Status of marine fisheries of Kerala

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Introduction

Kerala with a coastline of 590 km is a significant contributor to the total marine fish landings of the country. A picture of the marine fisheries sector in Kerala during the years 2005 and 2010 is presented below (Table 1). With a continental shelf of about 40,000 km^2 marine fisheries plays a vital role in the livelihood of the people.

Table 1. Comparision of Marine Fisheries Census data for 2005 and 2010

	2005	2010
Marine fishing villages	222	222
Marine fish landing centres	178	187
Fishermen families	120486	118937
Total fisher population	602234	610165

Male	304308	220602
Female	297926	215820
Female to male ratio (for 1000 males)	979	966
Average Family size	5	5
Active fishermen	140222	145396
Full-time fishermen	124103	130922
Part-time fishermen	10488	10582

Craft and gear

Of the 21781 craft in the fishery of Kerala, 4722 are in the mechanised sector, 11175 in the motorised sector and 5884 in the non mechanised sector. Of the 4722 units in the mechanised sector, maximum number of units in operation are in Ernakulam district followed by Kozhikode (Table 2). This factor therefore plays a major role in the districtwise contribution to the landings.

Table 2. Details of district-wise mechanised vessels

District	Trawlers	Gill netters	Ring seiners	Liners	Purse-seiners	Total
Kollam	950	5	35	3	0	993
Alappuzha	30	0	8	0	0	38
Ernakulam	1020	403	90	15	60	1588
Thrissur	130	0	65	0	0	195
Malappuram	200	2	150	1	0	353
Kozhikode	950	0	110	5	0	1065
Kannur	237	50	33	5	0	325
Kasargod	161	0	4	0	0	165
Total	**3678**	**460**	**495**	**29**	**60**	**4722**

(Source: Census Report 2010)

Fish Production in 2014

The marine fish landings in Kerala during 2014 was estimated at 5.76 lakh tonnes (t) registering a decline of about 95,000 t (15%) from 6.71 lakh t landed during 2013. An analysis of the period 2002-2014, shows that the fishery was more or less stable during the period 2002 - 2010. In 2012, fishery showed a quantum jump which was mainly due to the very high oil sardine landings in the state. However the landings could not be sustained and the decrease in 2013 continued in 2014 also. Landings of all major demersal and pelagic resources declined in 2014.

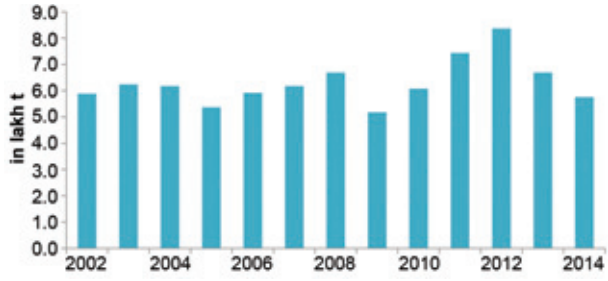

Fig. 1. Marine fish landings in Kerala during 2002 - 2014

Resource profile

The pelagic finfishes constituted 68%, demersal fishes 15%, crustaceans 9% and molluscs 8% of the total landings during 2014. The reduction in oil sardine landings caused the reduction in the pelagic finfish production to 3.91 lakh t in 2014 from 4.9 lakh t in 2013. The landings of the demersal resources also witnessed a decline which can be attributed to the reduction of about 18000 t in the landings of threadfin breams. An upward trend was noticed in the landings of crustacean resources, with an increase of about 9600 t in the landings of penaeid prawns. The contribution by molluscan resources showed an increase of about 6000 t, mainly due to the increase in squid landings in 2014.

Among the commercially important resources, fishery of oil sardine showed a decrease of about 92,000 t. Indian mackerel, penaeid prawns, cephalapods, tunas, soles etc. recorded increase in landings while threadfin breams, ribbonfishes, whitebaits, seerfishes, pomfrets and barracudas recorded a decrease in the landings during 2014.

Sectorwise contribution

Mechanised sector contributed 61% of the landings in 2014 which was about 1.23 lakh t less compared to the previous year. In the mechanized sector, the bulk of the landings were by trawlers, purse seines and ring seines. Ring seiners and gillnetters were the major contributors in the motorised sector. The proportion of landings in motorised sector increased to 38% in 2014. Non-motorised sector contributed only 1%.

The major gears which contributed to the landings in Kerala were trawl nets, seine nets and gill nets. Multi-day trawl landings accounted for 2.16 lakh t during 2014 with the catch per hour (CPH) being 49 kg which has decreased noticeably during 2014. The major resources caught in trawl net were threadfin breams, penaeid prawns, cephalopods, lizard fishes and ribbon fishes. Ring seine units operated in both mechanised and motorised sectors. Oil sardine and mackerel were the major contributors in the mechanised sectors. The unit operations of the mechanised ring seines declined by 50 %.

Table 4. Catch and Catch rates (CPUE or CPH) of major gears operated during 2014

Gear	Catch	CPUE	CPH
Multiday trawlnet (MDTN)	216054	1866	49
Mechanised gillnet (MGN)	1231	1689	22
Mechanised hook & line (MHL)	948	1877	11
Mechanised others (MOTHS)	32653	3585	30
Mechanised purse seine (MPS)	4039	4252	1904
Mechanised ring seine (MRS)	73033	2223	828
Mechanised trawl net (MTN)	20033	223	31
Outboard boat seine (OBBS)	7592	165	70
Outboard gillnet (OBGN)	35206	78	20
Outboard hook & line (OBHL)	11000	83	22
Outboard ring seine (OBRS)	162235	1083	515
Outboard trawl net (OBTN)	1881	65	19
Outboard others (OBOTHS)	1849	795	22
Non-mechanised (NM)	7891	27	13

Pelagic resources

Total pelagic fish landing during the year 2014 was 380043 tonnes which formed 66% of the total marine fish landing in Kerala. Pelagic fishery was supported mainly by sardines, anchovies, other clupeids, mackerel, carangids, ribbonfishes, seerfishes, tunas, billfishes, barracudas etc. Clupeids including oil sardine contributed 57.4 % of the pelagic fish catch. Other dominant resources were mackerel (13.7%), carangids (14.4%) and ribbonfish (6.8%). Landings of pelagic resources showed an increase from 2009 to 2012, but declined

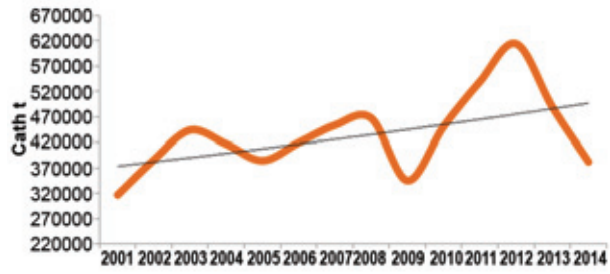

Fig. 2. Total pelagic fish landings (t) along Kerala coast during 2001 - 2014

thereafter. Contribution of pelagic resources to the total marine fish production during 2001-2014 varied between 61.7 and 74. 2%. Fishery occurred almost round the year with peak during September - October period.

Demersal Resources

The total demersal fish landings in Kerala in 2014 registered a decline of 14% compared to 2013. It was constituted by over 19 groups of which the dominant groups were threadfin breams, lizard fishes and elasmobranchs. Sharks, rays, groupers and snappers showed increase in the landings.

Elasmobranchs: An estimated 7054 t of elasmobranchs was landed during 2014 forming 1.2% of total marine fish landings and 8.6 % of demersal landings of the state. Sharks contributed 61% of the elasmobranch landings, followed by rays (36%) and guitar fishes (3%). More than 30 species were observed in the shark landings by Mechanised Driftnet Hook and Line (MDNHL) at Kochi. The major share was contributed *by Carcharhinus falciformis* (35%), *C. longimanus* (12%), *Sphyrna lewini* (8%), *Alopias pelagicus* (9%), *A. superciliosus* (5%), *Galeocerdo cuvier (*6%), *Isurus oxyrinchus* (7%), and *Triaenodon obesus* (6%). Landings of deep water species have showed an increase during the last few years. Among rays landed during 2014, *Mobula japanica* was the dominant species (54 %) followed by *Himantura fai*, *Taeniura meyeni*, *Pteroplatytrygon violacea, Mobula tarapacana, Dasyatis microps, Rhinoptera javanica* and *Aetomylaeus vespertilio*. *Mobula japanica* is completely utilised as its tail, liver are collected

and sent to Thoothukudi in Tamil Nadu for fishmeal preparation. Gill filaments locally called 'flower' fetched high price especially those of *Mobula tarapacana* called 'white' and *Manta birostris* known as 'black'.

Threadfin breams: An estimated 23585 t of threadfin breams were landed mainly by trawls forming 4.1 % of total marine fish landings of Kerala. Landings declined by 43.82 % compared to that of 2013. Fishery was mainly constituted by two species. *Nemipterus japonicus* (53%) and *Nemipterus randalli* (47%).

Groupers: Groupers which contributed to 3.39% of the total demersal landings increased by 34.1% compared to 2013. *Epinephelus diacanthus* was the dominant species in the trawler landings as well as in hooks and lines. Contribution of *Variola louti, Epinephelus longispinis, E.areolatus, E.flavocaeruleus, Cephalopholis miniata* to the commercial landings increased during 2014 compared to the previous years.

Snappers: Eleven species of snappers in six genera contribute to the commercial fishery in Kerala. The dominant species were *Lutjanus bohar* (34 %), *Pristipomoides typus* and *Lutjanus gibbus*. Landings of *L. bohar* increased considerably during 2014. The other species in the commercial fishery were *Pristipomoides multidens*, *P. filamentosus*, *Aphareus rutilans, A.virescens, Lutjanus kasmira*, *L. lutjanus*, *L. bengalensis* and *L. rivulatus*.

Flatfishes: An estimated 12,318 t of flatfish was landed in 2014 and formed 15.17% of the total demersal landings. *Cynoglossus macrostomus* (78.4 %) was the most important species in the fishery followed by *C. macrolepidotus* and *C. bilineatus*.

Sciaenids: An estimated 5619 t was landed in during 2014 which formed 6.9% of the demersal landings and landings showed a decline of 5.67% over 2013. Along the Malabar coast they were exploited by trawls, gillnets and ringseines. *J.sina* was the dominant species (50%) found in all the gears followed by *Otolithes ruber*, *O. cuvieri*, *Johnius belangeri* and *Nibea soldado* . Off Cochin *Otolithes ruber* was the dominant species found in all the gears. Other important species in the fishery here were *Johnius glaucus*, *O. cuvieri*, *Johnius belangerii*, *Nibea soldado* and *J. macropterus*.

Lizard Fishes: The lizard fish landings increased by 35% compared to the previous year. They were mainly exploited by trawls (96%). Fishery occurred throughout the year with peak landings in the post monsoon months of August to October. Four species were recorded of which *Saurida tumbil* dominated (60%) followed by *S. undosquamis* (34%), *Trachinocephalus myops* (4%) and *Synodus variegatus (*2%).

Priacanthids: Priacanthid landings increased by 21% compared to 2013. *Priacanthus hamrur* (87%) and *Cookeolus japonicus* (13%) were the species landed.

Crustacean resources

An estimated 45,500 t of shrimps comprising of 39499 t of penaeid and 6001 t of non-penaeid shrimps was landed in Kerala during 2014. The increase in the landings of *Parapenaeopsis stylifera* was 47%. Rapid stock analysis of penaeid shrimp landings for the period 1998 to 2014 of Kerala revealed that they are in the 'Abundant' category.

During 2014, the estimated 3561 t of marine crabs landed in Kerala recorded an increase of 44% from 2013. Multiday trawlers accounted 68.9% of the catch. Among crabs landed, *Charybdis feriatus* dominated the landings followed by *Portunus sanguinolentus*, *C. lucifera* and *P. pelagicus*. Lobsters like *Panulirus homarus* in the fishery had a size range of 113 -118 mm and were mainly exploited by bottom set gill nets at Vizhinjam.

Molluscan resources

There was decrease in the percentage contribution of squids in Central Kerala while the percentage contribution of cuttlefish and octopuses showed an increasing trend during 2007-2014. Among squids the main species exploited was

Uroteuthis (P) duvauceli followed by *U (P) sibogae* and *U (P) singhalensis*. Among cuttlefishes, 4 species belonging to the genus *Sepia* were exploited and fishery was predominated by *Sepia pharaonis*. Among octopus, *Amphioctopus neglectus* and *A. marginatus* were the most dominant followed by *Cistopus indicus*. The increase in total production of cephalopods was not corresponding to increase in effort. Major gear exploiting cephalopods was trawl (70-80%), while other artisanal gears such as beach seines, handjigs, lines and gillnets were in use. In Central Kerala, cephalopods showed maximum abundance during the post-monsoon months of August, September and October with catch rates exceeding 15 kg/h. During these periods, peak breeding occurs in both cuttlefishes and squids and therefore there exists great danger of recruitment overfishing. In the Malabar region, the total landings of cephalopod was contributed by squids (50%), cuttlefishes (47%) and octopus (3%).

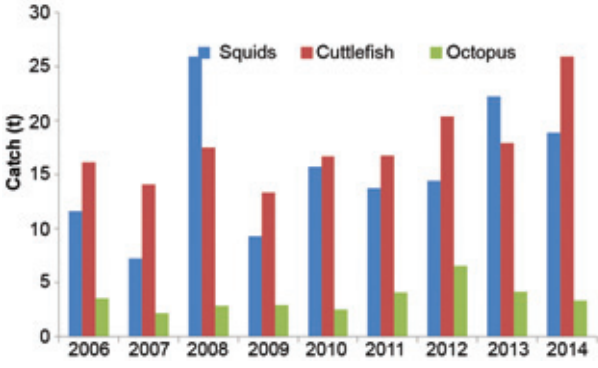

Fig. 3. Cephalopod landings in Kerala during 2006-2014

Economics

Analysis of economics of fishing operations of mechanised trawlers in Kerala showed that the capital productivity was highest for the multiday trawlers (2-5 days) operating with Indigenous engine. Better economic performance than multiday trawlers (with Chinese engines) with high capital productivity, Net-profit Earnings ratio (NE ratio) and Return on investment (ROI) was observed. The gross value of marine fishes at landing centre level was ₹ 6,340 crores. The value increased by 67% at landing centre level when compared to the year 2010.

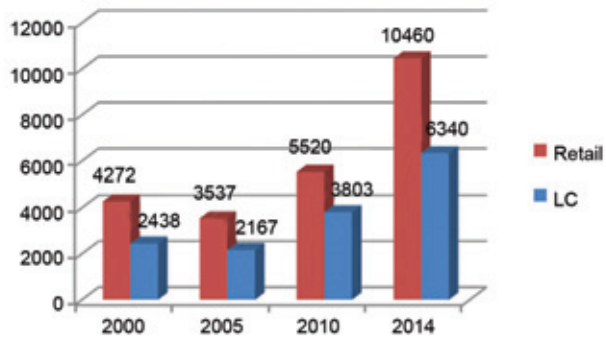

Fig. 4. Growth in nominal value of marine fish at Landing Centre (LC) and Retail levels (₹crores) during 2000-2014 period

Price behaviour analysis showed that the highest prices were recorded for lobsters (₹ 740/kg) seerfishes (₹ 320/kg) and silver pomfrets (₹ 320/kg) for the year 2014 and the lowest prices were recorded for oil sardines, flatfishes (₹ 45/kg) and stomatopods (₹ 25/kg). Analysis of trends in marine fish prices for the period 2000-2014 showed that the highest growth were shown by pomfrets, seer fishes and ribbonfishes at landing centre level and pomfrets and seerfishes at retail level.

Summary

Landings in Kerala have decreased by over 30% compared to 2012 and 22% when compared to 2011. The main decrease seen is in the catch of oil sardine and threadfin breams. An interesting phenomenon is the increase in landings of oceanic sharks and rays mainly at Cochin Fisheries Harbour. The stock status indicates stock of 11 resources in declining phase and only 6 in abundant state. Overcapacity has been noted in the motorised and mechanised gillnets and there is urgent need to reduce effort through government intervention. The implementation of the Minimum Legal Sizes (MLS) is expected to go a long way in the conservation and sustainable utilization of the resources. The price increase in cephalopods (23%), tunas (175%), seerfish (40%), mackerels and pomfrets and moderate increase in other fishes is a positive step towards economic improvement of the fishery sector, but the increasing margin concentrating in the hands of the middlemen is a matter of concern.