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# TRAWL FISHERY OF SOUTH KANARA WITH SPECIAL REFERENCE TO PRAWNS AND BY-CATCHES\*

## Introduction

Mechanised trawling for prawns has assumed great significance in recent years due to the increasing demand for prawns from export industry. Prawns are also caught in traditional gears like cast net, kanthabale (bottom set gill net) and kairampani net (shore seine) during monsoon months, but contributing to negligible quantities. Hence, although prawns form less than 15 percent of the trawl catches, the export oriented industry is largely dependent on trawl fishery.

Karnataka contributes around 2.1 percent of the total prawn landings in our country amounting to 3863 t (based on the average for 1971-80).

By way of by-catch large quantities of fishes consisting of both cheap trash fish and quality fishes are landed from shrimp trawling. The total by-catch forms as high as 85 percent of the trawl landings.

Karnataka has got a coast line of 300 km. An appraisal of the trawl fishery is being attempted based on the data collected from Mangalore and

Malpe during the fishing seasons 1980-81 and 1981-82.

## Craft and gear

Boats of varying lengths from 6.7 m to 10.97 m fitted with 20 to 96 H.P. engine using otter trawl with head rope length of varying lengths are operated from this area. A few large vessels (13.2 m) fitted with 120 H.P. engine are pressed into service during peak seasons.

Around 1500 trawl units are operating along this coast. Of this, 1161 units are in South Kanara alone, and most of them are centred around Mangalore (425 boats), Malpe (342 boats) and Gangoli (219 boats) mainly due to the infrastructural facilities (storage, transport, market etc.) available there. In addition, some boats are operated from Padubidri (33 units), Polippu (40 units), Hangarkatta (94 units) and Tarapathy (8 units) (Fig.1).

## Fishing season

Normally the trawling starts in September after the south west monsoon and lasts till May end or early June. With the onset of monsoon the fishing with mechanised vessels is suspended and the indigenous fishery takes over.

## Fishing operations.

Generally the trawl units set out for fishing at dawn and return around mid-day. Sometimes, the landings are continued upto 2-3 p.m. at Mangalore, whereas, at Malpe, this is continued till late in the evening during peak seasons.

The smaller boats (6.7 m to 9.75 m) usually fish in 10-25 m depth. During January to April, the larger boats go for 1-2 days' night fishing. These units generally operate the net upto a depth of 40 m for catching larger varieties of prawns which are brought to the landing centre in large ice boxes. A few big vessels after 3-4 days' fishing bring the catch in their fish-holds in crushed ice.

The number of hauls made by each unit vary from 1 to 1-3 per day with an average of 2 hauls, each lasting normally 2-3 hours.

Fishing grounds lie within 15 km from the shore.

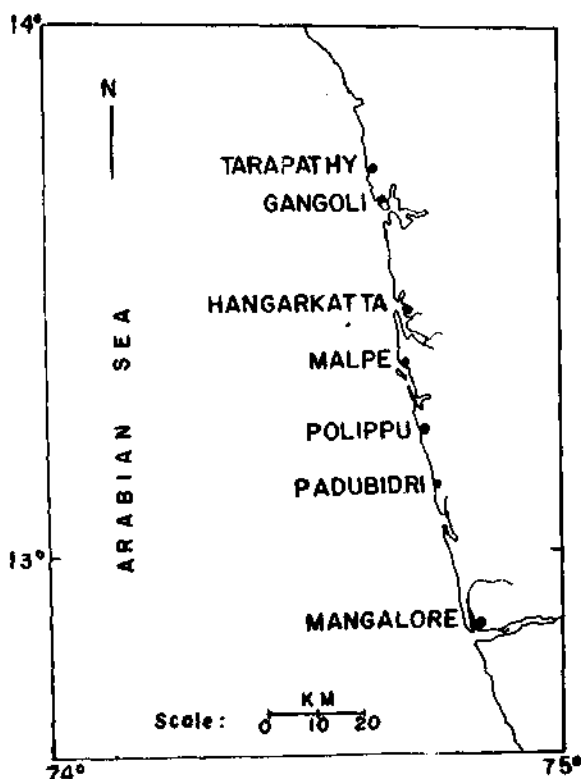


Fig. 1. South Kanara map showing the important trawler landing centres.

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**Table.1.** *Estimated month wise landings (in tonnes) of the important groups by trawl nets at Mangalore during 1980-81 & 1981-82.*

Categories	September		October		November		December		January	
	80-81	81-82	80-81	81-82	80-81	81-82	80-81	81-82	80-81	81-82
Prawns	79.7	8.4	0.2	0.3	2.2	120.2	78.6	152.9	127.9	61.2
Fishes	27.8	20.0	—	1.5	31.2	677.9	263.8	377.0	241.3	271.7
Stomatopods	—	—	—	—	9.5	147.3	383.8	326.1	441.2	362.2
Crabs	—	—	—	—	—	0.2	21.3	8.7	20.5	14.5
Cephalopods	—	—	—	—	0.8	3.8	1.8	14.2	1.4	5.2
<b>Total</b>	<b>107.5</b>	<b>28.4</b>	<b>0.2</b>	<b>1.8</b>	<b>43.7</b>	<b>949.4</b>	<b>749.3</b>	<b>878.9</b>	<b>832.3</b>	<b>714.8</b>

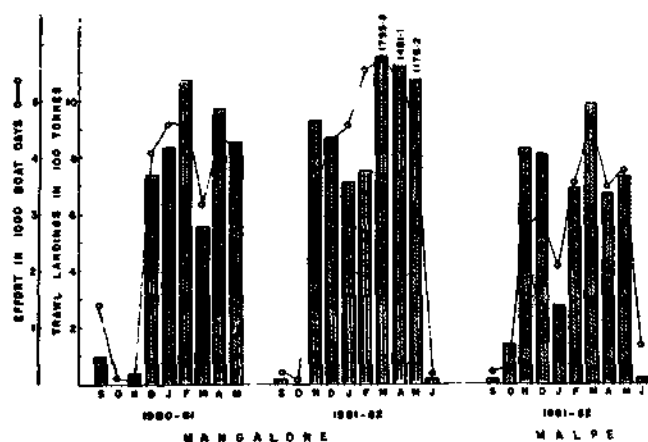
	February		March		April		May		June		Grand Total	
	80-81	81-82	80-81	81-82	80-81	81-82	80-81	81-82	80-81	81-82	80-81	81-82
	89.6	140.1	47.7	168.2	117.0	148.7	132.8	183.7	—	0.9	675.7	984.6
	456.0	326.8	334.6	954.4	617.3	546.3	528.2	898.7	—	11.9	2500.2	4086.2
	500.2	272.2	163.5	627.3	220.3	758.2	168.7	80.8	—	4.2	1887.2	2578.3
	31.4	19.0	19.8	24.2	26.5	20.1	28.5	7.8	—	0.4	148.0	94.9
	3.3	2.6	1.6	21.7	0.8	7.8	0.9	5.2	—	0.1	10.6	60.6
	<b>1080.5</b>	<b>760.7</b>	<b>567.2</b>	<b>1795.8</b>	<b>981.9</b>	<b>1481.1</b>	<b>859.1</b>	<b>1176.2</b>	<b>—</b>	<b>17.5</b>	<b>5221.7</b>	<b>7804.6</b>

**Catch and catch composition**

The annual landings at Mangalore was estimated at 5221.7 t (196.7 kg/boat day) and 7804 t (228.2 kg/boat day) during 1980-81, 1981-82 respectively. At Malpe, it was 5256.0 t (212.1 kg/boat day) during 1981-82 (Table 1 and 2). Though the trawling season is spread from September to May, the bulk of the catch was realised during the latter half January-May. The landings, generally low during October-November, increased to a peak during February-March and thereafter, declined marginally during the following months (Fig.2).

The trawls being primarily operated for prawns, the catches could be broadly grouped into prawns and by-catches, including 1) fishes 2)stomatopods 3) crabs and 4) cephalopods.

On an average, around 50% of the catch was contributed by fishes, 13% by prawns, 34.5 % by stomatopods, 2% by crabs and the rest by cephalopods (0.5%) (Fig.3).



**Fig. 2.** *Monthwise trawl landings and effort in boat days during 1980-81 and 1981-82 at Mangalore and during 1981-82 at Malpe.*

**Table.2. Estimated monthwise landings (in tonnes) of the important groups by trawl nets at Malpe during 1981-82**

Categories	September	October	November	December	January
Prawns	9.2	0.2	150.6	87.7	21.2
Fishes	9.5	135.3	379.8	235.3	123.4
Stomatopods	—	—	313.3	475.4	118.0
Crabs	—	—	1.4	0.3	16.6
Cephalopods	—	—	1.1	20.0	3.2
<b>Total</b>	<b>18.7</b>	<b>135.5</b>	<b>846.2</b>	<b>818.7</b>	<b>282.4</b>

February	March	April	May	June	Grand total
79.8	69.6	98.6	46.9	5.3	569.4
314.9	403.0	375.8	676.9	18.9	2672.8
249.8	505.4	189.9	15.0	2.1	1868.9
54.0	10.5	11.6	9.4	0.8	104.6
1.8	12.0	2.2	—	—	40.3
<b>700.3</b>	<b>1000.5</b>	<b>678.4</b>	<b>748.2</b>	<b>27.1</b>	<b>5256.0</b>

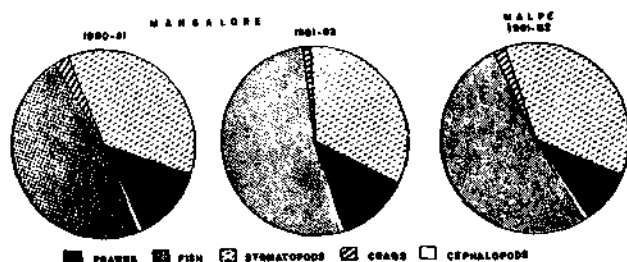


Fig. 3. Distribution pattern of the major categories in the shrimp trawlers at Mangalore (1980-81 & 1981-82) and Malpe (1981-82).

### Prawns

The prawns are represented by *Metapenaeus dobsoni*, *M. affinis*, *M. monoceros*, *Parapenaeopsis styliifera*, *Penaeus indicus* and *P. monodon*. Among them, *P. styliifera* and *M. dobsoni* were the dominant species contributing around 80-85% of the annual prawn catch (Fig.4). The estimated landing of prawns was 675.7 t and 984.6 t respectively during the two seasons at Mangalore. At Malpe, it was 569.4 t during 1981-82.

It may be seen that generally October-November is the lean period for prawns. The landings were fairly high during the latter half of the season particularly during May at Mangalore and during November at Malpe (Fig.5).

*M. dobsoni*, locally known as 'Poovaian', formed 53.5% of the prawn catch (361.4 t) during 1980-81 at Mangalore. In the following season, the landings decreased by 19.3% and accounted for only 29.6% (291.5 t) at the same centre. At Malpe, it contributed 20.5% (116.0 t). Landings were generally high

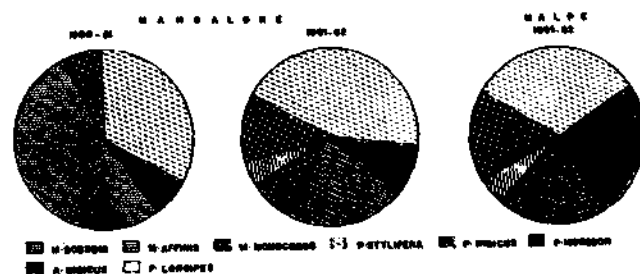


Fig. 4. Species composition of prawns landed by shrimp trawlers at Mangalore (1980-81 & 1981-82) and Malpe (1981-82)

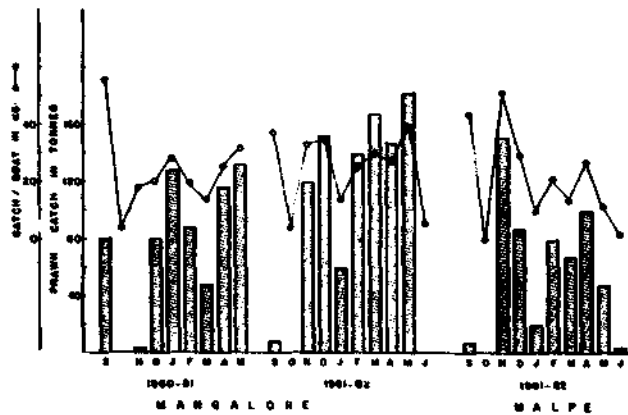


Fig. 5. Monthwise prawn catch and catch rate during 1980-81 and 1981-82 at Malpe.

during September and January- May at both the centres.

The catches of *M.affinis* (brown shrimp) were very poor during 1980-81 forming 0.9% of the annual prawn catch (6.3 t) at Mangalore. However, in the following season, the catches were better and amounted to 46.2 t (4.7%). At Malpe, it formed 5.2% (29.6 t). The best catches were obtained during February at both the centres.

*M.monoceros*, also known as brown shrimp, contributed to 5.9% of the annual prawn catch (40.2 t) during 1980-81 at Mangalore. The landings improved considerably during the following season forming 12.2 % (120.3 t). It formed 16.7% (94.5 t) at Malpe. Landings were fairly good during March at Mangalore and in December at Malpe.

*P.stylifera*, locally known as 'karikadi', contributed to 33.3% during 1980-81 (225.3 t) at Mangalore. The catches improved in the following year and formed 44.2% (434.9 t). It contributed to 32.0% (181.7 t) at Malpe during 1981-82. The catches were generally high during April-May at both the centres.

The catches of *P.indicus* (white shrimp) was 35.2 t (5.2%) and 49.3 t (4.1%) respectively during the two seasons at Mangalore. At Malpe, it formed 4.3% (24.6 t). March-May seems to be the best season for this prawn.

*P.monodon* (Tiger shrimp) is very important from the commercial point of view as it grows to very large size. However, it formed only 1 % or less of the annual average landings at Mangalore and Malpe. The catches amounted to 4.6 t and 9.2 t respectively during the two seasons at Mangalore and, it was 4.6 t at Malpe.

*Parapenaeus longipes*, although growing to comparatively smaller size, is potential resource occurring during April-May and the annual catch was 2.7 t during 1980-81 at Mangalore.

*Acetes indicus* was seldom caught in trawl nets in large quantities. The landings were fairly high during November 1981 forming 4.3 % of the annual average prawn catch (42.2 t) at Mangalore and, 20.5% (116.2 t) at Malpe.

### By-catches

#### Fishes

Fishes, contributing to about 50% of the trawl catches, are represented by a number of groups of species. Their abundance vary from season to season and month to month. Fig.6 shows the percentage composition of the important fish groups during 1981-82 at Mangalore and Malpe.

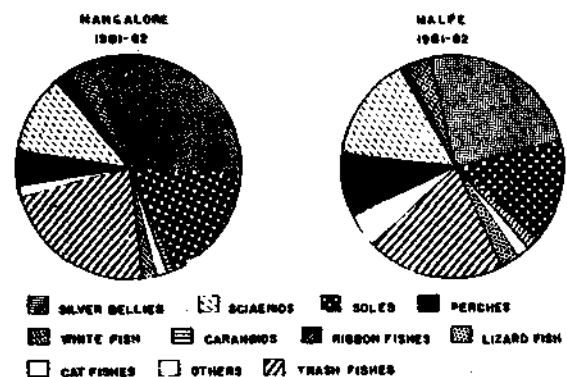


Fig. 6 Distribution pattern of the important category of fishes during 1980-81 and 1981-82 at Mangalore and 1981-82 at Malpe (Others - includes all those variety of fishes which contributed less than 1 percent).

Silver bellies, are the dominant group among fishes, contributing to 31.2% and 24.5% at Mangalore and Malpe respectively during 1981-82. Though a number of species of *Leiognathus* and a single species of *Gazza* occur regularly in trawl catch, *Gazza minuta*, *Leiognathus splendens*, *L.bindus* and *Secutor insidiator* are the abundant species, maximum catch was recorded during September- October.

Sciaenids, popularly known as 'Jew fishes', are generally caught in shrimp trawls throughout the year in varying quantities. In the annual fish catch, it formed 11.6% and 15.1% respectively at Mangalore and Malpe during 1981-82. Though this group is represented by several species, *Otolithoides cuvieri* together with a few species of the genus *Johnius* formed the bulk of the sciaenid catch.

Soles occurred round the year and contributed 17.5% and 15.0% respectively at Mangalore and Malpe. This group is mainly represented by a single species *Cynoglossus semifaciatus* and mostly consisted of smaller sizes 8-12 cm.

Perches formed 5.0% at Mangalore and 8.6% at Malpe during 1981-82. *Nemipterus japonicus* contributed to the bulk of the catch. Maximum catch was recorded during May.

White fish *Lactarius lactarius* is one of the quality fishes caught in small quantities round the year. It formed 3.2% and 3.8% respectively at these centres. The size ranging from 7 to 18 cm generally supported the fishery.

Carangids occur throughout the year and formed 1.2% and 2.0% respectively at these centres. It is represented by several species of *Caranx* and allied forms. Of these, *Selar calla* is the chief species contributing to around 80-90% of the carangid catch.

Ribbon fishes, represented by two species *Trichiurus lepturus* and *T.savala*, formed 2.1% respectively at Mangalore and Malpe. Bulk of the catch was obtained during April-May and September - October.

Lizard fish *Saurida tumbil* formed 1.9% and 3.0% respectively at these centre. Catches were fairly good during March-May.

Cat fishes occurred fairly in good quantities during March-May and contributed to 1.4% and 1.8% respectively at Mangalore and Malpe. *Arius tenuispinus* (size ranging from 15 to 35 cm) was the abundant species.

Among fishes, pomfrets are more in demand and hence highly priced. It occurred as stray numbers and formed less than 1 percent. It is represented by *Apolectus niger* (black pomfret) and *Pampus argenteus* (silver pomfret).

Anchovies are caught in small quantities during April-May and contributed less than 1 percent. *Stolephorus battaviensis* was the most common species.

Elasmobranchs (sharks, rays and skates) and clupieds (*Anadontostoma chacunda*, *Dussumieria acuta*, *Hilsa ilisha* and *Sardinella longiceps*) occur in stray numbers regularly.

In addition, several species of trash fishes of demersal and mid-pelagic nature, are landed in large quantities round the year and formed 22.6%

and 20.0% respectively at Mangalore and Malpe.

### Stomatopods

This group is represented by a single species, *Oratosquilla nepa*. The catches amounted to 1887.2 t and 2578.3 t during 1980-81 and 1981-82 respectively forming 36.1% and 33.0% of the annual trawl landings at Mangalore. At Malpe, the catch was to the tune of 1868.9 t forming 35.5% during 1981-82. The landings were very high during February-April.

### Crabs

Though this group is represented by a number of species along this coast, *Portunus sanguinolentus* and *P.pelagicus* are only commercially important. These species together formed around 2% of the annual average catch by trawls. The estimated landings amounted to 148.0 t (1980-81) and 94.9 t (1981-82). At Malpe, it was 104.6 t during 1981-82. Landings were generally good during February-March at both the centres.

### Cephalopods

Squids (*Loligo duvacelli*) and cuttle fish (*Sepia aculeata*, *Sepiella inermis* and *Sepia pharaonis*) represent this group in the order of their abundance. Cephalopods contributed less than 1% in the annual trawl landings at both the centres. The annual catch was 10.6 t and 60.6 t at Mangalore and 40.3 t at Malpe. Better catches were obtained during December-March.

### Marketing and disposal.

To facilitate auctioning, different category of prawns, quality fishes, crabs etc. are sorted out on board before arriving at the landing site. The catches, immediately on arrival, are taken out for disposal. If the boats are financed by Government agencies, auctioning is conducted by South Kananra Co-operative Fish Marketing Federation and 50% of the amount realised is adjusted towards the repayment of the loan, provided the prawn catches are heavy. Instead, if the prawn catches are low, only 5% of the return is taken as commission by Federation. Auctioning is generally done to fix the price of prawns (per kg) landed by different boats, separately. This is done since the quality and size of prawns vary from boat to boat. Even the rates of a single species differ from boat to boat in a day. The monthly average auctioning rates for different category of prawns are presented in Table 3. It is seen that the rate ranged from Rs.5 to 14 for *P.stylifera*, and from Rs.17 to 71 in the case of *P.indicus/P.monodon*.

**Table.3.** The average auctioning rates (in Rupees) of different category of prawns at Mangalore during 1980-81 and 1981-82

		<i>M.dobsoni</i>	<i>M.affinis</i>	<i>M.monoceros</i>	<i>P.stylifera</i>	<i>P.indicus</i>	<i>P.monodon</i>
September	1980-81	10.96	—	—	—	36.94	—
	'81-82	16.00	—	—	—	—	—
October	'80-81	—	—	—	—	—	—
	'81-82	—	—	—	—	—	—
November	'80-81	—	—	—	—	—	—
	'81-82	13.55	27.70	27.70	13.30	32.50	42.50
December	'80-81	10.90	—	—	11.80	17.00	—
	'81-82	11.75	28.75	28.75	10.75	37.00	45.60
January	'80-81	12.10	23.00	23.00	10.60	25.00	—
	'81-82	13.00	28.00	28.00	11.00	40.00	55.00
February	'80-81	14.20	29.00	18.80	12.80	39.45	48.35
	'81-82	16.00	29.00	29.00	14.00	42.00	58.00
March	'80-81	13.20	25.50	26.45	12.65	39.80	44.50
	'81-82	13.00	26.00	26.00	10.50	43.00	55.00
April	'80-81	14.35	25.00	26.40	12.95	40.00	—
	'81-82	13.50	30.00	30.75	10.25	57.75	—
May	'80-81	12.00	—	—	5.00	38.00	—
	'81-82	16.40	38.00	—	10.00	71.00	—
June	'80-81	—	—	—	—	—	—
	'81-82	16.50	—	—	9.40	—	—

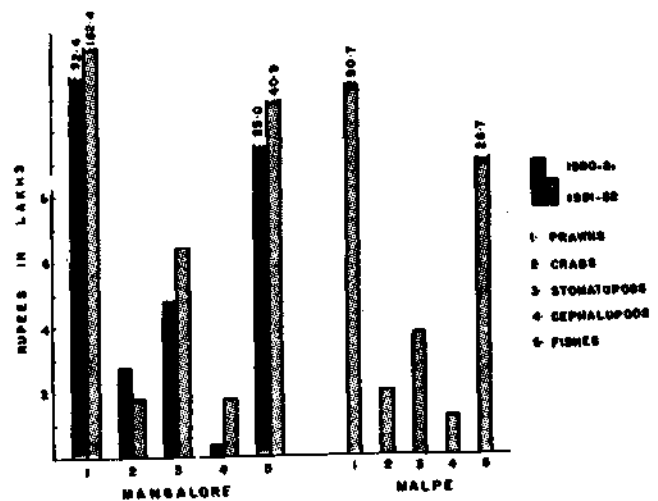
In addition, there are a good number of boats owned by private parties (In Mangalore, more than 100 units are private and at Malpe, except a few, all the boats are owned by private agencies). Prawn catches of these units are booked by agents by financing huge sums. Normally, they take the prawn catch at a reduced rate. Later, the prawns are sold to local freezing plants at higher prices by some agents, while others send them to Cochin by train in crushed ice in bamboo baskets reinforced on sides by coconut leaves/mats made of palmyra leaves.

Crabs and quality fishes are auctioned by Federation/fishermen in the landing centre itself immediately on arrival. Generally a few baskets are taken out and auctioned as a lot. These fishes /crabs are purchased by fisherwomen/merchants /cycle venders etc., who in turn take them to the nearby markets or transport them in crushed ice to interior markets for immediate consumption. If the catches are heavy, some of the fishes like silver bellies, soles, *Lactarius*, carangids, cat fish, anchovies etc., are salted and dried/sun dried for future sale.

The stomtopods are purchased by agents who supply them to fish meal plants nearby. At Malpe, this is sundried and packed in gunny bags before

selling them to fish meal plants/as manure at a premium.

Similarly, cephalopods are purchased by agents directly from the boats and supplied to processing units.



**Fig. 7.** Value of the major categories inducted by shrimp trawlers during 1980-81 & 1981-82 at Mangalore and 1981-82 at Malpe.

Based on the average price, the total estimated value realised in rupees was 12.5 million during 1980-81 at Mangalore. During 1981-82, the total amount realised was 21.3 million which was 70.3% more than that obtained during the previous season (Fig.7). This was due to enhanced catches of prawns and other fish groups resulting in better returns. At Malpe, the total value realised was 12.4 million rupees. In the total value, prawns alone contributed upto 75% at Mangalore and 72.3% at Malpe. The next important group was fishes fetching around 20% of the total value followed by stomatopods, crabs and cephalopods.

### General Remarks

It is interesting to note that prawns alone contributed around 70-75% of the total value realised, although it formed only 13% of the annual average trawl catch. Due to the ever-increasing demand for prawns from the processing industry, there has been a tendency to increase the number of trawl units since the beginning of seventies resulting in a

two-fold increase in fishing effort within a decade. The heavy exploitation of prawn resources is continuing and although there has not been any serious depletion of the resources, considerable strain on the exploited stock is evident, resulting in wide fluctuations in the catches. However, prawns being an annual stock, it may be possible for the resource to recover by the strength of the new recruits every year despite heavy fishing. The breeding migration of females of prawns, annual forced closure of the fishing during the period of the south west monsoon and the limited period of the fishing season (December-May) together with the restricted operations of trawls within 40 m depth are some of the biological and fishery controlled factors favourable for the resources to replenish its stock. In view of all these, although there has been fluctuation of the catches, showing very low returns in some years, it may not lead to any serious depletion of the resources, atleast in the near future, necessitating any urgent conservatory measures. However, a close monitoring of the situation is essential.

