

Decline in Marine Fishery Resources of the Trawler Sector in Kerala –An Economic analysis

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Abstract: *The study focused on the decline in the Marine fishery resources caught by the trawlers. Different Species of the Marine catch like Skates, Rays, Cat fish, Wolf herring, Anchovies, Stolporous, Thryssa, OtherClupeids, Flying- fish, other perches, Gastropods and Big Pamfrets declined. The decline in catch rate is more for the species like Halibut followed by Stomatopods and Silver bellies. High valued species like Stomatopods*

(-29.66), Lobsters (-18.53), Silver bellies (-15.85), Seer fish (-18.33), Penaeid Prawns (-10.38), Non Penaeid Prawns (-11.53) and Cephalopods (-11.05) showed a declining trend which affects the economic sustainability of the trawler fishery in Kerala. The most prominent centre of the trawl catch in Kerala namely the Neendakara –Shakthikulangara marked a considerable decline in the varieties of the Marine resources caught as a comparison is made between the years 2002 and 2011.

Key Words: *Decline in marine resources, Compound growth rate, Percentage share of species, Net profit and increase in the catch*

I. Introduction

Kerala, an important maritime state in India, contributes nearly 20 per cent of the country's marine fish landings and 24 per cent of the state's export (Aswathy et.al. 2011). Majority of this are contributed by the mechanized sector, dominated by the trawl fishery. In the sixties and seventies hundreds of trawlers were introduced into the archaic of Kerala fishery. The possibility of catching prawns by deep sea operations attracted the new investors and the number of trawlers proliferated. Thereby overcrowding and over fishing took place in the trawler fishery of Kerala. Considering the co-existence of high fishing effort in trawl fishery which is more than double and the average catch which has not exceeded the MEY (sinitha, 2014), the focus naturally falls on the decline in the Marine resources. Various studies of the Central Marine Fisheries Research Institute and the reports of the Directorate of Fisheries in Kerala reveal that Marine resources are declining. The present study analyses whether the trawl caught marine resources are declining. The study also analyses the species wise decline of the marine resources in Kerala from 2002 to 2011.

II. Methodology

The study used both primary and secondary data .The secondary data on annual landings of the centres, Neendakara Shakthikulangara of Kollam district, Munambam of Ernakulam district were collected from the Central Marine Fisheries Research Institute (CMFRI) for the period from 2002 to 2011. CMFRI collects the statistics on marine fish landings in major and minor landing centres of all the coastal states using the multi-stage stratified random sampling design. Primary data of the two selected centres namely Neendakara-Shakthikulangara and Munambam are collected for the five years of catch from 2005-2006 to 2010-2011

2.1 Area of the study

The two districts selected for the study are Kollam and Ernakulam districts of Kerala. Neendakara – Shakthikulangara of Kollam district and Munambam of Ernakulam district are the areas selected for the study. Neendakara-Shakthikulangara is selected because it is the pioneer base of trawler operation in Kerala. The trawlers were introduced into the Kerala Fishery through the Indo Norwegian Project (INP) in Neendakara-Shakthikulangara belt and the highest number of trawlers land in the Neendakara harbour in Kerala. Munambam is selected because it is second only to Neendakara- Shakthikulangara belt in having the highest number of trawlers landing in a single harbour. In munambam, there are the three types of trawlers identified for the study namely the small, medium and large trawlers comparable to Neendakara Shakthikulangara and in the Cochin harbour there are only two types of trawlers operating namely the small and medium types of trawlers. In these two districts selected for the study 61.42 per cent of the trawlers cluster. By studying the trawlers of these two centres a better picture of the trawl operation in Kerala can be elicited.

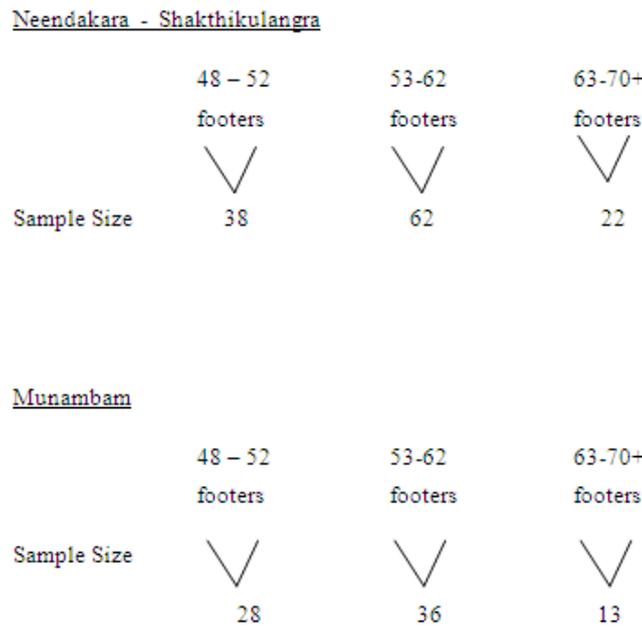
2.2 Sample Frame

The list of trawlers in the selected two areas of the study constitutes the sampling frame. First of all a composite list of all boat owners were extracted from the port offices of Neendakara and Munambam, MPEDA, fisheries offices of Neendakara and Vypin. The composite list thus received was sorted out on the basis of the continuous service of ten years, i.e. since 2002 to 2011. The veteran leaders from the Deep Sea trawl boat owners associations helped to identify the size of the trawlers.

2.3 Sample design

The sample design is done on the basis of stratified sampling, the stratum being the length of the boat. In both Neendakara-Shakthikulangara and Munambam, the length of the boat varies from 48-70 plus footers.

Ten per cent of the boats in each stratum constitute the sample. The stratum of the sample is explained in the following chart.



Thus total sample in the study is 199 trawl boats.

2.4 Data Collection, Management and Analysis

The reference period for the collection of the primary data was August to May 2005-2006 to 2009-2010, roughly two months being the trawler closure period. In total 199 schedules were administered on the owners of trawlers. The investment data was collected from the concerned boat owners through direct interviews. The operational cost data was collected from the log book maintained by the managers of the trawl boats. The catch data and the corresponding beach prices were enumerated for each trip. The duration of the data collection was once a week since trawlers undertake stay-overfishing. A compound annual growth rate of the species caught by the trawlers were done using the logarithmic form of the equation

$$Y = ab^t e^r \dots\dots\dots (1)$$

Then the compound growth rate (r) was computed by using the relationship

$$R = (\text{Anti log of } b-1) \times 100 \dots\dots\dots (2)$$

The compound growth rates were tested for their significance by the statistics given by r

$$t = \frac{r}{SE} \times r \dots\dots\dots (4)$$

$$SE (r) = [100b \times SE [Lnb]] \dots\dots\dots (5)$$

Lne

III. Result and Discussions

3.1 Compound Growth Rate of species caught by the trawlers.

A compound growth rate of the species caught by the trawlers in both N.S.belt and Munambam are estimated. Growth rate is estimated to measure the past performance of economic variables. In the present context, it is used to find out the trend in the growth of the marine catch of trawlers from 2002 to 2011. The

compound growth rate of the important species caught by the trawlers in N.S.belt and Munambam are given in table 1.1.

Table 1.1 Compound Annual Growth Rate of the catch of trawlers

Name of species	N. S. Belt	Munambam
Sharks	0.33	-2.89
Wolf Herring	-10.79	-18.14
Oil Sardines	-6.43	3.86
Stolephorus	-16.01	-12.4
Thryssa	-7.68	-10.66
Other clupeids	-2.62	32.17
Lizard fishes	0.67	22.30
Threadfin breams	6.58	23.12
Other perches	-7.8	9.96
Croakers	-8.64	7.27
Ribbon fishes	-19.81	14.98
Horse mackerel	26.73	38.68
Scads	6.64	21.14
Carangids	NA	8.79
Silver Bellies	-15.85	-12.34
Indian mackerel	27.15	47.58
Baracudas	-.88	18.47
Soles	-2.67	13.16
Penaeid prawns	-10.38	9.94
Crabs	-9.21	-3.81
Cephalopods	-11.05	21.36
Stomatopods	-29.66	NA
Silver bellies	-15.85	NA
Big Pamfrets	-8.20	NA
Rays	-12.26	NA
Rock cods	-20.56	NA
Halibut	-31.81	NA
Gastropods	-11.05	NA
Total	-5.92	16.58

Source: Data from CMFRI Cochin 2002-2011

The growth rate given in table 1.1 reveals that Munambam has a positive growth rate of 16.58, whereas in the N.S.belt growth rate has come down to negative 5.92. The decline in catch rate is more for the species like Halibut followed by Stomatopods and Silver bellies. High valued species like Stomatopods (-29.66), Lobsters (-18.53), Silver bellies (-15.85), Seer fish (-18.33), Penaeid Prawns (-10.38), Non Penaeid Prawns (-11.53), Cephalopods (-11.05) etc showed a declining trend which affects the economic sustainability of the trawler fishery in Kerala.

The declining trend of the catch of the trawlers in the N.S.belt and the overall decline of the high valued species like Stomatopods, Cephalopods, and Penaeid Prawns etc showed the declining tendencies of the net profit obtained from this centre. The owners of trawlers, scientists from CMFRI and the experts from the field agree with the view that there is destructive fishing practice since juveniles of fishes are destroyed during the trawling. There are biological and environmental reasons which lead to decline in the catches in Kerala. This has to be explored further.

IV. Percentage Shares of Different Species

Table 1.2 compares the percentage share of all the species caught by the trawlers in the N.S.belt and Munambam during 2002 and 2011.

Table 1.2 Percentage Share of the Different Species in Total Trawl Catch in Kerala (2002 -2011)

Name of Species	Share (%) 2002	2011
Sharks	0.34	.08
Skates	0.11	0.14
Rays	0.60	0.07
Eels	0.13	0.25
Cat fish	0.02	0.00
Clupeids	0.00	0.00
Wolf herring	0.14	0.03
Oil Sardines	1.90	1.60
Other Sardines	0.06	0.05
Hilsa Shad	0.00	0.00
Other Shads	0.01	0.05

Anchovies	0.00	0.00
Coilia	0.00	0.00
Setipinna	0.00	0.00
Stolephorus	3.96	1.77
Thrissina	0.00	0.00
Thryssa	2.05	0.69
Other clupeids	0.31	0.62
Bombay Duck	0.00	0.00
Lizard fishes	3.19	4.74
Halfbeaks & full beaks	0.00	0.00
Flying fishes	0.04	0.01
Perches	0.00	0.00
Rock cods	3.68	0.45
Snappers	0.13	0.01
Pig – face breams	0.03	0.01
Thread fin breams	14.60	27.71
Other perches	5.93	1.20
Goat fishes	0.01	0.04
Thread fins	0.00	0.00
Croakers	2.07	0.87
Ribbon fishes	7.07	10.22
Carangids	0.00	0.00
Horse Mackerel	0.38	0.28
Scads	4.20	8.65
Leather – Jackets	0.02	0.01
Other Carangids	1.51	0.57
Silver bellies	2.21	0.59
Big – Jawed Jumper	0.14	0.13
Pomfrets	0.00	0.00
Black Pomfrets	0.06	0.14
Silver Pomfret	0.17	0.17
Chinese Pomfret	0.01	0.00
Mackerels	0.00	0.00
Indian Mackerel	0.73	4.53
Other Mackerels	0.00	0.00
Seer fishes	0.00	0.00
S.Commersoni	0.67	0.08
S.Guttatus	0.01	0.00
S.Lineglatus	0.00	0.00
Acanthocybium spp	0.00	0.00
Tunnies	0.00	0.00
E.affinis	0.09	0.01
Auxis.spp	0.08	0.00
K.Pelamis	0.01	0.00
T.tonggol	0.00	0.00
Other Tunnies	0.03	0.00
Bill fishes	0.00	0.00
Baracudas	1.01	0.85
Mulletts	0.01	0.01
Halibut	0.02	0.00
Flounders	4.98	5.70
Penaeid prawns	16.31	11.15
Non – Penaeid prawns	4.51	2.82
Lobsters	0.16	0.03
Crabs	1.70	0.81
Stomatopods	1.69	0.47
Gastropods	0.27	0.18
Cephatopods	12.17	11.35
Miscellaneous	0.49	0.83
Total	100.00	100.00

Source: Unpublished data from CMFRI (2012)

Table 1.2 shows that majority of the species declined in the catch obtained in 2011 as compared to 2002. Species like Lizard fishes, Thread fin breams, Ribbon fishes, Scads and Indian Mackerels showed an increase in the catch. All the other species declined from 2002 to 2011. The reasons for this can be many like environmental, biological and others. This has to be explored further.

4.1 Net profit of the trawlers

The decline in the catch of the high valued species in the consecutive years from 2005-2006 to 2009-2010 affected the profit of the trawler sector. The net profit as found out by the study clearly points out that net

profit has declined. Decline in catch is added by the oil price hike and increase in the labour charges. This is depicted in table 1.3.

Table 1.3 Type of Vessels and Net profit

	Type of vessels											
	Small			Medium			Large			Total		
	Mean	Minimum	Maximum	Mean	Minimum	Maximum	Mean	Minimum	Maximum	Mean	Minimum	Maximum
2005-06	19.58	2.00	30.00	18.81	-40.00	40.00	23.15	5.00	30.00	19.50	-40.00	40.00
2006-07	17.50	1.00	30.00	17.34	-25.00	40.00	20.03	2.00	30.00	17.85	-25.00	40.00
2007-08	15.67	2.00	25.00	14.88	-15.00	40.00	19.15	4.00	40.00	15.87	-15.00	40.00
2008-09	11.88	-10.00	25.00	12.88	-15.00	40.00	15.44	2.00	25.00	12.97	-15.00	40.00
2009-10	-7.3	-10.00	25.00	-1.12	-10.00	20.00	-5.8	-5.00	25.00	-8.9	-10.00	25.00

Source: Survey Data

Table 1.3 puts forth that the large vessels relative to the small and medium vessels have more net profit for the four years out of the five years taken into consideration from 2005-2006 to 2009-2010. During the year 2009-2010 all vessels have negative net profit. Table 1.3 also makes it very clear that in all three types of vessels the net profit goes on falling year after year. It is to be noted that the medium vessels have comparatively low net profit than even the small vessels except for the year 2008-2009 and the increase is only by one per cent. In analysing the net profit of the year 2010-2011, it is found out that the small vessels have lowest net profit. From the present analysis it is found out that the net profit of Table 1.3 puts forth that the large vessels relative to the small and medium vessels have the medium vessels, during the five years from 2005-2006 to 2009-2010 were not up to the mark.

V. Conclusion

The percentage share of different species caught by the trawlers revealed that the commercially important species declined from that of the year 2002 to the year 2011. Species like Lizard fishes, Thread Fin Breams, Ribbon fishes, Scads and Indian mackerel showed an increase in the catch. The negative growth rate and decline in catch of the trawlers in the N.S.belt, the pioneer location of trawl operation in Kerala was observed. This clearly affects economic sustainability, environmental sustainability and ecological balance. The reasons for this could be the climatic changes, the destructive fishing practices and overexploitation. This has to be explored further.

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