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THE SHRIMP RESOURCES OF THE COASTAL WATERS OF KERALA AND THE EFFECT OF MECHANISATION

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ABSTRACT

The exploitation of shrimp resources in the coastal waters of Kerala by mechanised and traditional sectors together is limited to the 80 m depth zone in the continental shelf. Indications are that the shrimping grounds inside this depth zone all along the coast are being exploited to the maximum level, possibly by a combination of effort from the two sectors, except perhaps a few areas which are unreachable from the existing port facilities by the small mechanised vessels capable of only single day operations.

The trend in shrimp production right from the time of initial introduction of mechanisation using the shrimp trawls in the fifties through 1985 has been studied to assess the resource situation from an overall total shrimp production view point as well as the part played in the production by the two sectors. The total production which was less than 15,000 tonnes before the introduction of mechanisation rose up to the maximum of nearly 85,000 tonnes in 1973 and there after declined to an average of 30 to 40 thousand tonnes in recent years with fluctuations. The analysis of production data from important centres of fishing operations also shows a similar trend. Thus it is becoming more and more evident that a decline and stagnation has set in as far as the shrimp fishery of the coastal zone is concerned, inviting urgent measures for conservation of fishery in the area.

A comparative study of shrimp production data of the traditional sector and the mechanised sector shows that while the catches of the former decreased considerably, that of the latter increased over the years, resulting in the present conflict between the two sectors. This raises various management problems for the fishery and some of the management measures which could be adopted with reference to the total fishery as well as the fishery at important centres are discussed.

INTRODUCTION

It is a well known fact that the major part of the shrimp production in India comes from the west coast and in this a substantial portion, contributed by the south west coast, is from Kerala coastal waters. In order to meet the insatiable demand for shrimps from the export industry all possible measures are being explored for the maximum exploitation of the shrimp resources in these coastal areas. Mechanisation of the fishery and shrimp trawling is the most important development for this increased exploitation of the resources. Shrimp trawling has, no doubt, contributed to a conspicuous increase in production over a decade. However, in recent years the indications are that a stage has been reached where the total production is not showing much of an increase, but staying almost at a stagnant level.

The stagnation in production of the resource may be brought about by various reasons, among which may be mentioned limitation in the available resources, indiscriminate input of increasing effort in the fishery, variations in the environmental factors etc. A combination of all these factors or any one of these may be the causative factor for the decline or stagnation in production level. Added to these both mechanised and traditional sectors operating side by side and exploiting more or less the same resources makes the situation worse. Therefore a detailed analysis of the trends in production over the years, especially with reference to mechanisation is necessary to decide about the proper management measures to be taken in the maintenance of the fishery at the optimum level and the present contribution is an attempt in this direction.

TRENDS IN PRODUCTION

The shrimp production in Kerala State which was less than 15,000 tonnes in the years 1959 and 1960 rose to nearly 85,000 tonnes in 1973 and thereafter declined and in recent years it averaged, between 30,000 and 40,000 tonnes. The trend in triennial average catch shows an increase of little over 100 % from 1959-61 to 1974-76 (Fig. 1). After this there is a decline in the percentage increase from the 1959-61 base level by 30 % in 1983-85. From the year 1976 to 1985 the catch has declined from the level of 1973-75 and a stagnation with minor fluctuation from year to year at about 35,000 tonnes is noticed.

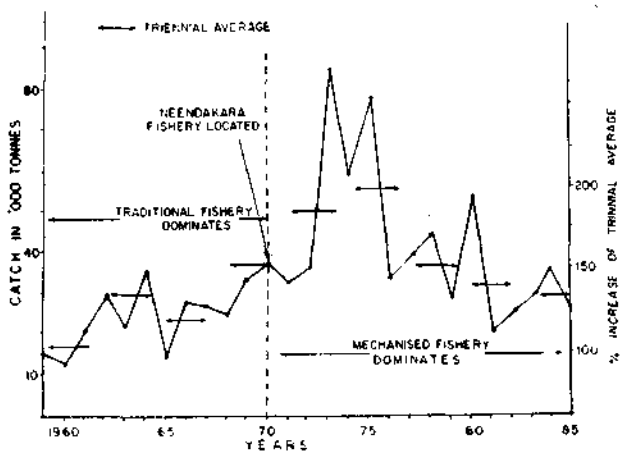

Fig. 1. The triennial averages of shrimp catches during 1960-85.

While analysing the production trends of shrimps of Kerala State it has to be bourne in mind that two sectors are operating side by side in the coastal waters, namely, the mechanised sector and the non-mechanised or traditional sector, more or less exploiting the same resource. The production of shrimps of both of these sectors needs to be considered separately in order to understand the problems in the fishery. The mechanised trawl fishery is concentrated mostly along centres where landing facilities for small boats are available along the coast and the artisanal fishery is operating in all areas of the coast. From the details given in Table 1 it is clear that Neendakara is by far the most important centre along the Kerala coast where the maximum quantity of shrimp is landed by the mechanised trawl fishery. The fishery limited to the monsoon months June to September is constituted by a single species, namely *Parapenaeopsis stylifera* (Karikkadi Chemmeen) and contributes to nearly 80% of the total shrimp production of the state in the mechanised sector.

The species composition and other biological features of the resources are well documented (George, 1961; George *et al*, 1963; Kurup & Rao, 1975; George *et al*, 1980; George *et al*, 1983; Alagaraja *et al*, 1986 etc.). Therefore it is

TABLE 1.

Shrimp catches at important shrimp trawl operation centres of Kerala from 1970 to 1984

Year	Centres							Total shrimp catch of trawl nets (Tonnes)
	Neendakara		Cochin		Calicut		Other centres catch Tonnes)	
	Catch (Tonnes)	Catch hour in kg	Catch Tonnes	Catch/hr in kg	Catch (Tonnes)	Catch/hr in kg		
1970	1,845	12.6	2,200	22.0	1,300	18.1	4,400	9,745
1971	11,004	39.8	3,850	6.1	1,050	11.5	3,200	19,104
1972	11,267	29.4	2,150	11.7	200	11.4	3,810	17,427
1973	45,477	82.6	6,000	21.1	625	8.3	6,925	59,027
1974	27,764	33.7	3,900	11.6	420	7.0	5,720	37,804
1975	53,750	42.6	7,200	20.9	570	7.7	7,280	71,800
1976	14,993	27.9	2,800	10.0	235	2.8	1,672	19,700
1977	24,120	18.0	5,300	14.0	340	4.1	4,440	34,200
1978	33,143	13.7	2,160	4.0	230	4.4	3,353	38,886
1979	14,582	20.1	3,350	9.4	330	4.9	6,250	24,512
1980	36,658	43.1	3,500	12.9	380	6.8	5,723	46,161
1981	9,399	17.7	2,550	47.6	112	3.9	4241	16,305
1982	9,425	16.2	2,957	16.3	217	30.2	8,738	20,977
1983	8,174	12.3	3,977	22.2	275	9.2	10,673	23,099
1984	14,575	19.5	2,357	16.2	214	9.9	7,825	24,971

not proposed to go into those details in the present contribution. However, it may be mentioned that among the five species contributing to the shrimp fishery in general in the coastal waters of the State, a shift in the dominant species from *Metapenaeus dobsoni* to *Parapenaeopsis stylifera* has been noticed in recent years. Also there is a general trend of more of smaller sizes of these shrimps coming into the fishery recently in all the Centres where the mechanised boats are concentrated.

PRODUCTION IN MECHANISED AND TRADITIONAL SECTORS AND THE EFFECT OF MECHANISATION ON THE FISHERY

The origin of mechanisation in the shrimp fishery of Kerala State may be traced back to the early fifties when the Indo-Norwegian Project was established at Neendakara in Quilon. Initially the traditional nets of the fishermen like the drift nets and gill nets were operated from small vessels with inboard engines. In due course small shrimp trawls operated from the 25 feet boats with 15 hp engines brought in big catches. Slowly private industry and entrepreneurs came into the picture in different areas of the coast and the mechanised trawl fishery came to stay in Kerala State. With the increase in catches of shrimps by these vessels every year more and more of these small mechanised vessels were introduced into the fishery and at present nearly 3,000 such vessels are enumerated in these coastal waters.

A comparative picture of the shrimp fishery of the traditional sector and the mechanised shrimp trawl fishery in Kerala may be seen in Fig. 2. Over the years side by side with the increase in shrimp catches by the shrimp trawls, a gradual decrease in the shrimp catches in the traditional sector is very much evident. This reduction in the shrimp catches by the traditional sector in the overall shrimp fishery of the State is all the more conspicuous when the percentage contribution of the traditional shrimp fishery to the total shrimp catches is considered. It fell from 96.5% in 1962 to an average of 15.5% in 1977-80 period and 24.2% in 1980-85 period. From this the natural conclusion which follows is that the mechanised fishery has

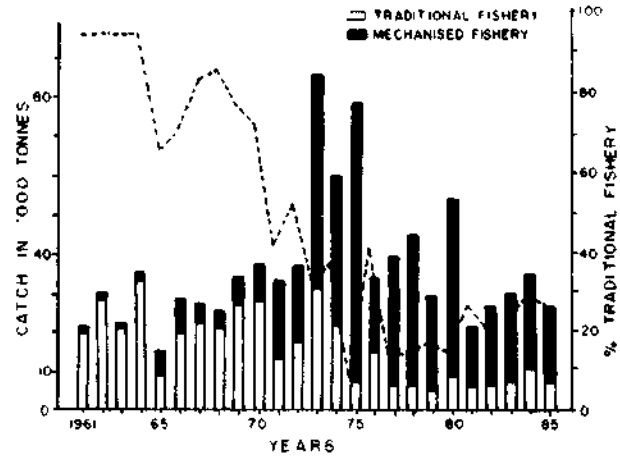

Fig. 2. Comparison of shrimp productions of the two sectors from 1961 to 1985.

adversely affected the traditional shrimp fishery of the State.

If we look at the figures a little closer it is clear that upto the year 1970 it is the production from the traditional fishery which is dominant and after 1970 the production by the mechanised trawl fishery dominates. From 1970 there is a sudden boost in the total catches contributed mostly by the phenomenal increase in the catches of the mechanised trawl fishery, as indicated in Fig 1. The reason for this is that it is in 1970 the shrimp trawl fishery at Neendakara was located and the subsequent few years show very high production from this Centre, which is reflected in the total production of shrimps (Table 1). However, it is noticed that by 1980 the production from that Centre goes down considerably, which again is reflected in the overall production. Still the dominance of the mechanised fishery in the total shrimp landings persists, although the total shrimp catch has declined and reached the level of the pre-1970 period.

Two important points emerge from the facts mentioned above. Firstly, in general the total production of shrimps from Kerala coastal waters has decreased considerably in the past few years. Secondly, while the production of shrimps by the mechanised trawl fishery has increased and eventually gone down in recent years, the production of shrimps from the traditional sector has deteriorated considerably over the years. It would appear that the shrimp trawl fishery of the coastal waters has prospered at the expense

of the catches of the traditional fishery. This is quite understandable since both the fisheries are based on the same resource from more or less the same grounds.

DISCUSSION

These disturbing tendencies in the shrimp production of the State raise serious management problems for the fishery and at the moment this is the most important aspect requiring attention of the fishery administrator and manager, the situation becoming all the more serious as the two conflicting interests are showing up the ugly faces of fights and quarrels between the two sectors. The position here is that the traditional sector is also growing up side by side with the mechanised sector. According to the census conducted by CMFRI (1981) and quoted by Thankappan Achari (1986) there is a rise of 63% in the total number of fishermen (of which the major portion is engaged in the traditional sector) from the census conducted in 1961/62. There is also a rise in the number of traditional crafts including catamarans, dug out canoes and plank built boats from 11,480 to 26,271 numbers, indicating the phenomenal growth in the sector. The only proper management solution for the problem seems to be limiting the areas of fishing grounds for particular fishery and also limiting the input of effort. This is what the State Government was trying to execute by the Marine Regulation Act, limiting depth zones for operation of the vessels of the two sectors. The consequent developments involving conflicts between the two sectors, the setting up of the Babu Paul Commission and later the Kalawar Commission and their reports in 1982 and 1986 respectively are well known.

Among the many reasons which could be attributed to the decline in the catches of both sectors the most important seems to be the limitation in the shrimp resources in the inshore coastal waters of the State. Along these coastal waters almost all the landings are from within the 50-60 m depth zone. Even in this depth zone the most productive areas are within the 25-30 m depth region according to reports available (George et al., 1983). Reoprts from the recent research cruises of research vessels as well as exploratory fishing operations indicate the same results. The crafts and gears of both mechanised and artisanal sectors, therefore, operate in more or less the same areas in which the resources are available and the more efficient gear for catching the bottom living shrimps obtain better catches.

All these things point to the necessity for developing a suitable management policy which would ensure profitable shrimp fishing operations for both mechanised and traditional sectors side by side. Among several conservation measures available for managing a fishery a combination of two measures seems to be best suited for proper management of the shrimp fishery under the circumstances described. The two measures are temporary closures of the fishery during certain months and limitation of input of effort along with sepecification of areas of operation for particular sectors. As far as the shrimp trawl fishery of the mechanised vessels off the coastal waters of Kerala was concerned the south west monsoon season traditionally acted almost as a closed season for the fishery, so that another closed season was not necessary. Naturally enough this stoppage of the fishery due to the monsoon rains and stormy weather takes place at a time when the mean sizes of all the species in the fishery are at the lowest and the absence of fishing operations for two or three months at that time acted as a natural conservation measure. But at Neendakara, the most important shrimp trawling centre of Kerala, the maximum fishing operations are carried out during the monsoon period with the maximum landings. The question arises weather the closure or ban of fishing during the monsoon season should be enforced here also. The answer to this question depends on whether the entire stock of shrimps appearing suddenly in the fishery there at that particular time will be lost to the fishery if not fished at that time or will these shrimps be available to the fishery there itself or in adjacent areas in bigger sizes in the subsequent months? The only way to prove this point is to apply an experimental closure for one or two years during those particular months and study the results.

The other measure, namely the limitation of fishing effort is equally important in the circum-

stances of the shrimp fishery of Kerala. When the available shrimp resources in the fishing grounds are subjected to increasing exploitation by introduction of more and more fishing effort, a stage would be reached when further input of effort would result in uneconomic returns and this is at present happening in the shrimp fishery of Kerala. Therefore, a limitation in the input of effort, by reduction in number of units and by fixing a catch limit for particular units in order to limit the total catch to the optimum level of sustainable yield may be adopted. In the circumstances of the shrimp fishery of Kerala where the machanised and traditional fishery are exploiting the same resource, specification of areas of operation for the particular fishery would also be necessary.

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