GOVT. OF INDIA

BULLETIN OF THE EXPLORATORY FISHERIES PROJECT

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ANNUAL REPORT 1974-75.

1

JULY 1975

EXPLORATORY FISHERIES PROJECT
GOVT. OF INDIA
BOTAWALA CHAMBERS
SIR PHEROZSHAH MEHTA ROAD
B O M B A Y - 1.

I N D I A .

The Bulletin of the Exploratory Fisheries Project, Bombay is published at irregular intervals as and when information of a useful nature becomes available for dissemination.

This report includes unprocessed or semi-processed data which would form the basis of scientific papers in due course. The material contained in the report, therefore, may not be made use of without the permission of this Project, except for quoting in scientific references.

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PREFACE

This is the second issue of the Bulletin of the Exploratory Fisheries Project. The first issue was released during November '74. This issue carries the annual report of the Project for the period from 1st April '74 to 31st March 1975. It is the second annual report of its kind published by the organization during its 29 years of existence. None of these publications give a comprehensive picture about the structure, activities, etc., of the Project. It is, therefore, considered useful and appropriate to devote a few pages of this issue for giving a brief account of the history, growth, objectives, organizational structure, etc., of the Project.

History

The Exploratory Fisheries Project, which was till recently known as the Deep Sea Fishing Station, Bombay, was established in October 1946 as a post-war developmental scheme by the Government of India. Having realised the catalytic effect it has had on the development of sea fishing industry in the area, the Government of India decided during the fifties to organise a chain of such deep sea and offshore fishing stations along both our coasts.

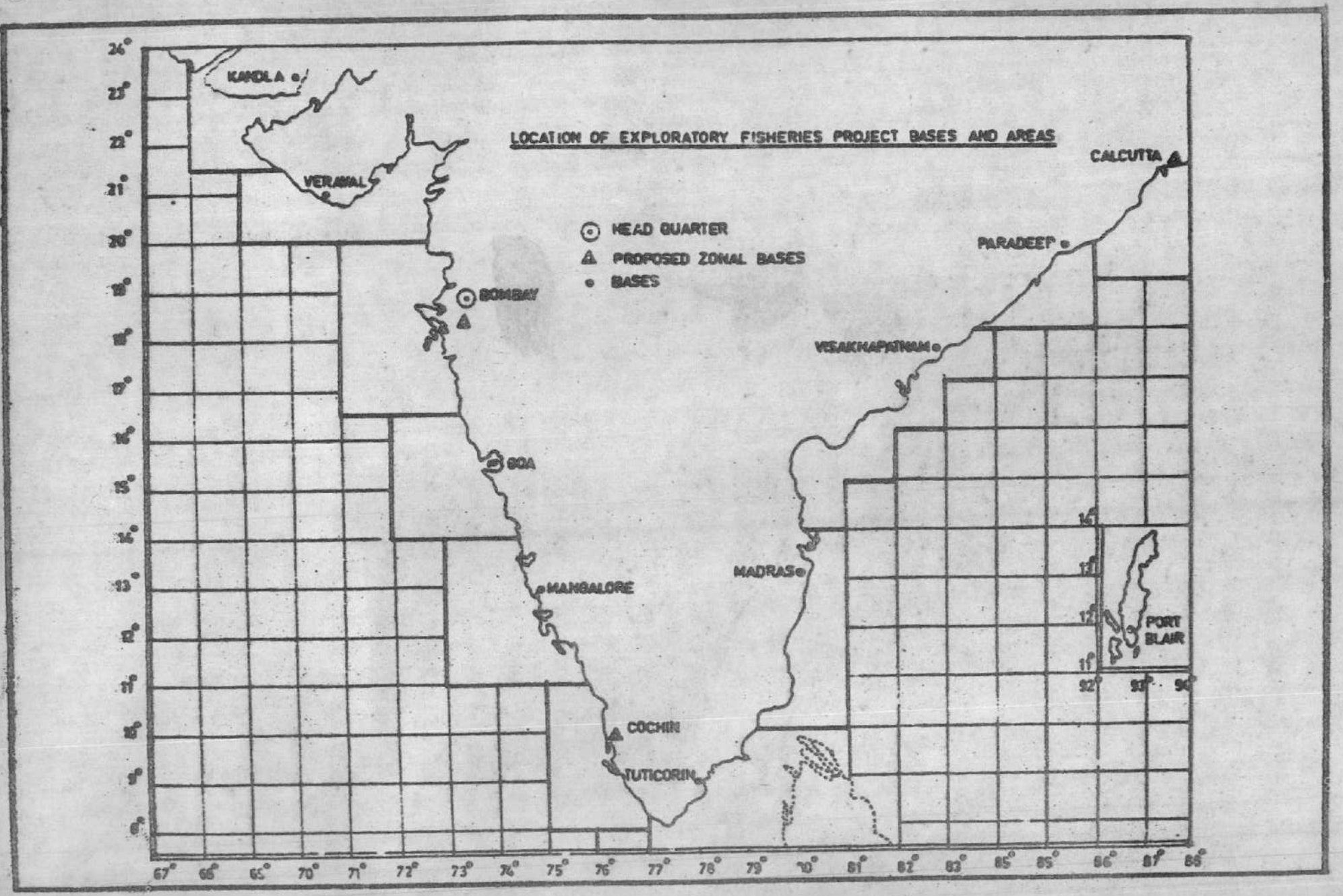
Growth

During the First Five Year Plan three Offshore Fishing Stations were established. The Offshore Fishing Station at Cochin was established in 1957 while those at Tuticorin and Visakhapatnam were opened in 1958. The establishment of these stations was in fact a sequel of the taking over of about a dozen T.C.M. Aid wooden fishing vessels and a few steel trawlers by the organization from various maritime states which were operating them then, during 1957-58. For sometime, these stations were working directly under the control of the then Ministry of Food and Agriculture, Government of India,

New Delhi. During 1960, these stations were brought under the administrative control of the Superintending Engineer, Deep Sea Fishing Station, Bombay, who was declared as the Head of the Department of the Offshore Fishing Stations also. As part of the Second Five Year Plan programmes, an Offshore Fishing Station at Mangalore and a sub-station of the Deep Sea Fishing Station, Bombay, at Veraval were established during 1962. Thus by the end of 1962 there were four Offshore Fishing Stations under the Deep Sea Fishing Station, Bombay, besides its sub-station at Veraval. These six stations were operating about 20 fishing vessels including 14 wooden vessels.

During the Third Five Year Plan, no new stations were established. Many of the wooden vessels became unsuitable for exploratory fishing by 1965 due to ageing and were, therefore, decommissioned. Consequently the Offshore Fishing Station, Mangalore and the Deep Sea Fishing sub-station at Veraval were closed down during 1965-66.

During the Fourth Five Year Plan an ambitious programme of establishing eight new Offshore Fishing Stations and of procuring 20 new steel trawlers was launched. Orders were placed for the construction of twenty 17.5 m. steel trawlers with the indigenous shipbuilding industry in 1968. With the taking over of these vessels, it was also decided to open Offshore Fishing Stations at Kandla, Veraval, Goa, Mangalore, Madras, Paradeep, Calcutta and Port Blair. The Offshore Fishing Stations at Port Blair and Calcutta were established during 1970-71. The Offshore Fishing Station, Kandla started functioning during 1971-72 while the Offshore Fishing Stations at Goa, Paradeep, Madras and Mangalore were established during 1972-73.


LOCATION OF EXPLORATORY FISHERIES PROJECT BASES AND AREAS
HEAD QUARTER
PROPOSED ZONAL BASES
BASES
KANDLA
VERAVAL
BOMBAY
GOA
MANGALORE
COCHIN
TUTICORIN
MADRAS
VISAKHAPATNAM
PARADEEP
CALCUTTA
PORT BLAIR

Of the eight new Offshore Fishing Stations envisaged to be established during the Fourth Plan seven were opened. The eighth station i.e. the Station at Veraval is yet to be established. Out of the 20 new vessels ordered, two are yet to be taken over and with the taking over of these vessels, the station at Veraval is also expected to be opened. Thus at the end of the Fourth Five Year Plan there were ten Offshore Fishing Stations, besides the Deep Sea Fishing Station, Bombay.

Change in name

During 1973, it was decided to separate the field office of the Deep Sea Fishing Station, Bombay, located at the Sassoon Dock from the main office and to make it an independent Offshore Fishing Station. The eleventh Offshore Fishing Station was thus born in October '73. Due to several reasons it was also decided by the Government of India to rename the organization of Offshore Fishing Stations and the Deep Sea Fishing Station as "Exploratory Fisheries Project" during 1974. The erstwhile Deep Sea Fishing Station, Bombay is known as the Exploratory Fisheries Project, Bombay while the eleven erstwhile Offshore Fishing Stations are known as Bases of the Exploratory Fisheries Project. Thus the Exploratory Fisheries Project has at present eleven bases of operation and they are Kandla, Bombay, Goa, Mangalore, Cochin, Tuticorin, Madras, Visakhapatnam, Paradeep, Calcutta and Port Blair. The twelfth base is scheduled to be opened during 1975-76 at Veraval. The designation of the head of the department also was changed in 1973 from Superintending Engineer to Director. The Project has at present 23 steel fishing vessels distributed among its 11 bases. Two more steel vessels will be taken over soon.

Organisational structure

The headquarters of the Project, as mentioned earlier, is at Bombay. The Director, who is the chief executive of the Project, is also head of the Department. He is assisted by an Executive Engineer, Assistant Director, Accounts Officer and Administrative Officer besides other staff at the headquarters.

Each of the base is manned on the fisheries side either by a Deputy Director or an Assistant Director and on the engineering side by an Assistant Engineer. Out of the 11 bases, five are manned by Deputy Directors and six by Assistant Directors. The incharge of each base is declared as head of office and is delegated with requisite administrative and financial powers. The head of offices report to the Director and the Director in turn report to the Fisheries Division in the Ministry. The present organisational structure is proposed to be streamlined by zonalizing the activities of the Project and reducing the span of direct control by the head office. This is receiving the attention of the government.

Objectives

The objectives of the Project as per Government of India order No.F.3-39/51-FY, dt.21-12-1951 are as follows:

1) to carry out exploratory work in respect of:

   i) the charting of fishing grounds;

   ii) the determination of the best fishing seasons;

   iii) the examination of the types of fish available;

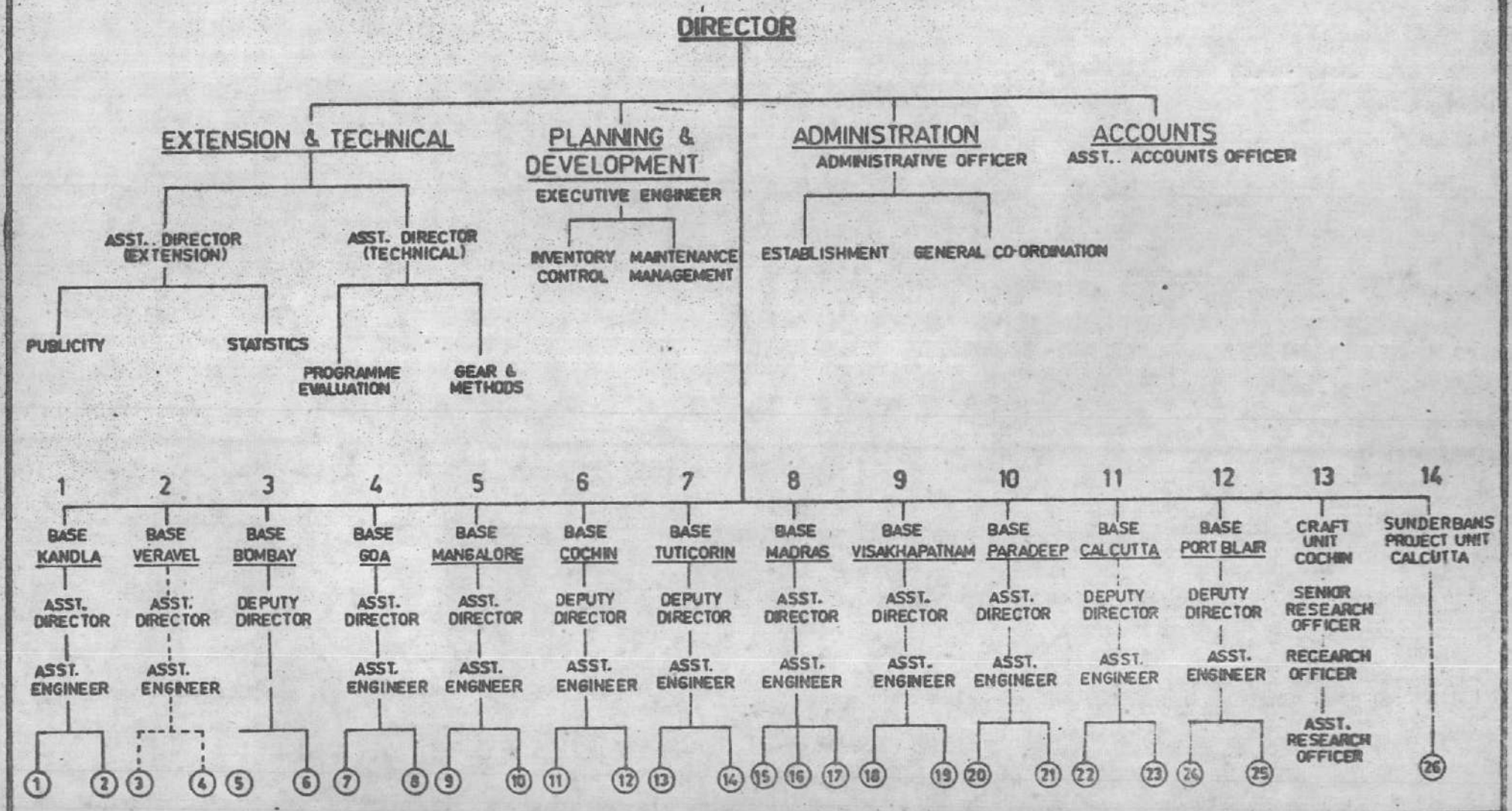
   iv) the assessment of the suitability of different types of fishing vessels; and

   v) the assessment of the suitability of different types of fishing gear and equipment especially nets;

2) to train personnel for fishing operations on modern lines; and

EXPLORATORY FISHERIES PROJECT BOMBAY

(ORGANISATIONAL CHART)



3) to test the commercial possibilities of deep sea fishing and make available the requisite data and information to those concerned so as to help and guide the expansion of the fishing industry.

It is perhaps necessary to add a word or two more about the objectives of the Project by way of clarification. It is natural that with the passage of time old ideas are replaced by new concepts and ideas. The fisheries science has been no exception to this rule. Concepts such as Exploratory fishing, Experimental fishing, etc. which embrace many of the above mentioned activities, have since emerged. Exploratory fishing, for instance, has been defined as the study of the distribution and abundance of the different species of fish, both in time and space, inhabiting in a given area using a fishing gear of known efficiency. Experimental fishing on the other hand is defined as the study of the efficiency of a fishing gear for the exploitation of the fish inhabiting in a given area. In recent times, "experimental fishing" has also been used by some authors to mean fishing aimed at establishing economic viability of a resource, in areas which have already been explored.

Generally speaking, the fishing programmes of the Project fall under two categories viz., (1) exploratory fishing and (2) experimental fishing. Exploratory fishing is conducted in areas which are either unexplored or under explored. Experimental fishing is conducted generally in explored areas either for introducing a new fishing method or gear or for evaluating their efficiency. It is also done to evaluate the economic viability of fishing a new found resource, or of a new type of vessel or gear.

Acknowledgements

As discussed elsewhere in this report the Project has achieved significant progress during the year under

report. The performance of fishing vessels measured in terms of catch, effort, etc., have registered an increase of 40 - 76 percent depending on the parameters. This progress was achieved in spite of numerous hurdles and bottlenecks, particularly lack of officers for manning different bases. It would have been impossible to achieve this progress without the unfailing support and constant encouragement of Sri S.P. Balasubramanian, Joint Secretary (Fisheries), Ministry of Agriculture, Department of Agriculture, New Delhi. I take this opportunity to place on record our indebtedness to him. I also take this opportunity to thank Prof. P.C. George, Joint Commissioner (Fisheries), Ministry of Agriculture, Department of Agriculture, New Delhi, for his valuable advice in all matters particularly in the areas of planning and scheduling of fishing programmes, processing and reporting of data, etc. I wish to thank Dr. T.A. Mammen, Deputy Commissioner, Ministry of Agriculture, Department of Agriculture, for his critical evaluation of the last year's Annual Report and for the valuable suggestions he has given. Many of his suggestions have been incorporated in the presentation of the present report. I also take this opportunity to thank all the officers and men in the Project without whose whole-hearted support and dedicated work we would not have been able to achieve the progress reported in this bulletin.

Bombay,
dt.15-7-1975

K.M. JOSEPH
D I R E C T O R

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ANNUAL REPORT OF THE EXPLORATORY FISHERIES PROJECT, BOMBAY, 1974-75

1. INTRODUCTION

This report deals with the activities and achievements of the Exploratory Fisheries Project, Bombay during the period from 1-4-74 to 31-3-75. One of the most important changes that took place during the year under report is the renaming of the organization as Exploratory Fisheries Project, Bombay. The erstwhile Offshore Fishing Stations were renamed as bases of the Exploratory Fisheries Project, Bombay. Needless to say that the new name is more appropriate as it reflects the actual objective and the true character of the organization.

The Project has at present 11 bases of operation, viz., Kandla, Bombay, Goa, Mangalore, Cochin, Tuticorin, Madras, Visakhapatnam, Paradeep, Calcutta and Port Blair under its administrative control besides the Sunderbans Project unit attached to the Exploratory Fisheries Project base, Calcutta and the Craft design unit attached to the Exploratory Fisheries Project base, Cochin. In all, there were 23 sea going fishing vessels distributed among these 11 bases besides the estuarine research vessel M.F.V. Sunderbans based at Calcutta. There was no increase or decrease in the strength of the fishing fleet during the year as compared to the previous year. The total staff strength stood at about 700 during the year.

Considerable progress was achieved in the efficiency of operation of the vessels during the year. 22 out of the 23 vessels have operated during the year as against 19 during the previous year. The combined fishing effort of these vessels rose from 2028 during '73-74 to 2891 during '74-75. The average number of days

operated per vessel was 126 days during '74-75 as against 88 days during '73-74 and 62 during '72-73. An unexplored area of about 22,000 sq. km. within 30 fathom depth and about 2000 sq. km. between the 30-100 fm depth were surveyed during the year as against about 15,000 sq. km. during the previous year. An area of about 37,000 sq. km. of shelf was also re-surveyed by the experimental fishing vessels. The catch and value, although incidental in ex loratory fishing, have also registered significant increase. The total catch landed by the vessels showed an increase of about 48 percent while the sale proceeds showed an increase of about 76 percent over those of the previous year i.e. '73-74.

The performance of 17.5 m indigenously constructed trawlers operated by the Paradeep base was remarkably good in terms of catch and value. Substantial progress was also recorded in other areas of the Project activities particularly in the field of diversification of fishing, processing and dissemination of results of exploratory survey, standaridisation of data collection and reporting, etc. The Project began to publish a bulletin during the year under review and the first issue of the bulletin covering information about the demersal fisheries resources of the North-west coast was published during November '74. It may be recalled that this progress was achieved ins ite of the fact that about 40 percent of the Class-I officers posts which were vacant during '73-74 continued to remain vacant during the year under report also.

2. FISHING PROGRAMME

Based on the recommendations of the sub-committees of the Central Advisory Committee on Exploratory Survey of Marine Fisheries, the Chairman of which is the Director of Fisheries of the concerned state, attached to each base and taking into consideration of the resources such as vessels, expertise, etc. available at the disposal of the Project, fishing programme were chalked, for each base and vessel. With some alteration this programme was approved by the Central Advisory Committee on Exploratory Survey of Marine Fisheries at its fourth meeting held at Cochin on 24th June '74. It may be recalled here that Directors of Fisheries of all the maritime states are members of the Central Advisory Committee. The fishing programme of the various bases as approved by the Committee is furnished in Table-I.

Base	Vessel	Type of operation	Area	Depth range (Mts)
KANDLA	Meena Udyog	Experimental demersal trawling.	22-68 and 22-69	10-70
	Kalyani V	Exploratory demersal trawling.	22-68 and 22-69	50-200
BOMBAY	Meena Bharati	Exploratory demersal trawling.	16-72,17-72, 18-71,18-72, 19-69,19-71, and 19-72.	50-200
	Meena Sachatak	Experimental demersal trawling.	17-72,17-73, 18-72 and 19-72.	20-60.
G O A	Meena Netra	Experimental bottom trawling and shrimp survey.	15-73 and 16-73	10-60.
	Meena Ayojak	Exploratory demersal trawling/Kalava hand-line fishing.	15-73,14-73,15-72, 15-73,16-72 and 16-73.	30-290
MANGALORE	Meena Tarangini.	Experimental demersal trawling.	12-74,13-74 and 14-74.	20-70.
	Meena Anveshak	Exploratory demersal trawling/Purse-seining.	12-74 and 13-74.	20-50.
COCHIN	Meena Utpadak	Exploratory shrimp survey.	9-75,9-76,10-75 and 10-76.	20-90.
	Meena Sangrahak.	Exploratory shrimp survey.	8-76,9-75,9-76, 10-75 and 10-76.	20-100
TUTICORIN	Meena Niryantak.	Experimental demersal trawling.	8-77,8-78,9-78 and 9-79.	20-50.
	Meena Saudagar	Exploratory demersal trawling.	8-78,9-78 and 9-79.	10-60.

(contd...)

(table...contd..)

Base	Vessel	Type of operation	Area	Depth range (Mts)
MADRAS	Meena Sitara	Experimental demersal trawling.	13-80 and 14-80	20-60
	Kalyani IV	Exploratory demersal trawling.	13-80- and 14-80.	50-200
	Meena Gaveshak	Exploratory demersal trawling	11-80,12-80, 13-80 and 14-80.	10-70.
VISAKHA-PATNAM	Meena Shodhak.	Exploratory shrimp survey.	16-82,17-82, 17-83 and 18-84.	30-60
	Meena Jawahar.	Experimental demersal trawling.	16-82,17-82, 17-83,18-83 and 18-84.	30-60.
PARADEEP	Meena-Prasarak.	Exploratory demersal trawling.	20-86	10-40
	Meena Grahi	Experimental demersal trawling.	20-86	10-30
CALCUTTA	Matsya-vigyani.	Exploratory demersal trawling.	19-85,19-86, 19-88,20-86, 20-87,20-88 and 21-88.	50-200
PORT BLAIR	Meena Prayas	Tuna long lining/ Trolling.	10-92,11-92, 12-93,11-92, 12-92 and 11-93.	20-300
	Meena-Khojini.	Demersal trawling/ Kalva handline fishing	11-92,12-92, 13-93 and 11-93.	10-120.

Table-I: Exploratory and Experimental fishing programme 1974-75.

One of the salient features of the fishing programme drawn up for '74-75 is the attempt made to make it as realistic as possible and to allocate appropriate priorities. The first priority was given for the survey of the demersal fisheries resources in areas which were still remaining unexplored within 30 fm belt along both the coasts. Ten 17.5 m indigeneously constructed trawlers were assigned with this task of surveying the demersal resources in unexplored areas within 30 fm from various bases. The second priority was for the survey of the demersal fishery resources between 30 and 100 fm by utilising the available number of larger vessels. Matsyavigyani from Calcutta, Kalyani-IV from Madras, Meena Bharati from Bombay and Kalyani V from Kandla carried out this work.

One of the significant features of fishing programme for 1974-75 was the clear demarcation made between exploratory and experimental fishing. Under experimental fishing scheme, eight 17.5 m. indigenously constructed vessels were conducting demersal trawling from Kandla, Bombay, Goa, Mangalore, Tuticorin, Madras, Vizag and Paradeep with a view to finding out the commercial viability of fishing with this type of trawlers from these bases. Diversification of fishing was also given considerable emphasis in the programme for the year '74-75. As a follow-up action to the work of Pelagic Fisheries Project, Cochin, Purse-seining was programmed to be taken up from Mangalore and Goa while midwater trawling was to be taken up from Tuticorin and Kandla. Tuna longlining and trolling were carried out by two 17.5 m. vessels from Port Blair. Kalava handline fishing was introduced from 17.5 m. vessels by Goa and Port Blair bases.

Some special studies which have direct industrial application were also taken up. Mention may be made of the special shrimp survey programme being carried out from Vizag and Cochin. Thus it may be seen from Table-I that out of the 23 vessels, 10 were conducting exploratory demersal trawling while two vessels conducted special survey for shrimp. Eight vessels carried out experimental demersal trawling whereas the remaining two vessels conducted diversified fishing such as purse-seining, tuna long lining etc. The vessel M.F.V. Jheenga was laid up throughout the year for want of an imported engine component.

3. FISHING VESSELS

The major specifications of the fishing vessels of the Project are given in table II. It may be seen from the table that during the period under review the fishing fleet of the Project comprised 23 steel trawlers. Out of these, 18 vessels were indigenously constructed steel trawlers of 17.5 m. overall length. Four of the remaining vessels were larger trawlers. Of these two viz., Kalyani-IV and V were about 20 years old.

During the period under review, it may be said that the 17.5 m vessels came out of their teething troubles and most of them yielded satisfactory results. Kalyani-IV and V which were laid up since 1969 were commissioned for fishing during the period under review. M.F.V. Jheenga which was laid up since 1973 for want of an imported gear box housing could not be commissioned inspite of the best efforts. Thus 22 out of the 23 vessels were in operation during the year as against 19 during the previous year.

Sl. No.	Name of vessel	Place built	OAL (m)	BHP	GRT	Main engine	Crew strength	Year built
1.	Kalyani IV	Japan	30.96	300	123.0	Hayashikane	14	1954
2.	Kalyani V	Japan	30.96	300	123.0	Hayashikane	14	1954
3.	Jheenga	Holland	16.50	153	48.6	Caterpillar	7	1958
4.	Meena Bharati	India	22.50	262	69.2	M.A.N.	13	1965
5.	Matsyavigyani	G.D.R.	32.20	578	182.6	New Schwema Sohenen	14	1969.
6.	Meena Prayas	India	17.5	200	56.8	Kirloskar M.A.N.	10	1969
7.	Meena Khojini	India	17.5	200	56.8	Kirloskar M.A.N.	10	1969
8.	Meena Utpadak	India	17.5	200	56.8	Kirloskar M.A.N.	10	1969
9.	Meena Sangrahak	India	17.5	200	56.8	Kirloskar M.A.N.	10	1969
10.	Meena Udyog	India	17.5	200	56.8	Kirloskar M.A.N.	10	1970
11.	Meena Niryantak	India	17.5	200	56.8	Kirloskar M.A.N.	10	1970
12.	Meena Sitara	India	17.5	200	56.8	Kirloskar M.A.N.	10	1970
13.	Meena Gaveshak	India	17.5	200	56.8	Kirloskar M.A.N.	10	1970
14.	Meena Jawhar	India	17.5	200	56.8	Kirloskar M.A.N.	10	1970
15.	Meena Shodhak	India	17.5	200	56.8	Kirloskar M.A.N.	10	1970
16.	Meena Tarangini	India	17.5	200	56.8	Kirloskar M.A.N.	10	1971
17.	Meena Saudagar	India	17.5	200	56.8	Kirloskar M.A.N.	10	1971
18.	Meena Sachetak	India	17.5	200	56.8	Kirloskar M.A.N.	10	1971
19.	Meena Netra	India	17.5	200	56.8	Kirloskar M.A.N.	10	1971
20.	Meena Anveshak	India	17.5	200	56.8	Kirloskar M.A.N.	10	1971
21.	Meena Grahi	India	17.5	200	56.8	Kirloskar M.A.N.	10	1971
22.	Meena Prasarak	India	17.5	200	56.8	Kirloskar M.A.N.	10	1971
23.	Meena Ayojak	India	17.5	200	56.8	Kirloskar M.A.N.	10	1971

Table-II. Major specifications of the fishing fleet.

4. FISHING GEAR

Table III shows the major specifications of the bottom trawls operated by the Project vessels during 1974-75. The principal types of gear operated by the 17.5 m vessels, were 28 m shrimp trawls and 24 m fish trawls. The larger vessels operated 42.5 m shrimp trawls and 35 m and 45 m fish trawls.

Type of trawl	Head rope length m	Foot rope length m	Mesh size maximum and minimum (stretched) mm	Weight and size of otter-board.
1. 20 m fish trawl	20.0	27.5	140-40	180 kg. 1.8 sq.m. Oval
2. 24 m four-seam fish trawl.	24.0	32.0	140-50	180 kg. 1.8 sq.m. Oval.
3. 30 m two-seam fish trawl	30.0	42.0	70-25	240 kg. 2.2 sq.m. Oval
4. 35 m fish trawl	35.0	43.0	60-20	180 kg. 1.89 sq.m. Oval
5. 45 m fish trawl	45.0	59.0	70-20	450 kg. 3.2 sq.m. Rectangular
6. 18.5 m shrimp trawl	18.5	18.5	30.12	180 kg. 1.89 sq.m. Oval
7. 28 m four-seam shrimp trawl	28.0	32.5	50-38	180 kg. 1.6 sq.m. Oval
8. 42 m four-seam synthetic shrimp trawl.	42.0	46.0	60-30	250 kg. 2.2 sq.m. Oval
9. 42.5 m shrimp trawl	42.5	46.9	50-25	180 kg. 1.6 sq.m. Rectangular

Table.III. Major specifications of the important types of trawls operated.

5. RESULTS OF SURVEY OF DEMERSAL FISHERIES RESOURCES

As mentioned elsewhere in this report, 14 vessels were deployed for exploratory fishing during the period under review. Of these, 12 vessels conducted exploratory demersal trawling from the eleven bases. In general 17.5 m vessels were surveying unexplored areas within 30 fm depth while the larger vessels such as Meena Bharati, Kalyani-IV and V and Matsyavigyani were operating in areas beyond 30 fm depth. The 14 exploratory fishing vessels surveyed a total unexplored area of about 24,000 sq. km. and in the course of the survey they landed about 745 tons of fish and prawns. A summary of the results of operation of exploratory fishing vessels is given in table-IV. It may be seen from the table that the highest catch per hour of trawling viz., 312 kg. was obtained by the vessel Meena Prasarak operated from Paradeep base. The second highest catch per hour of 245 kg. was registered by vessel Matsyavigyani operated from Calcutta base.

Base	Vessel	Days fished.	Area covered	Depth range (Mts.)	Extent of area surveyed(sq.km.)	Catch landed (kg.)	Catch/hour(kg.)
KANDLA	Kalyani-V	66	22-68 & 22-69	10-70	887	37,308	143
BOMBAY	Meena Bharati	126	17-72, 18-71, 18-72, 19-71 and 19-72.	20-140	2482	1,12,268	154
G O A	Meena Ayojak	95	15-73, 14-73,18-72 & 19-72	20-50	1530	27,583	61
MANGALORE	Meena Anaveshak	86	12-74,13,74,18-72 & 19-72.	20-50	1207	21,284	60
COCHIN	Meena Utpadak	173	9-75,9-76,10-75 & 10-76.	20-90	2251	56,039	85
	Meena Sangrahak	201	8-76,9-75,9-76, 10-75 & 10-76.	20-90	2517	58,301	79
TUTICORIN	Meena Saudagar	127	8-78,9-78,9-79, 12-74 & 13-74	10-60	1778	40,067	77
MADRAS	Kalyani-IV	34	13-80,14-80 & 18-72	10-60	401	26,831	227
	Meena Gaveshak	171	11-80,12-80, 13-80 & 14-80	10-70	2502	89,165	121
VISAKHAPATNAM	Meena Shodhak	136	17-82,17-73 & 18-84	30-60	2258	48,564	73
PARADEEP	Meena Prasarak	77	20-86	10-40	1187	1,08,822	312
CALCUTTA.	Matsyavigyani	138	19-86,20-86, 20-87 & 20-88.	10-60	1302	94,007	245

(contd...)

Base	Vessel	Days-fished.	Area covered	Depth range (Mts.)	Extent of area surveyed(sq.km.)	Catch landed (kg.)	Catch/hour(kg.)
PORT BLAIR	Meena Prayas	128	10-92,11-92, 12-93 & 11-93	20-300	2550	13,307	18
	Meena Khonini	63	11-92,11-93 & 12-92	10-120	466	11,358	83
T O T A L :		1621			23318	7,44,904	109

Table-IV Summary of operation of Exploratory Fishing vessels.

Eight 17.5 m vessels were conducting experimental demersal trawling in areas which were already explored. The data gathered by these vessels were also taken for the purpose of evaluation of relative abundance of resources and other analysis, in relation to area, depth and time.

For documentation and assessment of fisheries resources potential, the areas covered by the vessels along the west and east coasts were divided into four zones, viz., north west zone, south west zone, south east zone and north east zone. The Andaman and Nicobar group of islands were treated separately. For bathymetrical analysis, the shelf is stratified into zones of 10 m intervals. The fishing effort, total catch, species composition, catch per hour etc. of each division or square (Joseph 1974) were worked out. The catch per hour is used as the index for determining the relative abundance of resources in general and of important species.

5.1. Relative abundance and species composition by area

5.1.1. North west zone

It may be seen from table V that out of the eleven divisions surveyed in this zone, the highest catch rate of 224 kg. was obtained from area 19-69 off Maharashtra while area 22-68 off Gujarat yielded a catch per hour of 147 kg. The dominant species were cat fish, elasmobranchs, ghol, dhoma, karkara and pomfret. The abundance of cat fish was relatively high in areas 19-69 and 18-72 while they were insignificant in areas 22-68 and 19-72. Elasmobranchs and dhoma registered high catch rates in area 22-68. A high catch rate of eel was obtained from area 19-71 while ghol, karkara and pomfret accounted for the highest rate from area 19-69.

JOSEPH, K. M. 1974. Demersal Fisheries Resources off the North west coast of India. Bull. Expl. Fish. Proj. No.1., 1-45.

Area	Fishing effort (hrs.)	Catch/Hour of species in kg.											All species
		Prawn	Elasmo-branch	Cat fish	Ghol	Pom-fret	Dhoma	Karka-ra.	Eel	Kati	Other quality fish	Misc. fish	
		1	2	3	4	5	6	7	8	9	10	11	12
22-69	181	-	35.5	-	0.1	-	0.5	-	14.7	-	-	0.2	51.0
22-68	593	0.9	47.4	7.0	15.4	3.4	24.7	4.8	8.4	17.5	10.3	2.3	142.1
19-72	137	0.5	16.2	2.8	2.7	0.7	2.4	0.7	3.2	1.2	2.9	19.7	52.7
19-71	133	0.1	26.0	11.8	13.8	0.4	5.2	0.8	26.7	2.1	5.0	6.7	98.6
19-69	9	-	20.6	76.7	79.3	21.4	-	15.0	6.1	2.2	2.9	-	224.2
18-72	688	0.1	35.6	57.1	9.0	1.5	16.7	2.0	2.6	0.5	5.9	16.8	147.8
18-71	183	-	14.3	28.9	2.2	0.1	-	2.5	0.7	0.6	22.7	18.8	90.8
17-73	13	-	9.6	8.1	3.1	-	5.4	-	0.4	-	-	3.1	29.7
17-72	233	-	14.4	29.6	4.2	1.6	1.2	7.9	-	1.0	22.0	21.7	103.6
16-73	70	0.4	40.0	50.2	4.4	-	18.5	-	-	-	0.7	5.3	119.5
16-72	12	-	21.7	16.7	5.8	0.8	-	0.8	-	3.8	15.0	23.8	88.4

Table. V. Area-wise and species-wise catch/hour of trawling in the North west zone.

5.1.2. South west zone

Table VI shows that out of five areas surveyed along the Karnataka-Goa coast area 14-74 yielded the highest catch/hour viz., 171 kg. Next highest catch rate viz., 129 kg. was obtained from area 12-75. Area 15-73 off Goa and 13-74 off Karnataka were also remarkable in that they have yielded a catch rate of 113 and 104 kg. respectively. Out of five areas surveyed off Kerala, it may be noted that none yielded a catch/hour of more than 100 kg. The catch rate of prawn was comparatively high viz., 8.5 kg. from area 10-75. Kilimeen registered a high catch rate in area 9-75, while area 15-73 was remarkable for elasmobranchs, ribbon fish and perch. Lactarius was relatively more in areas 14-74. Cat fish accounted for the highest catch rate from area 12-75.

Area	Fishing effort (hrs.)	Catch/hour of species in kg. Prawn	Elasmo-branch	Cat fish	Lizard fish	Kili-meen	Lacta-rius	Ribbon fish	Perch	Other quality fish.	Misc. fish.	All species.
15-73	1047	4.8	24.2	21.9	2.4	5.2	-	12.2	4.2	12.1	26.2	113.2
14-74	15	0.7	8.0	16.7	-	-	56.5	-	-	-	89.0	170.9
13-74	515	0.7	11.9	13.8	-	3.9	5.9	1.9	-	0.7	65.3	104.1
12-75	18	1.4	9.7	24.7	-	-	6.9	-	-	1.1	85.3	129.1
12-74	515	2.1	12.4	21.6	-	1.6	2.7	5.5	-	2.1	34.4	82.4
10-76	127	2.2	9.6	19.4	1.6	-	0.6	-	0.3	3.4	33.9	71.0
10-75	176	8.5	4.3	4.6	0.9	0.1	0.7	-	0.1	2.5	32.6	54.3
9-76	854	3.0	10.9	8.4	1.6	3.2	0.5	-	0.3	5.6	51.3	84.8
9-75	238	1.3	16.2	13.2	2.5	16.1	0.2	-	0.2	8.1	38.5	96.3
8-76	61	-	4.7	16.7	5.3	-	-	-	-	3.7	60.0	90.4

Table.VI. Area-wise and species-wise catch/hour of trawling in the South west zone.

5.1.3. South east zone

From the results shown in table VII it may be seen that altogether eight areas were surveyed along the Tamil Nadu coast. Area 14-80 off Madras accounted for the highest catch/hour viz., 198 kg. Area 11-80 came next in the order of catch per unit effort. The catch rates from all areas covered from Tuticorin base were below 100 kg./hour as in the case of Cochin. Among the quality fishes of this zone perch was relatively predominant in areas 8-78/14-80 and 11-80. The incidence of leiognathids appears to be very high in most of the areas off Madras region. In the case of elasmobranchs the abundance appears to be relatively high in areas 8-77 and 8-78. Lactarius and sciaenids registered very high rates from area 14-80 while Synagris registered the highest catch rate from area 11-80.

Area	Fishing effort (hrs.)	Catch/hour of species in kg. Prawn	Elasmo-branch	Perch	Leiogna-thids	Sciae-nid.	Syna-gris.	Lecta-rius	Lizard fish	Other quality fish.	Misc. fish	All spe-cies.
8-77	63	-	20.4	13.1	-	-	-	-	-	9.5	16.5	59.5
8-78	855	0.1	28.7	43.0	-	0.3	-	-	-	10.0	13.1	95.2
9-78	40	0.1	7.7	15.4	-	-	-	-	-	8.7	39.6	71.5
9-79	56	-	8.0	9.5	-	0.6	-	-	-	8.3	34.5	60.9
11-80	20	0.5	-	46.0	-	-	12.3	-	-	8.3	74.0	141.1
12.80	82	-	0.8	0.1	26.4	-	1.0	-	3.5	3.2	15.8	50.8
13-80	828	0.1	3.7	5.9	33.6	2.1	1.5	0.7	3.3	12.0	27.4	90.3
14-80	721	0.2	8.3	36.4	30.7	16.3	2.3	5.6	-	11.0	86.7	197.5

Table.VII. Area-wise and species-wise catch/hour of trawling in the south east zone.

5.1.4. North east zone

Table VIII shows that among the twelve areas surveyed in this zone, area 19-88 yielded the highest catch/hour viz., 612 kg. Area 20-86 came next in the order of abundance. Out of these eight areas yielded catch rates above 100 kgs./hour and five of them yielded 200 kg. or more. Elasmobranchs, eel and pomfret appeared to be predominant in 19-86, while cat fish was dominant in area 17-83. In the case of perch the availability appears to be relatively high in area 18-83 while area 20-86 was remarkable for dhoma and prawn.

Area	Fishing effort (hrs.)	Catch/hour of species in kg. Prawn	Elasmo-branch	Cat fish	Pom-fret	Eel	Sciae-nid.	Far-kara	Perch	Other quality fish.	Misc. fish.	All species.
16-82	6	-	8.8	8.5	0.8	0.5	1.7	-	0.5	-	39.8	60.6
17-82	29	0.1	11.6	8.1	2.1	0.2	3.8	-	0.6	0.1	54.6	81.5
17-83	1278	0.8	6.1	22.2	0.6	0.3	0.4	-	1.2	2.1	44.1	77.8
18-83	164	0.1	23.1	10.2	0.8	2.0	11.7	-	11.2	0.3	100.9	160.3
18-84	118	0.1	11.8	18.5	0.9	4.4	0.9	-	10.4	0.9	80.1	137.0
19-85	4	-	23.8	-	-	-	-	-	-	10.0	46.3	80.1
19-86	62	1.3	55.2	10.8	35.4	25.4	-	12.3	-	39.2	73.3	252.9
19-88	2	17.5	52.5	52.5	61.0	-	-	53.0	-	270.0	105.0	611.5
20-86	888	24.4	18.4	5.9	13.6	2.2	-	0.9	-	56.5	165.1	287.0
20-87	17	-	51.2	2.1	-	-	-	23.5	-	2.4	136.2	215.3
20-88	193	0.7	52.3	4.5	1.5	5.0	-	1.9	-	8.7	148.6	223.2
21-88	2	-	25.0	-	-	-	-	-	-	-	105.0	130.0

Table.VIII. Area-wise and species-wise catch/hour of trawling in the North east zone.

5.1.5. Andaman and Nicobar Islands

Three areas were surveyed from Port Blair viz., 11-92, 12-92 and 13-93. A high catch/hour of 131 kg. was obtained from area 11-92 where most of the fishing effort was expended. Elasmobranch and cat fish were the dominant species in the catch from this area. The details are furnished below.

Area	Fishing effort (hrs.)	Catch/hour of species (kg.)						
		Elasmo-branch	Cat fish	Kar-kara	Perch	Other quality fish	Misc. fish.	All spe-cies.
11-92	83	31.3	9.5	0.2	0.1	0.8	88.8	130.7
12-92	5	1.0	-	-	-	-	56.2	57.2
13.93	1	80.0	-	-	-	-	-	80.0

5.2. Abundance and species composition by area and depth

5.2.1. North west zone

From table IX it may be seen that in this zone, survey was carried out upto 140 m depth. The highest catch rate was obtained from 60-69 m depth zone embracing areas 18-72 and 22-68. The catch rates appear to be relatively high in depth zones 40-49 m and 50-59 m. The belt between 40-70 m appears to be the best productive zone along the Maharashtra and Gujarat coast. Observations in areas beyond 100 m shows that off Maharashtra depth zone 120-139 m was rather rich in resources.

Area / Depth range (m)	Fishing effort (hrs.)	Percentage composition of species. Prawn	Elasmo-branch	Cat fish	Ghol	Com-fret	Dhoma	Kar-kara	Eel	Kati	Other quality fish.	Misc. fish	Catch/ hour of all species (kg.)
22-69													
10-19	6	-	52.0	-	-	-	-	-	48.0	-	-	-	65
20-29	123	-	75.6	-	0.2	-	0.2	-	24.0	-	-	-	41
30-39	48	-	66.8	-	-	-	2.2	-	31.0	-	-	-	76
40-49	4	-	83.3	-	-	-	-	-	16.7	-	-	-	30
22-68													
10-19	17	-	19.3	7.5	11.7	2.4	19.6	13.2	11.7	12.3	-	2.3	40
20-29	44	-	36.7	8.5	10.0	0.5	9.5	7.3	7.2	15.4	2.1	2.8	127
30-39	177	0.3	34.3	7.4	9.8	1.9	14.9	3.4	8.1	18.8	0.4	0.7	114
40-49	260	0.3	29.3	3.7	11.2	2.8	15.1	4.9	5.8	10.7	1.1	15.1	154
50-59	85	1.4	29.9	4.8	20.6	2.4	8.9	6.8	7.4	9.5	1.2	7.1	186
60-69	10	2.8	27.9	2.0	15.2	0.5	8.4	15.3	7.5	17.5	1.2	1.7	202
19-72													
30-39	64	-	32.3	2.5	17.5	1.7	0.7	0.8	6.8	0.3	4.7	32.7	46
40-49	58	-	26.9	9.1	2.2	1.5	1.6	1.5	3.7	5.1	6.2	42.2	48
50-59	8	7.7	29.6	5.8	1.7	-	18.7	3.2	4.6	1.3	4.1	23.3	97
60-69	7	1.8	39.8	0.7	10.3	-	16.0	-	13.3	-	2.1	16.0	102
19-71													
20-29	13	0.1	45.3	4.7	17.8	-	6.3	-	18.2	-	1.1	6.5	73
30-39	17	0.4	53.6	3.2	10.8	-	9.7	-	13.4	-	0.5	8.4	64
40-49	4	-	49.1	-	12.1	-	22.3	-	7.1	-	-	9.4	56
60-69	16	0.1	32.8	25.5	8.5	1.7	-	2.1	4.3	-	5.4	19.6	65
70-79	83	0.1	20.3	12.5	14.7	0.4	4.8	0.9	32.3	2.9	6.0	5.1	118
19-69													
120-129	1	-	2.2	54.2	34.1	5.2	-	3.3	-	0.5	0.5	-	922
130-139	8	-	15.0	17.3	36.5	13.2	-	9.6	5.2	1.4	1.8	-	137

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Area / Depth range(m)	Fishing effort (hrs.)	Percentage composition of species											Catch/ hour of all species(kg.)
		Prawn	Elasmo-branch	Cat fish	Ghol	Pom-fret	Dhoma	Kar-mara	Eel	Kati	Other quality fish.	Misc. fish .	
18-72													
10-19	28	-	22.3	9.5	8.1	1.4	-	0.1	6.3	1.2	11.9	39.2	53
20-29	127	0.1	44.5	10.1	10.0	0.9	8.7	0.7	3.0	0.2	3.9	17.9	69
30-39	117	0.1	28.4	15.4	12.0	0.4	16.2	0.2	3.9	-	6.8	16.6	55
40-49	137	0.1	22.8	45.3	6.4	0.2	14.8	0.4	2.5	-	4.2	3.4	123
50-59	142	0.1	34.4	35.8	3.8	1.2	9.6	0.9	1.8	0.1	2.5	9.8	206
60-69	91	0.1	11.9	56.7	6.3	1.6	13.9	1.6	0.8	0.4	4.5	2.2	310
70-79	27	-	12.9	26.4	6.0	0.7	4.6	4.5	0.7	1.3	5.9	37.0	224
80-89	19	-	8.3	35.8	1.8	0.9	1.1	4.3	-	2.4	0.2	45.2	246
18-71													
60-69	2	-	-	100.0	-	-	-	-	-	-	-	-	40
70-79	62	-	21.4	18.8	5.0	0.2	-	4.1	1.5	-	27.0	22.0	107
80-89	89	-	15.4	34.4	0.8	-	-	2.3	0.3	1.4	26.3	19.1	82
90-99	30	-	3.3	55.7	0.3	-	-	0.6	-	-	16.7	23.4	87
17-73													
30-39	13	-	32.5	27.3	10.4	-	18.2	-	1.3	-	-	10.3	30
17-72													
20-29	7	-	42.7	14.7	5.9	-	32.4	-	-	-	2.2	2.1	49
40-49	12	-	38.7	41.7	-	-	15.1	-	-	-	2.5	2.0	83
50-59	52	-	14.8	26.8	6.8	1.2	0.3	7.2	-	0.8	5.1	37.0	172
60-69	48	-	11.2	32.6	4.1	2.9	-	9.4	-	1.4	10.8	27.6	153
70-79	40	-	7.8	45.9	-	-	-	5.5	-	1.7	15.0	24.1	72
80-89	26	-	8.3	14.1	-	0.8	-	6.6	-	-	10.5	59.7	46
90-99	40	-	12.8	5.3	0.6	1.7	-	12.2	-	-	27.6	39.8	45
100-109	8	-	20.9	9.3	6.2	3.1	-	7.8	-	-	15.6	37.1	80

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(table.contd...)

Area Depth range(m)	Fishing effort (hrs.)	Percentage composition of catch. Prawn	Elasmo-branch	Cat fish	Ghoi	Pom-fret.	Dhoma	Kar-kara	Eel	Kati	Other quality fish.	Misc. fish.	Catch/ hour of all species(kg.)
16-73													
20-29	37	0.3	34.0	47.0	4.0	-	11.5	-	-	-	0.7	2.5	161
30-39	26	0.7	24.8	27.2	3.8	-	31.4	-	-	-	-	12.1	63
40-49	7	0.2	49.5	28.1	-	-	17.3	-	-	-	-	4.9	87
16-72													
50-59	2	-	13.8	19.2	18.4	4.6	-	-	-	4.6	21.8	27.6	109
60-69	6	-	33.7	20.5	4.4	-	-	-	-	5.1	15.7	20.6	114
80-89	4	-	-	25.2	-	-	-	6.3	-	-	15.1	53.4	40.

Table.IX. Areas-wise and depth-wise percentage composition of species by trawling in the North west zone.

The abundance of cat fish appears to be highest in 60-69 m depth zone off Maharashtra while it is highest in 20-29 m depth zone off Gujarat. In the case of elasmobranchs the percentage was relatively high in 20-39 m depth zone. Dhoma accounted for the highest percentage of catch in 20-39 m depth zone along the Maharashtra coast and 10-19 m depth zone along the Gujarat coast. The percentage of ghol was highest in 50-59 m depth zone. The percentage of pomfret was relatively high in 120-139 m depth zone along the Maharashtra coast and 40-49 m depth zone along the Gujarat coast. The highest percentage of eel was obtained from 10-19 m depth belt from Maharashtra and 30-39 m depth belt from Gujarat. Karkara registered the highest percentage in 90-99 m depth zone from Maharashtra and 60-69 m depth zone from Gujarat.

5.2.2. South west zone

It may be seen from table A that demersal survey was conducted in depth upto 90 m in this zone. The depth zones 40-49 m and 50-59 m along the Kerala coast and 40-49, 50-59 and 60-69 m depth zones along Karnataka-Goa coast were relatively rich in resources.

Elasmobranchs formed the highest percentage in 70-79 m depth zone off Kerala and 30-49 m depth zone off Karnataka. In the case of cat fish, the abundance appeared to have been highest in 20-39 m depth zone. The abundance of kilimeen was found to be relatively high in 40-49 m depth zone along the Kerala coast while ribbon fish was found abundant in this depth zone along the Karnataka-Goa coast. The percentage of perch was relatively high in 50-59 m depth zone off Goa.

Area Depth range(m)	Fishing effort (hrs.)	Percentage composition of species. Prawn	Elasmo-branch	Cat fish	Lizard fish	Kili-meen	Lacta-rius	Ribbon fish.	Perch	Other quality fish.	Misc.	Catch/ hour of all species(kg.)
15-73												
0-9	3	9.0	20.8	1.4	-	-	-	-	-	13.5	55.3	148
10-19	182	19.4	13.8	14.7	-	-	-	3.8	3.4	5.2	39.7	102
20-29	365	3.3	10.3	20.8	2.2	2.4	-	8.4	2.0	14.0	36.6	94
30-39	226	0.5	38.8	18.9	4.7	11.0	-	0.8	2.3	8.4	14.6	115
40-49	229	0.2	22.0	20.6	1.3	3.9	-	25.0	7.5	10.7	8.8	154
50-59	42	0.5	26.9	34.2	0.9	10.3	-	0.6	9.2	8.4	9.0	94
14-74												
20-29	15	0.4	4.7	9.8	-	-	33.0	-	-	-	52.1	171
13-74												
10-19	35	0.9	1.1	19.5	-	11.4	6.8	-	-	1.9	58.4	108
20-29	180	2.9	4.4	10.8	-	7.0	5.1	6.1	-	1.0	62.7	62
30-39	213	0.1	16.0	15.5	-	3.4	5.7	1.2	-	0.3	57.8	109
40-49	60	-	10.8	13.0	-	-	5.9	-	-	1.6	68.7	135
50-59	24	-	15.7	7.6	-	-	6.1	-	-	-	70.6	254
60-69	3	-	3.3	7.3	-	-	2.5	-	-	-	86.9	460
12-75												
20-29	18	1.1	7.5	19.1	-	-	5.4	-	-	0.9	66.0	129

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(table...contd...)

Area Depth range(m)	Fishing effort (hrs.)	Percentage composition of species										Catch/hour of all species (kg.)
		Prawn	Elasmobranch	Cat fish	Lizard fish.	Kilimeen	Lactarius	Ribbon fish.	Perch	Other quality fish.	Misc.	
12-74												
10-19	46	12.3	3.6	8.8	-	-	4.9	-	-	3.3	67.1	47
20-29	279	5.5	0.6	21.9	-	-	4.2	18.9	-	0.7	48.2	48
30-39	120	0.4	9.6	36.4	-	1.8	2.5	0.6	-	6.4	42.3	113
40-49	56	-	40.9	24.2	-	5.0	2.6	2.0	-	0.2	25.1	209
50-59	14	-	9.0	15.1	-	-	6.0	-	-	-	69.9	119
10-76												
10-19	23	2.7	22.6	24.7	3.7	-	-	-	-	0.7	45.6	44
20-29	86	3.4	12.0	30.1	1.9	-	0.9	-	-	4.1	47.6	83
30-39	14	1.1	17.0	6.5	3.2	-	2.0	-	0.4	12.9	56.9	48
40-49	4	-	8.8	15.8	1.2	-	0.6	-	0.8	15.2	57.6	43
10-75												
20-29	40	32.0	11.4	3.9	0.3	-	0.1	-	-	4.6	47.7	53
30-39	86	16.1	7.0	14.6	1.6	-	1.5	-	-	3.6	55.6	50
40-49	33	5.5	6.3	2.5	2.4	1.2	0.9	-	-	4.5	76.7	71
50-59	9	-	6.9	5.3	3.9	-	2.1	-	-	3.2	78.6	48
60-69	6	0.3	13.0	4.8	3.3	-	1.2	-	2.1	7.3	68.0	55
70-79	2	-	10.5	-	-	-	31.6	-	-	57.9	-	10

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Area / Depth range (m)	Fishing effort (hrs.)	Percentage composition of species. Prawn	Elasmo-branch	Cat fish	Lizard fish.	Kili-meen	Lacta-rius	Ribbon fish	Perch	Other quality fish.	Misc. fish.	Catch/hour of all species (kg.)
9-76												
10-19	8	2.9	3.1	2.0	1.8	-	0.4	-	-	2.7	87.1	69
20-29	152	3.1	13.1	17.0	1.0	1.0.	1.4	-	0.5	6.9	56.0	77
30-39	528	4.8	13.0	7.0	2.0	3.2	0.7	-	0.3	7.3	61.7	79
40-49	61	0.8	18.5	10.6	3.4	4.6	0.2	-	0.1	4.6	57.2	104
50-59	70	1.7	6.3	11.1	1.0	7.2	0.3	-	0.2	3.6	68.6	132
60-69	14	0.5	11.4	19.5	0.4	17.1	0.6	-	0.1	5.5	44.9	111
70-79	15	10.9	22.6	10.9	3.4	9.2	0.1	-	-	4.1	38.8	47
80-89	6	1.2	15.6	21.2	-	0.8	1.0	-	-	9.3	50.9	87
9-75												
20-29	2	-	-	-	-	-	-	-	-	-	-	-
30-39	46	2.4	4.4	14.1	2.9	-	0.2	-	1.0	7.2	67.8	64
40-49	103	-	20.3	7.8	1.5	34.8	-	-	0.2	4.6	31.0	112
50-59	39	0.3	18.0	24.5	3.2	0.1.	0.3	-	-	10.3	43.3	119
60-69	40	1.9	15.1	21.8	4.0	0.2	0.7	-	0.2	22.4	33.7	87
70-79	4	-	35.3	5.4	5.4	-	-	-	-	2.2	51.7	64
80-89	4	-	15.6	17.7	10.6	-	-	-	-	2.8	53.3	35
8-76												
40-49	1	-	-	-	-	-	-	-	-	-	-	-
50-59	4	-	8.1	-	5.8	-	-	-	-	5.5	80.6	50
60-69	1	-	-	51.3	6.2	-	-	-	-	1.5	41.0	195

Table.X. Area-wise and depth-wise percentage composition of species in the South-west zone.

5.2.3. South east zone

Table XI reveals that the 30-39 m depth zone along the Madras coast and 40-49 m depth zone along the Tuticorin coast were richer in resources than the other depth zones. In the case of perch the abundance was found to be highest in 20-29 m depth zone along the Madras region and 10-19 m depth zone along the Tuticorin region. The abundance of elasmobranchs was the highest in 30-39 m depth zone along the Tuticorin coast. The highest percentage of leiognathids was obtained from 40-49 m belt off Madras. Synagris recorded the high percentage in 20-29 m depth strata.

5.2.4. North east zone

A close scrutiny of table XII shows that 20-29 m depth zone along the Orissa-West Bengal coast was richer than other belts in this zone. The percentage of elasmobranchs was highest viz. 57 percent in 20-29 m depth zone. The percentage of eel was high in 50-59 m depth zone. Prawn and dhoma recorded the highest percentages from 30-39 m depth zone along the Orissa coast. The percentage of cat fish was high in 20-49 m depth belt in this zone. The abundance of Sciaenid was the highest in 20-39 m depth zone. The percentage of karkara was high in 10-29 m depth zone.

Area / Depth range(m)	Fishing effort (hrs.)	Percentage composition of species, Prawn	Elasmo-branch	Perch	Leiog-nathid	Sciae-nid.	Syna-gris	Lacta-rius	Lizard fish.	Other quality fish.	Misc. fish	Catch/ hour of all spe-cies(Kg.)
8-77												
20-29	24	-	33.1	17.9	-	-	-	-	-	17.9	31.1	60
30-39	-	-	35.0	24.6	-	-	-	-	-	14.8	25.6	59
8-78												
10-19	52	0.1	30.0	45.4	-	-	-	-	-	9.1	15.4	80
20-29	328	0.2	32.3	39.9	-	-	-	-	-	11.5	16.1	81
30-39	465	-	29.7	49.3	-	0.6	-	-	-	9.9	10.5	106
40-49	8	-	23.9	21.7	-	-	-	-	-	18.2	36.2	144
60-69	2	-	31.6	21.1	-	-	-	-	-	21.1	26.2	48
9-78												
10-19	16	-	29.2	56.9	-	-	-	-	-	8.5	5.4	49
20-29	7	0.7	2.0	16.8	-	-	-	-	-	13.5	67.0	43
30-39	17	0.1	2.3	5.1	-	-	-	-	-	12.2	80.3	104
9-79												
20-29	9	-	18.0	44.3	-	-	-	-	-	26.6	11.1	35
30-39	9	-	4.4	17.4	-	-	-	-	-	12.1	66.1	58
40-49	35	-	15.6	10.1	-	0.7	-	-	-	25.7	47.9	67
50-59	3	-	0.9	26.7	-	7.1	-	-	-	20.8	44.5	75
11-80												
20-29	20	0.3	-	32.6	-	-	8.7	-	-	5.9	52.5	141

(contd...)

(table..contd...)

Area / Depth range(m)	Fishing effort (hrs.)	Percentage composition of species: Prawn	Elasmobranch	Perch	Leiognathid	Sciaenid	Synagris	Lactarius	Lizard fish	Other quality fish	Misc. fish	Catch/ hour of all species(kg.)
12-80												
40-49	82	-	1.5	3.2	52.0	-	1.9	-	7.0	4.3	31.1	51
13-80												
20-29	107	-	1.5	26.4	32.1	10.8	1.4	1.2	-	10.0	16.6	122
30-39	322	0.1	4.6	2.3	51.1	1.2	3.4	0.2	3.8	13.2	20.1	70
40-49	195	0.1	4.1	2.8	25.6	0.3	0.4	1.1	1.8	14.6	49.2	131
50-59	204	-	6.8	1.4	41.0	-	1.3	0.5	10.2	13.6	25.2	66
14-80												
10-19	49	-	5.1	21.3	15.7	24.3	1.2	1.6	-	6.6	24.2	199
20-29	389	0.1	4.4	16.9	16.1	5.6	1.8	2.8	-	5.7	46.6	195
30-39	114	0.1	3.7	28.6	14.4	16.0	0.2	2.4	-	6.0	28.6	275
40-49	145	0.2	4.2	10.0	14.1	0.7	0.9	3.8	-	4.2	61.9	163
70-79	24	-	0.9	2.5	21.5	-	-	4.2	-	10.8	60.1	79

Table.XI. Area-wise and depth-wise percentage composition of species by trawling in the South east zone.

Area / Depth range(m)	Fishing effort (hrs.)	Percentage composition of species										Catch/hour of all species (kg.)
		Prawn	Elasmo-branch	Cat fish	-om-fret	Eel	Scia-enid	Kar-kara	-erch	Other quality fish.	Misc. fish.	
16-82												
40-49	6	-	14.6	14.0	1.4	0.8	2.8	-	0.8	-	65.6	61
17-82												
20-29	4	-	36.3	14.7	1.0	-	7.8	-	-	1.0	39.2	26
30-39	12	-	9.9	9.1	1.6	-	3.9	-	0.2	0.2	75.1	102
40-49	11	0.1	12.8	10.1	4.1	0.4	5.1	-	2.5	-	64.9	90
50-59	2	-	25.4	17.0	3.4	-	3.4	-	-	-	50.8	30
17-83												
30-39	292	3.8	10.8	20.3	0.4	1.3	1.1	-	1.3	0.2	60.8	53
40-49	812	0.5	7.5	30.6	0.9	0.3	0.4	-	1.7	0.3	58.0	84
50-59	171	0.3	6.7	28.1	0.8	-	-	-	1.4	0.4	62.3	90
60-69	3	-	2.0	27.4	-	-	-	-	-	-	70.6	83
18-83												
20-29	8	0.1	26.3	2.7	0.3	0.3	22.7	-	2.9	-	44.7	183
30-39	156	0.1	13.7	6.6	0.5	1.3	6.4	-	7.2	0.2	64.0	159
18-84												
20-29	10	-	2.9	49.2	1.2	1.7	7.2	0.1	9.0	0.1	28.6	176
30-39	50	0.1	7.7	13.0	0.4	2.8	7.1	0.2	7.6	0.2	60.9	124
40-49	58	-	10.5	6.3	0.5	3.8	7.3	0.2	7.2	0.2	64.2	141
19-85												
20-29	4	-	30.0	-	-	-	-	-	-	12.5	57.5	80
19-86												
20-29	60	0.5	21.3	4.4	14.3	10.2	-	5.0	-	15.6	28.7	256
30-39	2	-	53.7	-	-	-	-	-	-	10.9	35.4	138

(contd..)

Area / Depth range (m)	Fishing effort (hrs.)	Percentage composition of species										Catch/hour of all species (kg.)
		Prawn	Elasmobranch	Cat fish	Pomfret	Eel	Sciaenid	Karkara	Perch	Other quality fish.	Misc. fish.	
19-88												
20-29	2	2.9	8.6	8.6	10.0	-	-	8.7	-	44.2	17.0	612
20-86												
10-19	590	9.0	4.8	1.0	3.3.	-	-	-	-	19.3	62.6	328
20-29	251	6.3	12.7	5.4	10.4	3.2	-	1.4	-	19.8	40.8	213
30-39	47	11.1	4.6	4.0	1.2	3.4	-	0.5	-	25.2	50.0	165
20-87												
20-29	2	-	11.1	12.1	-	-	-	-	-	-	76.8	158
30-39	12	-	21.2	-	-	-	-	13.1	-	1.3	64.4	254
40-49	3	-	54.5	-	-	-	-	-	-	-	45.5	98
20-88												
10-19	8	-	24.2	23.9	4.5	3.1	-	41.0	-	-	3.3	159
20-29	15	-	56.7	4.5	-	3.5	-	-	-	2.7	32.6	245
30-39	137	0.2	22.9	0.6	0.3	1.4	-	0.5	-	4.5	69.6	220
40-49	28	1.0	10.2	2.3	1.8	3.6	-	0.9	-	2.2	78.0	269
50-59	5	-	22.0	11.1	-	21.1	-	-	-	12.4	33.4	90
21-88												
10-19	2	-	19.2	-	-	-	-	-	-	-	80.8	130

Table.XII. Area-wise and depth-wise percentage composition of species by trawling in the North east zone.

5.2.5. Andaman and Nicobar Islands

The details of the results by depth and area are furnished below. The depth zones 20-29 m and 50-59 m recorded relatively high catch rates. Elasmobranchs were almost evenly distributed in most depth zones. The percentage of cat fish was high in 50-59 m depth zone.

Area / Depth renge (m)	Fishing effort (hrs.)	Percentage composition of species. Elasmo-branch	Cat fish	Kar-kara	Perch	Other quality fish.	Misc. fish.	Catch/hour of all species (kg.)
11-92								
20-29	3	26.7	2.0	-	-	-	71.3	168.7
40-49	56	24.1	2.0	0.2	0.1	0.8	72.8	120.0
50-59	24	23.1	17.8	-	-	0.6	58.6	151.9
12-92								
20-29	5	1.8	-	-	-	-	98.2	57.2
13-93								
30-39	1	100.0	-	-	-	-	-	100.0

5.3 Seasonal variation in the catch

Table XIII shows monthly variation in catch per hour of trawling in respect of the vessels operated from the eleven bases. It may be seen from the table that the vessels operated from Kandla and Bombay registered the highest catch rate during November and January respectively and the lowest during the period June to September. The months of March, April and May appeared to have been the best productive period in the case of Goa and Mangalore regions. In the case of Cochin, October and November appeared to have been the best productive months.

In contrast to the West coast, the months of July and August registered the highest catch rates in the case of Tuticorin region. In the case of Madras region two peak months viz., February and July were observed. Similarly the catch/hour was very low during June, August and November in the Madras region. In the case of Visakhapatnam, the months of July, September and December accounted for the highest catch/hour. The month of January registered a record catch rate of 447 kg./hour in Paradeep area. Catch rate was relatively high during December and January also. In the case of West Bengal, the month of June registered the highest catch/hour while the months of November and January came next in the order of abundance. The month of March appears to be the best productive month in the case of Port Blair.

Vessels	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Meena Udyog	100	29	-	-	-	30	32	206	59	192	124	97
Kalyani V	267	94	76	34	30	-	70	1659	-	211	-	-
Meena Bharati	105	91	-	-	-	-	-	216	174	231	125	116
Meena Sachatak	59	75	42	-	-	-	60	77	108	158	107	103
Meena Netra	104	146	123	108	4	7	-	98	113	116	120	156
Meena Ayojak	-	50	56	94	30	-	-	-	-	-	52	207
Meena Tarangini	292	104	40	27	32	107	20	72	120	96	71	98
Meena Anaveshak	58	66	40	44	-	-	-	-	-	-	30	70
Meena Utpadak	75	125	181	-	-	15	51	126	40	63	89	75
Meena Sangrahak	52	87	52	13	-	-	208	146	46	80	93	97
Meena Niryantak	94	97	58	142	100	76	16	104	47	64	74	62
Meena Saudagar	213	71	5	33	29	9	51	39	84	84	49	71
Meena Sitara	75	104	63	261	36	171	139	67	62	121	413	96
Meena Gaveshak	70	74	60	-	45	217	121	59	120	177	155	127
Kalyani IV	-	-	-	39	-	-	-	-	101	207	321	266
Meena Shodhak	82	37	77	81	-	115	67	95	98	54	39	62
Meena Jawahar	80	44	55	153	80	111	117	46	128	137	140	119
Meena Grahi	-	-	62	106	74	180	232	-	298	406	286	269
Meena Prasarak	-	-	-	-	74	160	204	163	373	447	293	251
Matsyavigyani	-	37	368	-	-	-	-	317	217	311	222	216
Meena Khojini	-	-	151	126	-	-	5	100	55	39	47	102

Table.XIII. Month-wise catch/hour of trawling of the project vessels.

5.4. Observations on Penaeid shrimps

Trawl surveys with special emphasis on shrimp resources were conducted from six bases viz., Mangalore, Goa, Cochin, Madras, Visakhapatnam and Paradeep while exclusive shrimp survey programmes were conducted from Cochin and Vizag. Two 17.5 m vessels stationed at Cochin and one 17.5 m vessel of Visakhapatnam carried out this work. A scrutiny of table V-VIII shows that the catch rates of prawn were relatively high from south west and north east zones while it was not so good from the south east and north west zones. The highest catch per hour of 24.4 kg. was obtained from area 20-86 from north east zone. Area 19-88 yielded the second highest catch rate of 17.5 kg. Catch per hour of prawn was relatively high in areas 9-76, 10-75, 10-76, 12-74 and 15-73 along the south west coast. Observations on the Cochin based vessels reveal that the catch rates were high in shallow waters particularly in 30-40 m depth zone.

6. RESULTS OF EXPERIMENTAL FISHING

6.1 Experimental demersal trawling

During the period under review eight 17.5 m vessels as against one during 1973-74, were conducting experimental demersal trawling, with a view to finding out the economic viability of trawling with indigenously constructed 17.5 m steel trawlers from different bases such as Kandla, Bombay, Goa, Mangalore, Tuticorin, Madras, Vizag and Paradeep. These vessels were conducting fishing in areas which had already been explored to some extent. The eight vessels have conducted a total of 1270 days fishing and landed about 663 tons of fish and prawns valued at Rs.5.5 lakhs. They have also resurveyed an area of about 37,000 sq.km. The results of operation of the experimental vessels are detailed below.

Base	Vessel	No.of fishing days.	Area re-surveyed (sq.km.)	Catch (kg.)	Value (Rs.)	Average catch/ hour(kg.)
KANDLA	Meena Udyog	113	3500	58721	50297	114
BOMBAY	Meena Sachatak	125	3366	49901	35964	101
G O A	Meena Netra	173	5025	86003	51568	116
MANGALORE	Meena Tarangini.	162	4577	70995	35970	106
TUTICORIN	Meena Niryantak.	202	5678	76651	72193	92
MADRAS	Meena Sitara	191	5472	108397	99022	135
VISAKHAPATNAM	Meena Jawahar	186	6338	95998	45434	103
PARADEEP	Meena Grahi	118	2985	116103	161337	264
	TOTAL:	1270	36941	662769	551785	122

The average annual catch/hour of these vessels as given in table above shows a clear and comparative picture of demersal fisheries potentialities in the offshore areas at different sections of our continental shelf. The highest catch per hour of 264 kg. was obtained in the case of Meena Grahi operated from Paradeep. The vessel Meena Sitara operated from Madras registered the second highest catch rate of 135 kg. The catch per hour was below 100 kg. in the case of Meena Niryantak operated from Tuticorin. In all other cases the catch per hour was about 100 kg. The average catch/hour of all the vessels was 122 kg.

As regards Cochin this study was completed during '72-73 and the results of which were reported by Joseph (1973).

Joseph, K.M. 1973. Economics of operation of the 17.5 m indigenous steel trawlers along the Kerala coast. Seafood Export Journal Vol.V. No.7, 1-6.

It may be recalled that the vessel Meena Utpadak had landed about 200 tons of catch during 200 days of operation. The average catch per day worked out to about one ton. In the case of Paradeep also the average catch worked out about one ton per day. This shows that quantitatively the productivity of demersal resources of Paradeep region might be comparable to that of Cochin. The studies are incomplete due to several reasons. During 1975-76 it is hoped, a better and clear picture about the economics of operation of this type of vessel would emerge.

6.2. Introduction of diversified fishing.

Demersal trawling is the mainstay of industrial sea fishing in Indian waters at present. The importance of introducing diversified fishing methods is being gradually realised. An attempt was made during the year to introduce diversified fishing methods such as purse-seining, tuna long lining, kalava hand line fishing, trolling, etc. from different bases. As stated elsewhere in this report purse-seining was started from Goa and Mangalore while tuna long lining and trolling were conducted from Port Blair. Kalava hand line fishing was introduced from Goa and Port Blair.

6.2.1. Introduction of purse-seining.

As a follow up to the programme of work of the Pelagic Fisheries Project, Cochin, purse-seining was programmed from Mangalore and Goa. The vessels Meena Anaveshak and Meena Avojak both fitted with sonar, were allotted to these bases after carrying out the requisite modification/alteration. From Mangalore, purse-seining was started using Meena Anaveshak during November '74 and continued upto January '75.

The net was a 330 m islandic type purse-seine. The operation was conducted with the help of a purse-seine

expert from the Integrated Fisheries Project, Cochin. Only one successful netting took place during the period under review which brought about 3 tons of oil sardines. Nevertheless, the operation enabled crew to achieve the requisite experience in this method of fishing and the organization to build up the requisite infrastructure for the same. It was not possible to start purse-seining from Goa during the period under report due to the lack of expertise. Purse-seining will be continued from Mangalore and will be commenced from Goa during '75-76.

6.2.2. Tuna long lining.

Tuna long lining was conducted from Port Blair during the period under report from a 17.5 m vessel viz., Meena Prayas. The areas 10-92, 11-92, 12-93 and 13-93 were surveyed. About 800 sq.km. area was surveyed. It may be seen from table XIV that the hooking rate of total catch worked out to 4.7. Of this the hooking rate of shark was about 4.0 while that of tuna was 0.47. High hooking rates of 22.8 and 22.9 were obtained from areas 11-92/1E and 12-93/6E respectively, while a hooking rate of 15.9 was recorded in May and July.

6.2.3. Trolling.

The results of trolling conducted from Port Blair are furnished in table XV. It may be seen from table that fishing was conducted in eleven sub-areas embracing three squares viz., 11-92, 11-93 and 12-92. The average catch per lin/hour for the whole year worked out to less than 0.1 kg. Comparatively high catch rates were obtained from areas 11-92/6D and 12-92/4E. Carangids and perch were the dominant species in the catch.

Area/ sub-area	No. of hooks operated.	No. of fish caught.	No. of shark.	No. of Scombroid(Tuna)	No. of others.	Hooking rate (%) Shark	Scombroid (Tuna)	Others	Total
10-92/3E	235	7	7	-	-	2.98	-	-	2.98
10-92/4E	195	30	19	10	1	9.74	5.13	0.51	15.38
11-92/6A	245	26	25	-	1	10.20	-	0.41	10.61
11-92/1E	180	41	41	-	-	22.78	-	-	22.78
11-92/3E	114	4	-	-	4	-	-	3.51	3.51
11-92/4E	1880	57	44	8	5	2.34	0.43	0.27	3.04
11-92/5E	220	5	5	-	-	2.27	-	-	2.27
11-92/4F	1250	41	39	2	-	3.12	0.16	-	3.28
11-92/5F	726	16	12	4	-	1.65	0.55	-	2.20
11-92/6F	95	9	9	-	--	9.47	-	-	9.47
12-93/6F	50	11	11	-	-	22.00	-	-	22.00
13-93/2A	100	2	1	1	-	1.00	1.00	-	2.00
TOTAL:-	5290	249	213	25	11	4.03	0.47	0.21	4.71

Table.XIV. Results of Tuna long lining.

	ines operated	Fishing effort (hrs.)	Total catch (kg.)	Tuna No.	Tuna Weight (kg.)	Carangids No.	Carangids Weight (kg.)	Perch No.	Perch Weight (kg.)	Misc.fish No.	Misc.fish Weight (kg.)	Catch/line/hour (Weight) (kg.)
11-92/3E	25	14	18	-	-	3	10	1	4	2	4	0.051
11-92/4E	167	122	639	43	207	28	247	32	125	10	60	0.031
11-92/5E	231	135	238	6	50	20	112	17	53	5	23	0.007
11-92/1F	11	6	-	-	-	-	-	-	-	-	-	-
11-92/5F	63	41	57	2	7	1	7	16	43	-	-	0.022
11-92/6F	25	19	-	-	-	-	-	-	-	-	-	-
11-92/6D	8	5	30	2	6	-	-	3	15	1	9	0.750
12-92/4E	46	42	481	8	68	13	75	25	112	21	226	0.248
11-93/1A	13	5	-	-	-	-	-	-	-	-	-	-
11-93/5A	102	66	183	11	54	11	45	11	32	20	52	0.027
11-93/6A	45	30	83	1	4	4	15	11	29	8	35	0.061
TOTAL:	736	485	1729	73	396	80	511	116	413	67	409	0.005

Table.XV. Results of trolling.

6.2.4. Kalava hand lining.

Kalava hand lining was conducted from Port Blair and Goa. It was done from Port Blair during the period August to December. A total area of about 200 sq. km. was surveyed in areas 11-92, 12-92 and 13-93. The catch per line/hour worked out to 1.0 kg. The highest catch rate of 1.9 kg. was registered from the area 11-93/5A. The results of Kalava handline fishing from Port Blair are detailed below:

Area/sub-area	Depth range (m)	Fishing effort (hrs.)	Quantity of Kalava caught (kg.)	Catch /line /hour (kg.)
11-92/3E	16-80	11.83	42	1.18
11-92/4E	40-80	15.83	5	0.11
11-92/5E	35-70	4.92	-	-
11-92/5A	16-120	2.67	9	1.12
12-92/6F	10-30	1.00	4	1.33
11-93/5A	11-65	13.67	76	1.85
TOTAL:	10-120	49.92	136	0.91

Kalava handline fishing was also done from a 17.5 m vessel from Goa. The result was not encouraging.

7. OBSERVATIONS ON VESSEL-WISE AND BASE-WISE PERFORMANCE

7.1. Kandla base.

During the period under report one 17.5 m vessel viz. Meena Udyog and one 27.8 m vessel viz., Kalyani V were operating from this base. The vessel Meena Udyog conducted experimental trawling in area 22-68 while Kalyani V conducted exploratory demersal trawling area 22-69. Results of operation of these vessels are given in annexures III and IV respectively. These vessels operated fo

total of 177 days covering 766 hours of actual fishing and landed 93,354 kgs. of fish and prawns valued at Rs.71,903. They have surveyed/resurveyed an area of about 4500 sq.km.

7.2 Bombay Base.

Six vessels viz., Meena Bharati, Meena Anaveshak, Meena Ayojak, Kalyani IV, Kalyani V and Meena Sachatak had conducted fishing from this base at different intervals during 1974-75. Kalyani IV and V after trial fishing were transferred to Madras and Kandla respectively during April/May. Meena Ayojak and Meena Anveshak were shifted to Goa and Mangalore respectively, for purse-seining as they were fitted with sonars. Meena Sachatak was transferred to this base from Goa during December, 1974. These vessels together conducted 293 days of fishing spending 1472 hours of actual fishing and landed 1,74,252 kgs. of fish valued at Rs.1,77,442. They have surveyed areas 16-72, 16-73, 17-72, 17-73, 18-71, 18-72, 19-69, 19-71 and 19-72 off Maharashtra. Annexures V and VI show the results of operations of Meena Bharati and Meena Sachatak. Meena Bharati during 126 days of fishing covering 730 hours landed 1,12,268 kgs. of fish valued at Rs.1,17,594. She surveyed an area of approximately 2500 sq.km.

7.3. Goa base.

One 17.5 m vessel viz., Meena Netra was operated from this base throughout the year. This vessel conducted experimental bottom trawling and shrimp survey in areas 15-73 and 16-73. From annexure VII it may be seen that the vessel conducted fishing for 173 days putting 739 hours of actual fishing effort and landed 86,003 kgs. of fish and prawns valued at Rs.51,568. She resurveyed an area of about 5000 sq.km.

Meena Sachatak conducted experimental fishing from this base as well as Bombay base in areas 15-73, 16-73, 17-72, 17-73, 18-72 and 19-72. As detailed in annexure VI she conducted fishing for 125 days covering 495 hours of actual fishing and landed 49,901 kgs. of fish and prawns valued at Rs.35,964.

Meena Ayojak was transferred to this base during December, 1974 after converting her for purse-seining. It was not possible to start purse-seining due to non-availability of purse-seine expert at the proper time. The vessel was therefore utilised for kalava hand line fishing and demersal trawling. She had conducted demersal trawling in area 15-73 from this base and in areas 18-72 and 19-72 from Bombay base. It may be seen from annexure VIII that the vessel conducted 95 days of fishing covering 450 hours of actual fishing and landed 27,583 kgs. of fish and prawns valued at Rs.20,844. She has lost about 90 days due to conversion into purse-seining etc.

7.4. Mangalore Base.

Meena Tarangini conducted experimental trawling in areas 12-74, 12-75, 13-74 and 14-74. She operated for 162 days spending 673 hours of actual fishing effort and landed 70,995 kgs. of fish and prawns. The sale proceeds amounted to Rs.35,970. Annexure IX shows the details of fishing operation done by this vessel. The vessel Meena Saudagar was operating from this base upto November 1974 and then she was transferred to the Tuticorin base. She conducted exploratory demersal trawling from this base and Tuticorin base in areas 12-74, 13-74, 8-78, 9-78 and 9-79. It may be seen from annexure XIV that the vessel conducted altogether 127 days of fishing expending 523 hours of actual fishing and landed 40,067 kgs. of fish and prawns valued at Rs.23,926.

Meena Anveshak arrived at this base during November after conversion for purse-seining and conducted purse-seining during the period November to January. Thereafter, the vessel was converted for trawling temporarily and conducted demersal trawling in areas 12-74 and 13-74. She operated from Bombay in areas 18-71, 18-72, 19-71 and 19-72. As shown in annexure X the vessel operated for 86 days covering 355 hours of actual fishing and landed 21,284 kgs. of fish and prawns. The sale proceeds amounted to Rs.20,616. The vessel lost about 90 days for conversion in connection with purse-seining etc.

7.5. Cochin Base.

Two 17.5 m vessels viz., Meena Sangrahak and Meena Utpatak were conducting exploratory shrimp survey from this base in the areas 8-76, 9-75, 9-76, 10-75 and 10-76. These vessels conducted fishing for a total of 374 days covering 1401 hours of actual fishing and landed 1,14,340 kgs. of fish and prawns. The sale-proceeds amounted to Rs.69,547. Details of operations of Meena Utpadak and Meena Sangrahak are furnished in annexures XI and XII respectively. The vessels together surveyed an area of about 5000 sq.km. for shrimp.

7.6. Tuticorin Base.

One 17.5 m vessel Meena Niryantak conducted experimental demersal trawling in areas 8-77, 8-78, 9-78 and 9-79. It may be seen from annexure XIII that she operated for 202 days spending 835 hours of actual fishing. She landed 76,651 kgs. of fish and prawns valued at Rs.72,193. This vessel resurveyed an area of about 6000 sq.km. of shelf. The vessel Jheenga was idle throghout the year for want of an imported gear box housing.

Meena Saudagar arrived at Tuticorin during December and carried out exploratory demersal trawling in areas 8-78, 9-78 and 9-79 etc. as reported under Mangalore base (annexure XIV).

7.7. Madras Base.

Three vessels viz., Meena Sitara, Meena Gaveshak and Kalyani IV were attached to this base during the period under report. Meena Gaveshak and Kalyani IV conducted exploratory fishing in areas 11-80, 13-80 , 14-80 and 15-80. Meena Sitara was conducting experimental trawling in areas13-80 and 14-80. The combined fishing effort of three vessels was 391 days covering 1653 hours of actual fishing. They landed 2,24,196 kgs. of fish and prawns, valued at Rs.2,12,079. Annexure XV to XVII show the results of operation of these vessels. The operation of Kalyani IV was found to be difficult due to non-availability of spare parts and the ovalty of her crank shaft.

7.8. Visakhapatnam Base.

The vessel Meena Shodhak was conducting exploratory shrimp survey in areas 16-82, 17-82, 17-83 and 18-84. From annexure-XVIII it may be seen that during the year under report she conducted fishing for 136 days putting 664 hours of fishing effort and landed 48,564 kgs. of fish and prawns valued at Rs.24,608.

The vessel Meena Jawahar conducted experimental fishing for 186 days expending 932 hours of fishing effort. She landed 95,998 kgs. of fish and prawns valued at Rs.45,434. Further details of her operation are furnished in annexure XIX.

7.9. Paradeep base.

The vessel Meena Prasarak was conducting exploratory demersal trawling in area 20-86. She operated for 77 days covering 349 hours of actual fishing. She landed 1,08,822 kgs. of fish and prawns valued at Rs.1,51,799.

Meena Grahi was conducting experimental demersal trawling in area 20-86. The vessel operated for 118 days putting 439 hours of fishing effort and landed 1,16,103 kgs. of fish and prawns valued at Rs.1,61,337. The results of operation of these vessels are furnished in annexures XX and XXI. The catch was found to be very good during January-February 1975.

7.10. Calcutta Base.

The vessel Matsyavigyani conducted exploratory trawling in areas 19-85, 19-86, 19-88, 20-86, 20-87, 20-88 and 21-88. It may be seen from annexure XXII that she operated for 138 days spending 383 hours of actual fishing. She landed 94007 kgs. of fish and prawns which valued at Rs.1,11,953. She surveyed an area of about 1300 sq.km.

7.11. Port Blair Base.

The vessel Meena Prayas conducted tuna long lining and trolling in areas 10-92, 11-92, 11-93, 12-92, 12-93 and 13-93. As shown in annexure XXIII during 128 days of fishing she landed 13,307 kgs. of fish valued at Rs.3,807.

Meena Khojini conducted exploratory bottom trawling and kalava hand line fishing in areas 10-92, 11-92, 11-93, 12-92, 12-93 and 13-93. It may be seen from annexure XXIV that the vessel operated for 63 days covering 137 hours of actual fishing and 11,358 kgs. of fish valued at Rs.4,487.

8. CRAFT UNIT

The objective of the Craft unit attached to the Exploratory Fisheries Project base, Cochin, is to evolve designs of fishing vessels and accessories suitable for exploitation of our marine fisheries resources. Hitherto the organization had

been concentracting on the design and development of small boats upto about 17.5 m length. Many of these designs have become very popular both on the east and west coasts including Laccadive and Andaman Islands. The emphasis in future will be on the development of larger fishing vessels and equipments and accessories required for them.

During the year, the unit has taken up the development of a mechanical trawl winch for trawlers above 20 m length. The designing of the winch is more or less complete and the work on prototype was on hand.

Besides during the period under review, two 7 m size skiffs were built under the supervision of this unit departmentally for the purse-seining vessels based at Goa and Mangalore. The Craft unit is headed by a Senior Research Officer.

9. SUNDERBANS PROJECT UNIT

Since exploratory fishing in estuarine waters does not come within the purview of the objective of this Project, the Government of India was requested to transfer this unit along with the vessel M.F.V. Sunderbans and other assets to any other suitable agency. The proposal is under the active consideration of the Government.

During the year under review the vessel Sunderbans which was laid up since 1972 was commissioned for fishing. It may be recalled that the vessel was undergoing extensive repairs and alterations at M/s. Garden Reach Workshop Ltd., Calcutta. It is hoped that the Unit will be transferred to a suitable agency engaged in research and exploitation of inland and estuarine waters soon.

10. EXTENSION

During the year under review, it was possible to lay the nucleus of an extension wing which was sanctioned by the Ministry in '72, at the headquarters at Bombay. With the filling

up of vacant posts in this unit including that of the Assistant Director (Extension), the Project is geared up to deal effectively with processing, reporting and dissemination of information gathered during exploratory and experimental fishing.

As already mentioned elsewhere in the report, the Project began to publish a bulletin entitled Bulletin of the Exploratory Fisheries Project, Bombay during the year under review. The first issue of this bulletin carrying the results of the demersal fisheries resources survey conducted during the last 27 years along the North west coast of India was released during November, 1974. It is hoped that with the stabilisation of the extension wing during the ensuing year, processing and publication of data covering other areas will be systematized and speeded up.

11. TRAWLING

The Project continued its programme of imparting in-vessel sea training to trainees who have undergone institutional training at the Central Institute of Fisheries Operatives, Cochin and Madras. In addition, the departmental fishing second hands, Ist Class and IInd class Engine Drivers etc. were encouraged to appear for competency certificates such as Skipper's and Engine Driver (F.V.). The number and type of candidates including on the job trainees undergoing training and the number and types of candidates who have obtained competency certificate during 1974-75 are given below.

Category of trainees	No.undergoing training in 1974-75.	No. got certificates in 1974-75.
1. Fishing second hand trainees sponsored by the Central Institute of Fisheries Operatives.	20	4
2. Engine Driver trainees sponsored by the Central Institute of Fisheries Operatives	10	2
3. Departmental fishing second hand got training for Skipper's certificate	23	8
4. Departmental 1st class and 2nd class Engine Drivers who got training for Engine Driver certificate (F.V.).	7	6
5. Departmental Engine Driver (F.V.) obtaining sea service for Engineer(F.V.) certificate	4	-

12. GENERAL

12.1. Administration

The details of the sanctioned strength of officers and staff, the position with regard to their filling up, etc. as on 31-3-75 is furnished in annexure I. From the information furnished, it may be seen that the total staff strength of the organization was about 600 and that of the officers 33. Out of the 33 posts of officers 30 are Class I and three Class II. Out of the 30 Class I posts 10 posts were vacant during the period under review. Besides this one Class II post was also vacant. Steps were being taken by the Ministry for filling up the vacant posts expeditiously. Due to shortage of officers it was not possible to establish the Veraval base as programmed.

The names and designations of officers who were in position as on 31st March, 1975 are furnished in annexure II. Consequent to his resignation, Sri Pradip Tagore, Deputy Director, Exploratory Fisheries Project, Bombay base was relieved in April '74. Dr. N. Radhakrishnan, Biologist, Pelagic Fisheries Project, Cochin joined the Project as Deputy Director at Exploratory Fisheries Project base, Calcutta in May '75. Sri K.P. Philip from the Integrated Fisheries Project, Cochin also joined the Project as Assistant Director during the year under review.

12.2 Marketing of catch.

Table XVI details the total catch landed, value realised etc. by all the vessels of the Project. It may be seen from the table that these vessels during 2891 days of fishing landed about 1410 tons of fish and prawns valued at about Rs.12.5 lakhs.

Name of vessel	Fishing effort Days	Hours	Total catch landed (kg.)	Value realised (Rs.)	Catch/hour (kg.)
Meena Udyog	113	515	58,721	50,297	114
Kalyani V	66	261	37,308	23,882	143
Meena Bharati	126	730	1,12,268	1,17,594	154
Meena Sachatak	125	495	49,901	35,964	101
Meena Netra	173	739	86,003	51,568	116
Meena Ayojak	95	450	27,583	20,844	61
Meena Tarangini	162	673	70,995	35,970	106
Meena Anaveshak	86	355	21,284	20,616	60
Meena Utpadak	173	662	56,039	32,925	85
Meena Sangrahak	201	739	58,301	36,622	79
Meena Niryantak	202	835	76,651	72,193	92
Meena Saudagar	127	523	40,067	23,926	77
Meena Sitara	191	804	1,08,397	99,022	135
Kalyani IV	34	118	26,831	25,401	227
Meena Gaveshak	171	736	89,165	87,991	121
Meena Jawahar	186	932	95,998	45,434	103
Meena Shodhak	136	664	48,564	24,608	73
Meena Grahi	118	439	1,16,103	1,61,337	264
Meena Prasarak	77	349	1,08,822	1,51,799	312
Matsyavigyani	138	383	94,007	1,11,953	245
Meena Prayas	128	750	13,307	3,807	18
Meena Khojini	63	137	11,358	4,487	83
TOTAL:	2891	12289	14,07,673	12,38,240	114

Table.XVI. Summary of fishing operation of the Project vessels.

The total catch, value realised and average price obtained per ton etc. in respect of each base is furnished below:

Base	Total catch (kg.)	Total value (Rs.)	Average price of fish/ton (Rs.)	Mode of disposal.
KANDLA	93354	71903	770	Fixed rate
BOMBAY	174252	177442	1020	Departmental auction.
G O A	118599	67916	570	Goa Fisheries Corporation.
MANGALORE	103337	53570	520	Departmental auction.
COCHIN	114340	69547	610	Integrated Fisheries Project.
TUTICORIN	91436	82358	900	Fixed rate.
MADRAS	224196	212079	950	Fixed rate.
VISAKHAPATNAM	144562	70042	480	Fixed rate
PARADEEP	224925	313136	1390	Fixed rate
CALCUTTA	94007	111953	1190	Calcutta Fisheries Corporation.
PORT BLAIR	24665	8294	340	Fixed rate
TOTAL:	1407673	1238240	880	

The average unit value of the catch was found to be above Rs.1000 per ton at Bombay, Paradeep and Calcutta. The highest average price of Rs.1390 per ton was obtained from Paradeep. During the period under review an increase in the unit value of catch was found from bases such as Kandla, Goa, Tuticorin, Madras and Calcutta while a decrease was observed from bases like Bombay, Mangalore, Cochin, Visakhapatnam and Port Blair as compared to the previous year.

The all India average price per ton of fish increased during the year to Rs.880 from Rs.740 during the previous.

12.3. Expenditure

The expenditure incurred by the Project during '74-75 base-wise under the heads 'Staff' and 'other expenses' are given below:

Base	Actual expenditure		
	staff	Other expenses (Rs. in lakhs)	Total
HEADQUARTERS, BOMBAY	3.22	0.72	3.94
K A N D L A	2.79	3.19	5.98
BOMBAY (BASE)	4.47	19.21	23.68
G O A	2.00	2.44	4.44
M A N G A L O R E	2.66	2.97	5.63
C O C H I N	3.68	3.89	7.57
T U T I C O R I N	2.72	2.85	5.57
M A D R A S	3.64	3.34	6.98
VISAKHAPATNAM	3.10	2.12	5.22
PARADEEP	2.39	2.41	4.80
CALCUTTA	3.09	3.83	6.92
PORT BLAIR	3.01	1.33	4.34
TOTAL:	36.77	48.30	85.07
Capital			
Headquarters, Bombay.		(Equipments)	11.05
Paradeep		(Equipments)	0.22
TOTAL:			11.27

The figures are only approximate. It may be mentioned that about one third of the total wage bill of Rs.36 lakhs was earned by the Project through its record high sale proceeds from fish during the year under review. But for the three old vessels viz., the two Kalyanis and Jheenga this would have been around 50 percent of the expenditure on staff.

/Annexure.II/

NAMES AND DESIGNATIONS OF OFFICERS IN POSITION AS ON 31-3-1975.

Office	Designation	Name of Officer
HEADQUARTERS, BOMBAY	Director	K.M. Joseph
	Executive Engineer	S.K. Bhadury
	Assistant Accounts Officer.	N.S. Rangan
	Administrative Officer	B.T. Daryanani
KANDLA BASE	Assistant Director	V.D. Ramamoorty
	Assistant Engineer	S.K. Das
BOMBAY BASE	Assistant Engineer	A. Ranjan
GOA BASE	Assistant Director	T.J. Sebastian
	Assistant Engineer	A.M. Goorha
MANGALORE BASE	Assistant Director	K.K. Varghese
COCHIN BASE	Senior Research Officer	C.S. George
TUTICORIN BASE	Assistant Director	K.P. Philip
	Assistant Engineer	Y. Krishnamoorty
MADRAS BASE	Assistant Director	T.E. Sivaprakasam
	Assistant Engineer	R. Chandrasekharan
VISAKHAPATNAM BASE	Assistant Director	V. Visweswara Rao
PARADEEP BASE	Assistant Director	Y. Sreekrishna
	Assistant Engineer	P. Ray Choudhury
CALCUTTA BASE	Deputy Director	N. Radhakrishnan
	Assistant Engineer	D.K. Halder
PORT BLAIR	Deputy Director	D. Sudarsan
	Assistant Engineer	J. Mangaldoss

/Annexure.I/

STAFF PARTICULARS AS ON 31ST MARCH 1975

Office	No.of Officers Sanctioned	No.of Officers Available.	No.of staff sanctioned.	No. of staff available Technical	No. of staff available Non-technical.	Total
HEADQUARTERS BOMBAY	6	4	43	1	39	40
KANDLA BASE	2	2	45	31	11	42
VERAVAL BASE	1	-	41	-	-	-
BOMBAY BASE	4	1	52	29	15	44
GOA BASE	2	2	42	23	8	31
MANGALORE BASE	2	1	42	26	11	37
COCHIN BASE	1	-	47	30	14	44
TUTICORIN BASE	2	2	49	36	12	48
MADRAS BASE	2	2	56	40	11	51
VISAKHAPATNAM BASE.	2	1	47	32	12	44
PARADEEP BASE	2	2	41	24	11	35
CALCUTTA BASE	2	2	38	20	11	31
PORT BLAIR BASE	2	2	42	26	10	36
CRAFT UNIT (COCHIN BASE)	3	1	7	4	-	4
SUNDERBANS UNIT (CALCUTTA BASE)	-	-	12	6	1	7
TOTAL:	33	22	604	328	166	494

/Annexure. III/

RESULTS OF FISHING BY MEENA UDYOG APRIL'74 - MARCH'75

Month	Fishing effort Days	Hours	Total catch landed (kg.)	Species composition (kg.) Shark & Skate	Ray	Prawn	Eel	Cat fish	Kar-kara	Dho-ma.	Ghol	Kati	Pom-fret	Dara	Koth	Misc. fish.
Apr.	11	58	5790	278	3732	-	205	191	-	642	492	199	29	-	-	22
May	3	12	345	40	163	-	142	-	-	-	-	-	-	-	-	-
Jun.	Annual dry-docking and other repairs.															
Jul.	Annual dry-docking and other repairs.															
Aug.	Annual dry-docking and other repairs.															
Sep.	8	18	549	162	132	-	117	30	-	80	28	-	-	-	-	-
Oct.	14	42	1345	137	341	-	53	34	-	386	77	317	-	-	-	-
Nov.	17	82	16907	1630	1785	97	702	732	450	2582	1974	2324	812	253	3308	258
Dec.	19	102	6000	579	1630	-	446	190	716	957	272	503	229	13	236	211
Jan.	16	60	11503	827	3735	-	644	439	613	2184	1136	753	369	67	563	173
Feb.	15	98	12126	853	3204	-	969	833	425	1626	910	2574	188	41	281	222
Mar.	10	43	4156	317	1034	-	237	653	92	817	761	89	-	18	87	51
TOTAL:	113	515	58721	4823	15756	97	3515	3102	2296	9292	5650	6759	1627	392	4475	937

/Annexure.IV/

RESULTS OF FISHING BY KALYANI V APRIL'74 - MARCH'75.

Month	Fishing effort Days	hours	Total catch landed (kg.)	Species composition (kg.) Shark & Skate	Ray	Prawn	Eel	Cat fish	Koth	Dhoma.	Ghol	Pomfret	Kati	Surmai.	Dara	Misc. fish.
Apr.**	2	10	2675	70	85	-	-	1750	-	-	40	-	-	-	-	730
May	6	16	1508	300	1053	-	155	-	-	-	-	-	-	-	-	-
Jun.	6	12	909	185	228	-	496	-	-	-	-	-	-	-	-	-
Jul.	7	29	1002	63	542	-	397	-	-	-	-	-	-	-	-	-
Aug.	7	24	714	77	335	-	302	-	-	-	-	-	-	-	-	-
Sep.	Laid up due to dry-docking and compressor repairs.															
Oct.	21	100	7038	899	2402	24	1261	246	-	899	229	-	952	126	-	-
Nov.	3	6	9952	1625	1093	425	637	-	258	2134	1841	267	1621	-	-	51
Jan.	14	64	13510	869	3561	-	978	873	373	2325	1544	375	1486	-	353	773
Feb.	Laid up for want of dispensation for Engine driver to act as Chief Engineer															
Mar.	Laid up for want of dispensation for Engine Driver to act as Chief Engineer.															
TOTAL:	66	261	37308	4088	9299	449	4226	2869	631	5358	3654	642	4059	126	353	1554

** Operated from Bombay base.

/Annexure V/

RESULTS OF FISHING BY MEENA BHARATI APRIL '74 - MARCH '75.

Month	Fishing effort Days	Hours	Total catch landed (kg.)	Species composition (kg.) Shark & Skate	Ray	Prawn	Eel	Cat fish	Kar-kara	Dho-ma.	Ghol	Pom-fret	Kati	Sura-mai.	Other quality fish.	Misc. fish.
Apr.	15	54	5676	456	785	1	300	1502	250	-	1269	241	21	19	215	614
May	19	132	12004	660	2150	-	638	935	960	310	848	654	285	72	1027	3465
June	Laid up due to main engine overhauling and other repairs.															
Jul.	Laid up due to main engine overhauling and other repairs.															
Aug.	Laid up due to main engine overhauling and other repairs.															
Sep.	Laid up due to main engine overhauling and other repairs.															
Oct.	Laid up due to dry-docking.															
Nov.	11	41	8845	160	3775	-	-	-	120	195	130	-	-	-	10	4455
Dec.	24	146	25365	1137	1610	20	30	7245	1780	1670	1265	25	85	10	7268	3220
Jan.	22	156	36102	2580	2215	-	185	23085	424	2055	1397	555	150	125	1566	1765
Feb.	17	104	13050	385	505	10	10	8520	145	460	572	97	150	15	879	1302
Mar.	18	97	11226	610	1950	6	2975	1290	75	1135	1640	15	305	-	805	420
Total:	126	730	112268	5988	12990	37	4138	42580	3754	5825	7121	1587	996	241	11770	15241

/Annexure-VI/

RESULTS OF FISHING BY MEENA SACHATAK APRIL'74 - MARCH'75.

Month	Fishing effort Days	Hours	Total catch landed (kg.)	Species composition (kg.) Shark & Skate	Ray	Prawn	Eel	Cat fish	Butter fish	Ribbon fish.	Perch	Pom-fret	Dhoma	Ghol	Other quality fish.	Misc. fish.
Apr.*	3	9	533	125	32	21	-	28	54	28	-	-	-	-	-	245
May	17	57	4284	242	184	139	5	500	375	820	-	102	-	-	120	1797
Jun.	7	17	723	-	27	158	-	66	10	-	7	-	-	-	-	455
Jul.	Laid up due to dry-docking, engine overhauling and other repairs.															
Aug.	Laid up due to dry-docking, engine overhauling and other repairs.															
Sep.	Laid up due to dry-docking, engine overhauling and other repairs.															
Oct.	14	44	2663	339	633	98	89	118	93	-	290	-	-	-	-	1003
Nov.	15	51	3942	475	1176	-	83	1614	36	41	142	35	-	-	15	325
Dec.	11	41	4418	252	264	-	63	1176	91	963	86	68	150	60	287	958
Jan.**	19	83	13102	840	3100	77	60	4785	-	-	-	46	2549	225	929	491
Feb.	19	99	10548	865	2735	43	224	3320	-	-	-	-	1715	841	118	687
Mar.	20	94	9688	1690	1670	-	40	3170	-	-	-	-	2320	467	57	280
Total:	125	495	49901	4828	9821	536	564	14777	659	1852	525	251	6734	1593	1520	6241

* From April to December the vessel operated from Goa base.

** The vessel was shifted to Bombay base in the last week of December.

/Annexure-VII/

RESULTS OF FISHING BY MEENA NETRA APRIL '74 - MARCH '75.

Month	Fishing effort Days	Hours	Total catch landed (kg.)	Species composition (kg.) Shark & skate	Ray	Prawn	Eel	Cat fish	Butter fish	Ribbon fish	Perch	Kili-meen	Pom-fret	Lizard fish.	Other quality fish.	Misc. fish.
Apr.	10	50	5199	140	550	161	10	210	740	310	570	-	50	-	8	2450
May	20	92	13399	300	1007	361	42	2005	1045	1390	125	-	332	-	667	6125
Jun.	17	55	6752	403	115	1979	32	320	277	65	120	15	36	-	-	3390
Jul.	16	48	5236	75	45	2006	-	-	127	-	35	-	-	-	-	2948
Aug.	17	36	145	-	5	-	-	-	-	-	-	-	-	-	-	140
Sep.	8	16	110	-	-	-	5	-	-	-	-	-	-	-	-	105
Oct.	Laid up due to dry-docking and other repairs.															
Nov.	10	52	5085	55	963	-	7	2720	110	125	192	-	258	30	35	590
Dec.	18	93	10550	390	805	-	45	1717	285	185	330	1170	165	1033	1780	2645
Jan.	19	88	10222	895	2510	1	-	2322	135	1	210	1647	1	898	475	1127
Feb.	16	90	10779	146	3389	13	-	3716	370	-	593	1180	45	202	314	811
Mar.	22	119	18526	723	3337	1	3	4155	1218	4344	1431	1063	797	309	128	1017
Total:	173	739	86003	3127	12726	4522	144	17165	4307	6420	3606	5075	1684	2472	3407	21348

/Annexure-VIII/

RESULTS OF FISHING BY MEENA AYOJAK APRIL 1974 - MARCH '75.

Month	Fishing effort Days	Hours	Total catch landed (kg.)	Species composition (kg.) Shark & Skate	Ray	Prawn	Eel	Cat fish	Ribnon fish.	Dhoma	Ghol	Pom-fret.	Dutter fish.	Perch	Other quality fish.	Misc. fish.
Apr.*						Engine repairs.										
May	12	103	5142	405	1025	-	253	300	-	-	206	90	-	-	532	2331
Jun.	14	49	2724	300	960	-	160	255	-	555	190	-	-	-	250	45
Jul.	13	27	2551	220	1045	-	217	335	-	280	234	-	--	-	220	-
Aug.	3	1	30	-	30	-	-	-	-	-	-	-	-	-	-	-
Sep.**						Conversion for purse-seining.										
Oct.						Conversion for purse-seining.										
Nov.						Conversion for purse-seining										
Dec.***	4	7				Kalava hand-line fishing (nil catch).										
Jan.	20	110				Kalava hand-line fishing (nil catch).										
Feb.	15	94	4941	95	2855	4	-	945	93	-	-	-	128	251	22	548
Mar.	14	59	12195	307	2923	40	-	1468	4451	-	-	714	245	615	556	876
Total:	95	450	27583	1327	8838	44	639	3303	4544	835	630	804	373	866	1580	3800

*April-July, the vessel was at Bombay base.
**August-November, the vessel was at Integrated Fisheries Project undergoing conversion for purse-seining.
***Operated from Goa base.

/Annexure-IX./

RESULTS OF FISHING BY MEENA TARANGINI APRIL'74-MARCH'75.

Month	Fishing effort: Days	Hours	Total catch landed (kg.)	Species composition (kg.): Shark & Skate	Ray	Prawn	Lacta-rius	Ribbon fish.	Kili-meen.	Cat fish.	Other quality fish.	Misc. fish.
Apr.	10	58	16953	150	1530	-	785	20	15	1665	-	12788
May	11	46	4794	65	48	9	345	158	780	1018	-	2371
Jun.	8	17	682	90	75	18	-	-	-	-	-	499
Jul.	5	9	248	-	55	18	-	29	-	-	-	146
Aug.	17	33	1052	-	19	148	-	-	-	-	-	885
Sep.	19	30	3220	-	-	325	45	150	-	950	-	1750
Oct.	3	10	196	-	-	-	-	-	40	-	-	156
Nov.	14	66	4768	-	28	-	270	1380	-	580	45	2465
Dec.	20	116	13874	40	150	64	610	60	1240	4733	874	6103
Jan.	19	81	7755	55	600	69	1190	-	-	1123	40	4678
Feb.	16	105	7432	70	305	87	555	30	-	1160	35	5190
Mar.	20	102	10021	10	3860	451	365	240	580	1070	75	3370
Total:	162	673	70995	480	6670	1189	4165	2067	2655	12299	1069	40401

/Annexure.X./

RESULTS OF FISHING BY MEENA ANAVESHAK APRIL'74 - MARCH'75.

Month	Fishing effort Days	Hours	Total catch landed (kg.)	Species composition (kg.) Shark & Skate	Ray	Prawn	Eel	Cat fish	Kar-kara	Dhoma	Ghol	Pom-fret	Oil sardi-nes.	Lac-ta-rius	Other quan-tity fish.	Misc. fish.
Apr.*	9	52	3013	290	735	-	120	220	75	-	173	5	-	-	140	1255
May	18	99	6533	705	1810	5	528	365	40	215	669	52	-	-	307	1837
Jun.	18	78	3143	245	580	-	115	435	10	-	451	-	-	-	87	1220
Jul.	13	35	1535	140	490	-	105	120	-	295	155	-	-	-	55	175
Aug. **			Conversion for purse-seining.													
Sep.			Conversion for purse-seining.													
Oct.			Dry-docking and other repairs.													
Nov.***	1		Dry-docking and other repairs.													
Dec.	2	3	Trial fishing.													
Jan.	8	2	2490	-	-	-	-	-	-	-	-	-	2490	-	-	-
Feb.	4	19	577	-	-	2	-	30	-	-	-	-	-	19	-	526
Mar.	13	57	3993	75	340	123	-	540	-	-	-	-	-	230	75	2610
Total:-	86	355	21284	1455	3955	130	868	1710	125	510	1448	57	2490	249	664	7623

* April - July the vessel was at Bombay base.

** August - November the vessel was at Integrated Fisheries Project, undergoing conversion for purse-seining.

*** The vessel operated from Mangalore base from the last week of November.

/Annexure.XI./

RESULTS OF FISHING BY MEENA UTKADAK APRIL'74 - MARCH'75

Month	Fishing effort Days	Hours.	Total catch landed (kg.)	Species composition (kg.) Shark & Skate.	Ray	Prawn	Kili-meen	Cat fish	Flat fish	Lizard-fish.	Lacta-rius.	Horse mack-erel.	Perch	Bara-cuda	Other quali-ty fi-sh.	Misc. fish.
Apr.	23	111	8381	473	886	160	-	529	36	158	58	169	29	278	211	5394
May	21	75	9394	115	334	256	347	527	64	99	18	53	6	337	93	7145
Jun.	10	35	6332	133	1365	158	-	1244	57	82	132	7	1	201	201	2751
Jul.	Laid up due to dry-docking and other repairs.															
Aug.	Laid up due to dry-docking and other repairs.															
Sep.	7	12	185	-	-	-	-	185	-	-	-	-	-	-	-	-
Oct.	20	69	3546	5	2	62	801	1826	-	24	-	-	-	-	-	819
Nov.	20	81	10217	175	477	25	3017	2389	14	235	38	108	7	209	955	2568
Dec.	18	90	3614	151	421	148	-	746	17	208	36	-	-	13	62	1812
Jan.	17	58	3678	40	297	54	-	324	23	156	56	2	48	58	135	2485
Feb.	14	61	5439	59	696	95	-	73	18	126	38	1	26	204	573	3530
Mar.	23	70	5253	80	1483	2	15	255	5	136	2	-	32	137	82	3024
Total:-	173	662	56039	1231	5961	960	4180	8098	234	1224	378	340	149	1437	2319	29528

/Annexure-XII./

RESULTS OF FISHING BY MEENA SANGRAHAK APRIL'74 - MARCH'75.

Month	Fishing effort. Days	Hours	Total catch landed (kg.)	Species composition (kg.) Shark & Skate	Ray	Prawn	Kili-meen.	Cat fish.	Flat fish	Liz-ard fish	Lacta-rius	Horse mack-erel.	Perch	Bar-acu-da.	Other quali-ty fish.	Misc. fish.
Apr.	21	83	4292	204	1526	191	-	-	53	35	-	155	32	91	61	1944
May	22	75	6512	83	1092	597	24	618	66	270	34	-	-	110	115	3503
Jun.	24	95	4966	71	387	1748	-	-	-	-	64	12	-	8	59	2617
Jul.	16	34	449	-	-	327	-	-	-	-	-	-	-	-	-	122
Aug.	6	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sep.	Laid up due to dry-docking repairs.															
Oct.	10	15	3125	-	-	-	-	1975	-	-	-	-	-	-	-	1150
Nov.	20	60	8785	101	582	59	110	1475	33	80	93	157	4	251	248	5592
Dec.	18	70	3201	288	340	285	6	208	28	91	22	66	59	7	218	1583
Jan.	19	69	5544	228	208	43	1059	848	25	64	17	7	28	6	159	2852
Feb.	22	121	11311	278	432	86	795	300	86	145	144	15	2	395	353	8280
Mar.	23	104	10116	1038	1091	334	422	178	63	364	3	7	32	190	192	6202
Total:-	201	739	58301	2291	5658	3670	2416	5602	354	1049	377	419	157	1058	1405	33845

/Annexure-XIII/

RESULTS OF FISHING BY MEENA NIRYANTAK APRIL'74 - MARCH'75.

Month	Fishing effort Days	Hours	Total catch landed (kg.)	Species composition (kg.) Shark & Skate	Ray	Prawn	Perch	Cat fish	Other quality fish.	Misc. fish.
Apr.	17	71	6714	66	2065	-	3939	-	455	189
May	19	64	6187	19	2639	1	2292	-	715	521
Jun.	4	21	1220	-	439	-	450	-	151	180
Jul.	19	64	9078	41	2937	47	4722	-	586	745
Aug.	15	54	5382	75	1187	-	3134	-	418	568
Sep.	11	34	2588	-	706	-	1424	-	327	131
Oct.	19	90	1460	198	2931	-	9951	-	875	652
Nov.	17	78	8102	-	2666	2	2498	-	1096	1840
Dec.	19	50	2364	-	940	4	730	-	349	341
Jan.	19	74	4718	52	1585	-	2349	-	358	374
Feb.	19	96	7063	9	2652	9	1535	99	1241	1518
Mar.	24	139	8628	9	2649	14	2095	335	1038	2488
Total:	202	835	76651	469	23396	77	35119	434	7609	9547

/Annexure-XIV/

RESULTS OF FISHING BY MEENA SAUDAGAR APRIL'74 - MARCH'75.

Month	Fishing effort Days	Hours	Total catch landed (kg.)	Species composition (kg.) Shark & Skate	Ray	Prawn	Perch	Lacta-rius	Ribbon fish.	Kili-meen	Cat fish	Other quality fish.	Misc. fish.
Apr.	12	74	15780	1705	1930	-	-	777	-	-	3950	-	7418
May	14	56	3956	1044	390	-	-	50	-	-	478	284	1710
Jun.	17	53	264	76	18	-	-	-	-	-	108	-	62
Jul.	1	2	67	-	-	-	-	-	-	-	-	-	67
Aug.	3	7	204	-	-	70	-	-	-	-	-	-	134
Sep.	6	17	151	-	-	73	-	-	-	-	-	-	78
Oct.	15	60	3084	-	6	-	-	80	790	175	856	-	1177
Nov.	9	45	1776	4	33	-	-	75	895	-	672	18	79
Dec.*	6	16	1346	-	223	-	755	-	-	-	-	134	234
Jan.	16	45	3800	-	723	-	1221	-	-	-	-	544	1312
Feb.	8	41	1994	-	731	4	352	-	-	-	42	205	660
Mar.	20	107	7645	405	689	2	1258	-	-	-	205	774	4006
Total:	127	523	40067	3234	4743	149	3586	982	1685	175	6311	1959	16937

* The vessel was transferred to Tuticorin base from Mangalore base.

/Annexure. XV./

RESULTS OF FISHING BY MEENA SITARA APRIL'7[illegible] - MAY'75.

Month	Fishing effort		Total catch landed (kg.)	Species composition (kg.)													
	Days	Hours		Shark & Skate	Ray	Prawn & Lobster.	Synagris	Lactarius	Leiognathid	Sciaenid	Lizardfish.	Perch.	Flat fish	Pomfret	Moon fish	Other quality fish.	Misc. fish.
Apr.	12	54	4031	377	10	-	-	-	1528	-	-	293	-	-	25	962	835
May	15	73	7602	306	18	-	211	18	387	129	78	502	-	-	32	249	5672
Jun.	23	86	5416	90	246	-	34	-	3507	-	434	13	-	-	-	997	95
Jul.	16	65	16943	210	263	-	42	319	1727	-	493	300	10	-	97	500	12982
Aug.	7	20	728	45	-	-	29	-	253	-	156	4	-	-	37	-	204
Sep.	15	73	12518	175	70	10	50	626	1482	-	204	428	39	-	-	580	8854
Oct.	12	62	8612	112	17	18	235	194	2488	-	266	155	-	-	-	1052	4075
Nov.	21	80	5327	311	215	9	63	-	2426	-	40	55	-	-	-	584	1624
Dec.	23	72	4459	98	78	14	70	-	2568	-	221	4	-	-	-	5145	892
Jan.	19	82	0929	203	489	17	208	119	2661	16	145	1224	50	22	-	847	3928
Feb.	15	62	25599	259	-	39	46	668	3990	5161	-	8614	129	158	-	641	5894
Mar.	13	75	7233	997	245	-	36	79	1574	240	-	1911	144	118	-	746	1163
Total:	191	804	108397	3163	1651	108	1024	2023	24591	5546	2037	13503	372	298	191	7672	46218

/Annexure.XVI./

RESULTS OF FISHING BY KALYANI-IV APRIL'74 - MARCH'75.

Month	Fishing effort. Days	Hours	Total catch landed (kg.)	Species composition(kg.) Shark & Skate	Ray	Prawn & lobster	Synagris	Lactarius	Leiognathid.	Sciaenid.	Perch	Flat fish	Pomfret.	Other quality fish.	Misc. fish.
Apr.				Under going repairs at Bombay.											
May				Under going repairs at Bombay.											
Jun.				Under going repairs at Bombay.											
Jul.	5	5	197	90	50	2	-	-	-	-	-	-	-	5	50
Aug.	3	2		Movement to Madras											
Sep.				Laid up due to engine repairs.											
Oct.				Laid up due to engine repairs.											
Nov.				Laid up due to engine repairs.											
Dec.	6	17	1717	8	9	5	107	89	805	18	-	-	-	58	618
Jan.	5	23	4768	30	175	9	48	209	1558	94	2066	40	25	152	362
Feb.	6	23	7373	60	179	1	120	79	1486	2371	1892	28	52	256	849
Mar.	9	48	12776	432	365	16	289	38	3755	2306	3439	57	47	605	1427
Total:	34	118	26831	620	778	33	564	415	7604	4789	7397	125	124	1076	3306

/Annexure.XVII./

RESULTS OF FISHING BY MEENA GAVESHAK APRIL '74 - MARCH '75.

Month	Fishing effort		Total catch landed (kg.)	Species composition (kg.)													
	Days	Hours		Shark & Skate	Ray	Prawn	Synagris	Lactarius	Leiognathid.	Sciaenid.	Lizard fish	Perch.	Flat fish	Pomfret	Other quality fish.	Misc. fish.
Apr.	19	106	7440	600	-	-	120	233	1371	-	-	372	-	101	579	4064
May	15	52	3860	110	43	-	39	-	1021	-	53	10	-	-	94	2490
Jun.	15	48	2873	17	15	-	60	-	1636	-	246	-	-	3	260	636
Jul.	Dry-docking and other repairs															
Aug.	13	47	2128	5	25	4	222	-	434	-	385	6	-	5	335	707
Sep.	18	93	20173	149	90	29	245	1061	1515	-	-	1600	-	18	824	14642
Oct.	13	64	7759	208	50	6	74	163	1367	-	-	188	-	34	825	4844
Nov.	10	24	1428	-	30	2	31	-	902	-	-	-	-	-	93	370
Dec.	18	71	8506	504	73	5	233	110	2951	177	78	144	-	73	589	3569
Jan.	15	63	11142	258	134	14	276	180	2847	84	78	1663	92	70	2216	3230
Feb.	19	88	13657	218	341	-	145	271	3058	1583	66	3999	67	141	826	2942
Mar.	16	80	10199	134	139	1	208	112	2802	1342	33	3150	50	277	723	1228
Total:	171	736	89165	2203	940	61	1653	2130	19904	3186	939	11132	209	722	7364	38722

/Annexure.XVIII./

RESULTS OF FISHING BY MEENA SHODHAK APRIL'74 - MARCH'75.

Month	Fishing effort Days	Hours	Total catch landed (kg.)	Species composition(kg.) Shark & Skate	Ray	Prawn	Crab & Lobster	Eel	Perch	Pom-fret	Sci-aenid.	Cat fish.	Other quality fish.	Misc. fish.
Apr.	12	50	4094	120	64	6	-	-	62	-	-	834	372	2636
May	5	25	923	17	3	57	1	27	40	-	-	113	116	549
Jun.	23	103	7942	128	368	116	4	65	598	82	-	1254	224	5103
Jul.	6	31	2517	60	155	14	22	-	20	12	-	510	44	1680
Aug.			Dry-docking repairs.											
Sep.	6	23	2644	101	202	16	21	-	23	-	-	386	35	1860
Oct.	9	39	2606	66	210	6	29	12	19	-	-	703	41	1520
Nov.	15	95	9014	233	437	39	18	50	279	32	207	3855	57	3807
Dec.	17	63	6174	118	186	4	15	-	12	18	-	3907	55	1859
Jan.	17	90	4842	177	771	11	3	4	11	-	66	987	76	2736
Feb.	10	50	1946	61	85	14	-	2	20	-	-	430	55	1279
Mar.	16	95	5862	152	462	117	-	58	112	11	-	792	64	4094
Total:	136	664	48564	1233	2943	400	113	218	1196	155	273	13771	1139	27123

/Annexure.XIX./

RESULTS OF FISHING BY MEENA JAWAHAR APRIL'74 - MARCH'75.

Month	Fishing effort Days	Hours	Total catch landed (kg.)	Species composition (kg.) Shark & Skate	Ray	Prawn	Crab & Eel Cray fish		Perch	Pom-fret	Sci-aenid.	Cat fish	Other quality fish.	Misc. fish.
Apr.	13	51	4093	22	4	23	-	4	-	90	-	900	504	2546
May	18	79	3444	195	95	243	-	-	3	41	-	535	347	1985
Jun.	23	102	5626	138	55	206	14	75	61	90	-	1324	240	3423
Jul.	17	76	11615	903	131	14	21	40	20	156	-	3707	80	6543
Aug.	13	56	4506	209	73	21	72	-	8	138	-	1597	20	2368
Sep.	9	40	4453	140	158	28	32	14	137	1	-	1548	20	2375
Oct.	14	56	6559	163	221	18	31	24	51	10	-	2289	27	3725
Nov.	17	75	3491	367	233	2	9	3	8	17	-	875	11	1966
Dec.	17	94	12005	295	190	11	18	279	1109	81	1041	2023	90	6868
Jan.	13	91	12467	578	839	10	34	113	591	32	1377	736	2	8155
Feb.	17	118	16563	731	1460	-	22	408	896	107	759	1094	-	11086
Mar.	15	94	11176	797	1058	5	8	141	596	110	212	2146	18	6085
Total :	186	932	95998	4538	4517	581	261	1101	3480	873	3389	18774	1359	57165

/Annexure-XX./

RESULTS OF FISHING BY MEENA PRASARAK APRIL'74 - MARCH'75.

Month	Fishing effort Days	hours	Total catch landed (kg.)	Species composition (kg.) Shark & Skate	Ray	Prawn	Cat fish	Eel	Dhoma	Ribbon fish	Pomfret	Misc. fish.
Apr.				Gear box and other repairs.								
May				Gear box and other repairs.								
Jun.				Gear box and other repairs.								
Jul.				Gear box and other repairs.								
Aug.	1	1	74	-	-	-	-	-	43	-	-	31
Sep.	3	8	1280	-	36	111	60	12	481	-	19	561
Oct.	8	29	5924	102	112	866	178	172	1288	-	56	1350
Nov.	1	6	980	-	-	429	-	8	122	-	38	383
Dec.	3	13	4852	59	110	672	-	-	1458	44	133	2376
Jan.	20	97	43366	349	1106	5110	190	24	9645	32	655	26255
Feb.	17	81	23732	352	796	1474	107	7	5182	107	564	15143
Mar.	24	114	28614	514	2266	1067	142	67	5002	28	883	18645
Total:	77	349	109822	1376	4426	9729	677	290	23221	211	2348	66544

/Annexure.XXI./

RESULTS OF FISHING BY MEENA GRAHI APRIL'74 - MARCH'75.

Month	Fishing effort Days	Hours	Total catch landed (kg.)	Species composition (kg.) Shark & Skate	Ray	Prawn	Cat fish	Eel	Kar-kara	Ghol	Dhoma	Ribbon fish	Pom-fret	Misc. fish.
Apr.				Vessel under repairs.										
May				Vessel under repairs.										
Jun.	10	21	1302	73	-	51	-	-	-	-	322	-	12	844
Jul.	11	18	1914	450	-	45	-	-	-	-	708	-	9	702
Aug.	10	26	1915	67	-	77	133	179	-	-	606	-	16	837
Sep.	13	45	8107	225	502	1264	873	90	-	17	2351	-	114	2671
Oct.	11	36	8359	136	222	900	301	259	37	15	2161	-	124	4204
Nov.				Dry-docking										
Dec.	3	13	3880	-	-	673	-	-	-	-	1380	-	130	1697
Jan.	21	99	40209	575	217	6472	26	-	7	26	7486	11	1478	23911
Feb.	20	101	28900	381	781	1528	1053	-	-	-	6162	-	498	18497
Mar.	19	80	21517	467	1672	678	638	117	-	35	2805	-	273	14832
Total:	118	439	116103	2374	3394	11688	3024	645	44	93	23981	11	2654	68195

/Annexure.XXII./

RESULTS OF FISHING BY M.V. MATSYAVIGYANI APRIL'74 - MARCH'75.

Month	Fishing effort Days	Hours	Total catch landed (kg.)	Species composition (kg.) Shark & Skate	Ray	Prawn	Saw fish	Eel	Dara	Karkara	Pomfret	Cat fish	Tam	Surmai	Misc. fish.
Apr.			Vessel under repairs.												
May	2	1	37	-	5	-	-	-	-	-	-	-		-	32
Jun.	16	5	1839	100	958	-	-	-	-	105	-	-		-	676
Jul.	12	-	Fishing could not be carried out due to bad weather.												
Aug.	6	-	Fishing could not be carried out due to bad weather.												
Sep.			Repairs and bad weather.												
Oct.			Repairs and bad weather.												
Nov.	17	46	14570	960	1840	310	830	249	1100	1121	1197	1580	-	740	4643.
Dec.	18	33	7175	175	415	-	140	240	--	80	168	390	-	-	5562
Jan.	20	56	17430	1075	975	10	-	45	-	230	6450	497	--	245	7883
Feb.	22	116	25700	2270	3265	60	-	715	2000	580	715	-	530	-	15665
Mar.	22	126	27256	2825	4520	75	494	2345	-	372	1145	610	150	-	14637
Total:	138	383	94007	7405	11978	455	1464	3594	3100	2383	9675	3182	680	985	49106

/Annexure. XXIII./

RESULTS OF FISHING BY MEENA PRAYAS APRIL'74 - MARCH'75.

Month	Fishing effort Days	Hours	Total catch landed (kg.)	Species composition (kg.) Shark & Skate	Tuna	Marlin	Seer fish	Bara-cuda	Cara-ngids	Rui	Red Snapper	Other perch	Sura-mai.	Misc. fish.
Apr.	11	41	1453	929	87	-	54	46	237	77	14	9	-	-
May	10	59	1964	1200	41	422	71	28	75	35	-	83	9	-
Jun.	3	24	-	-	-	-	-	-	-	-	-	-	-	-
Jul.	5	33	1588	1588	-	-	-	-	-	-	-	-	-	-
Aug.	11	58	1657	1466	50	75	25	-	41	-	-	-	-	-
Sep.	12	68	1737	1683	6	26	-	4	10	4	-	-	-	4
Oct.	15	99	690	500	15	-	5	7	73	39	-	-	38	13
Nov.	15	76	1027	766	6	94	117	-	11	23	-	-	-	10
Dec.	20	119	580	373	6	76	53	9	-	20	3	-	20	20
Jan.			Laid up due to engine repairs.											
Feb.	11	74	208	65	19	-	-	31	22	71	-	-	-	-
Mar.	15	99	2403	2232	55	-	3	69	24	-	4	-	14	2
Total:	128	750	13307	10802	285	693	328	194	493	269	21	92	81	49

/Annexure.XXIV./

RESULTS OF FISHING BY MEENA KHOJINI APRIL'74 - MARCH'75.

Month	Fishing effort Days	Hours	Total catch landed (kg.)	Species composition (kg.) Shark & Skate	Ray	Cat fish	Tam	Perch	Kar-kara	Rui	Tuna	Caran-gids	Baracuda	Misc. fish.
Apr.				Engine overhauling and other repairs.										
May				Engine overhauling and other repairs.										
Jun.	7	12	1812	229	235	23	23	-	-	-	-	-	-	1302
Jul.	8	17	2139	347	305	25	-	-	-	-	-	-	-	1462
Aug.	2	7	-	-	-	-	-	-	-	-	-	-	-	-
Sep.				Dry-docking repairs.										
Oct.	10	25	123	7	-	-	1	49	-	51	7	5	3	--
Nov.	18	43	4312	516	332	115	-	5	-	9	-	-	-	3335
Dec.	12	18	993	97	140	-	45	-	15	-	-	-	-	696
Jan.	2	4	158	102	-	3	-	12	-	-	-	-	-	41
Feb.	1	2	95	95	-	-	-	-	-	-	-	-	-	-
Mar.	3	9	1726	153	131	625	-	-	-	-	-	-	-	817
Total:	63	137	11358	1546	1143	791	69	66	15	60	7	5	3	7653