers are transported by road to the major landing centers (Mangalore, Malpe, Bhatkal, Tadri, Honnavar and Karwar) in Karnataka where adequate transportation, icing facilities and several marketing agents are present thus ensuring competitive price to the fishers. However, as LPFs (seerfish, neritic tunas and barracudas) have good demand in the domestic market,

Table 2. Mean monthly landings (%) of large pelagic fishes (2013- 2019)

Fish species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Seerfish	8.5	9.7	9.2	8.7	7.1	0.7	0.5	11.9	14.6	11.3	6.9	10.9
Tuna	12.3	2.2	4.4	13.3	6.4	0	0.4	8.1	24.9	12.2	3.4	12.4
Billfish	0.5	3.7	6.3	20.4	6.2	0.1	3.1	20.2	27.3	6.5	1.7	4.0
Barracuda	7.5	9.6	7.8	7.7	10.5	0.2	2.1	3.1	17.7	12.9	10.3	10.6
Queenfish	3.9	10.4	6.8	7.5	8.7	0	0	7.7	17.8	9.6	14.2	13.4
Fullbeaks	4.2	11.3	14.6	12.6	13.3	1.7	7	5.9	14.7	2.8	5.8	6.1
Cobia	8.3	9.4	7.9	11.8	11.4	0.4	0.1	3.8	13.5	11.6	10.5	11.3
Dolphinfish	2.8	5.6	5.3	5.7	5.5	0	0.3	7.6	26.9	22.6	9.5	8.2

Table 3. Species composition of large pelagic fishes and their % contribution

Fish species	2013	2014	2015	2016	2017	2018	2019
Seerfish							
S. commerson	91.8	94.1	98.4	93.9	98	91.2	82.5
S. guttatus	8.2	5.9	1.6	6.1	1.9	8.7	17.4
A. solandri	0.001	0.002	0.013	0.002	0.019	0.1	0.1
Tuna							
A. rochei	10.4	3.7	0.1	3.9	5.4	17.2	13.7
A. thazard	15	4.2	3.1	19.8	9.1	13	4.1
E. affinis	73.3	85.5	88.4	74	80.8	66.9	74.6
K. pelamis	0.2	0.1	0.3	0.1	0.5	1	1.9
S. orientails	0.1	0	0.1	0.8	0.6	0.5	1.2
T. albacares	0.2	2	0.2	0.1	2.2	0.2	0.2
T. tonggol	0.8	5.5	7.8	1.2	1.4	1.2	4.2
Billfishes							
I. platypterus	63.1	81.9	57.4	93.1	93.1	73.8	26.2
I. indica	36.9	18.1	42.6	6.9	6.9	80	20
Barracudas							
S. barracuda	31.5	28.6	36.9	17.4	21.6	11.4	5.4
S. arabianensis	0.0	0.0	0.0	9.4	8.2	1.8	7.5
S. obtusata	38.7	35.7	22.5	28.4	28.6	26.5	12.5
S. putnamae	16.5	19.1	19.3	25.9	28.7	46.5	59.8
S. jello	13.3	16.6	21.3	18.9	12.9	13.8	12.7
Queenfishes							
S. commersonianus	65.7	53.1	45.1	34.3	51.7	54.3	36.4
S. tol	17.9	44.2	48.2	50.1	43.8	36.2	57.6
S.tala	16.4	2.7	6.4	15.6	3.2	9.3	3.5
S. lysan	0.0	0.01	0.4	0.1	1.3	0.2	2.4
Fullbeaks							
A. hians	26.2	10.1	39.6	23.6	32	38.8	39.0
T. crocodilus	70.9	88	57.3	75.6	59.4	49.4	60.0
S. strongylura	2.0	1.9	3.1	0.8	8.6	9.8	1.0

Table 4. Landing centres, types of boats operated and landings of large pelagic fishes

Landing centre	Boats operated	Common name	Scientific name
Mangalore, Malpe and Karwar	SDF, MDF, Purse seines, Multiday gillnet, outboard gillnet and other indigenous gears	Seerfishes	*Scomberomorus commerson* *S. guttatus* and *Acanthocybium solandri*
		Tunas	*Euthynnus affinis, Auxis thazard, A. rochei, Thunnus albacares* and *Katsuwonus pelamis*
		Billfishes	*Istiophorus platypterus* and *Istiompax indica*
		Barracudas	*Sphyraena obtusata, S. putnamae, S. jello, S. barracuda, S. arabiensis, S. fosteri* and *S. flavicauda*
		Queenfishes	*Scomberoides tol, S. tala, S. lysan* and *S. commersonianus*
		Fullbeaks	*Ablennes hians, Strongylura strongylura, Strongylura leiura* and *Tylosurus crocodilus*
		Cobia	*Rachycentron canadum*
		Dolphinfish/Mahimahi	*Coryphaena hippurus*
		Rainbow runner	*Elagatis bipinnulata*
Gangolly, Kodiyeri, Kesarkodi, Gorate, Belake, Bhatkal, Thenginagundi Murudeshwara, Byloor, Honnavar, Kasarkode, Tadri	SDF, Out board Gillnet and other indigenous gears	Seerfishes	*Scomberomorus commerson* and *S. guttatus*
		Tunas	*Euthynnus affinis, Auxis thazard* and *A. rochei*
		Barracudas	*Sphyraena obtusata* and *S. putnamae*
		Cobia	*Rachycentron canadum*
		Dolphinfish/Mahimahi	*Coryphaena hippurus*

even when landed in small quantity by outboard gillnet and ring seines, are sold at minor landing centers itself.

Post-harvest

The study conducted on utilization pattern of seerfish landed in Karnataka revealed that 35% goes for the local consumption in fresh condition, 45% are processed for export and 20% are purchased by interstate traders and transported to neighbouring states of Kerala and Goa. Consumer preference for tunas is comparatively low in Karnataka and only 5% of the total tuna landed was utilized for local consumption while 85% was taken by interstate traders. The remaining catch was utilized by processing (9%) and canning plants (1%) respectively. More than 95% of the billfish landed are taken by the interstate traders especially from Kerala and only 5% is taken up by local hotels and restaurants. The market linkage of barracudas is minimal as transactions takes place directly between boat owners, auctioneers, local markets and interstate traders. *S. obtusata*, the smallest fish in the group is utilized for local consumption when landed in good quality and very small and partially spoilt fishes are taken by fish meal plants. As there is very good demand for barracudas in Kerala and Goa, major portion (80-85%) goes to these states through interstate traders and the rest goes to local markets. The preference of queenfishes for domestic consumption is comparatively low and preference is only for *S. commersonianus.* Therefore, 90% of the landings are taken by interstate traders especially from Kerala. There is very good local demand for fullbeaks and 35-40% goes for the local consumption and rest to other states through interstate traders. Cobia has good demand locally and nearly 90% of the landings were used for local consumption and rest marketed to other states. There is not much demand for the dolphinfish in Karnataka and nearly 90% is taken to Kerala by the interstate traders.

Facilities for onboard handling of LPF are minimal in single day fishing crafts (SDF), such as purse seiners, ring seiners, gillnetters and other small indigenous gears. The fish caught are placed on the deck and brought back to the landing centre. The multiday crafts such as trawlers (MDTN), purse seines (MPS) and gillnet (MGN) have fish holds with a capacity ranging from 15 to 20 t where the fish caught is preserved in ice. Onboard handling is thus limited to just preserving the fish with ice till it is landed. Creating awareness and training fishermen to adopt better post-harvest onboard handling procedures would ensure better quality and also fetch higher remuneration for the LPF catch in Karnataka.