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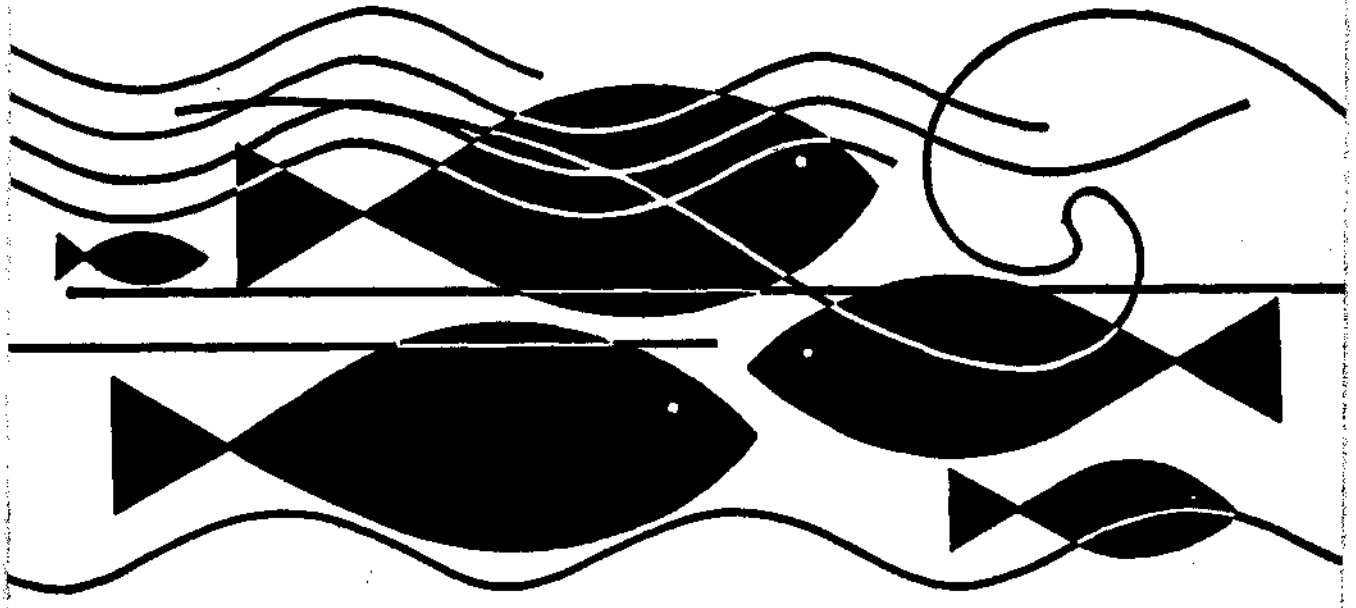
an appraisal of the marine fisheries of gujarat



Issued in connection with the 40th Anniversary Celebrations of

Central Marine Fisheries Research Institute
P. B. No. 2704, E. R. G. Road, Cochin 682 031, India
Indian Council of Agricultural Research
September 16–18, 1987

AN APPRAISAL OF THE MARINE FISHERIES OF GUJARAT

K. BALAN, P. SIVARAMAN,
K. P. GEORGE AND M. RAMACHANDRAN

CMFRI Special Publication
Number 38

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Dr. P. S. B. R. JAMES
Director
Central Marine Fisheries
Research Institute
P. B. 2704
E. R. G. Road
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India

Cover drawing by Shri K. K. Sankaran
Artist
CMFRI, Cochin

CONTENTS

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PREFACE

The Central Marine Fisheries Research Institute, Cochin, is the premier organisation in the country conducting research in marine fisheries leading to rational exploitation, management, development and conservation of living marine resources. The Institute, ever since its early days of inception, has been collecting data on the catch and effort along with the biological information on the exploited marine fisheries resources of the country, through a stratified multistage random-sampling method. In addition to making use for biological studies, including assessment of stocks conducted by the Institute, these data have been processed and utilised to furnish estimates of annual marine fish production in different states over the past 38 years.

With the changed objectives and functions of the Institute in recent times, greater emphasis has been laid on the assessment of stocks for better management of the exploited stocks and to indicate the possible sources of additional production in the context of modern technological innovations in fishing practices in both traditional and mechanised sectors.

With continued increase in fishing effort and intense exploitation of certain resources in different areas of the seas around India a need now arose to examine critically the present status of the exploited stocks, the fishing intensity, the number of boats and different types of gears, infrastructural facilities for handling, storage, transportation and marketing of the catches the status of the underexploited resources and the availability of additional resources beyond the presently exploited areas of each maritime state for providing necessary technical advice to the respective Governments to manage and conserve the resources.

It is with this in view that the data relating to each maritime state for the period 1975-84 are consolidated and processed and presented as a separate special publication. This number gives the appraisal of the marine fisheries of Gujarat state, highlighting the status of the exploited resources and the catch prospects. Some suggestions for management measures are also discussed.

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P. S. B. R. James
Director
C. M. F. R. Institute
Cochin-31

AN APPRAISAL OF THE MARINE FISHERIES OF GUJARAT

K. Balan, P. Sivaraman, K. P. George and M. Ramachandran

INTRODUCTION

Among the maritime states of India, Gujarat, with its 11 maritime districts, namely Kutch, Rajkot, Jamnagar, Junagadh, Amreli, Bhavanagar, Ahamedabad, Kheda, Bharuch, Surat and Valsad, has the longest coastline and, the continental edge in this part of the Arabian sea being farther from shore than in any other part of the country, has the widest shelf area. The coastline of about 1640 km consists of 173 landing centres. The shelf area covers about 1,64,000 sq.km, of which 64,800 sq.km falls in the depth range 0-50 m, which can be exploited by traditional as well as mechanised craft. The state also has excellent estuarine potentials. Despite the State's thus having an excellent scope for the marine fisheries development, it ranks only the fourth place in regard to the contribution to the all-India marine fish production, the annual average landings being 2.21 lakh tonnes. And, with regard to the involvement of the costal rural population in the marine fishery activities, Gujarat ranks lowest. The state has a marine fishermen population of only 1.52 lakhs, of which hardly 37000 are engaged in actual fishing and allied occupations.

As on the rest of the west coast, the more or less stable summer condition of the shelf waters of Gujarat gradually changes to an unstable condition with the approach of the S. W. monsoon by the middle of May every year, followed by a nutrient-replenishing coastal upwelling. This and the heavy runoff from the Sabarmati, Tapti, Narmada etc. cause an enrichment of the inshore areas, which sustain some major commercially important fishes such as bombayduck, pomfrets, sciaenids, threadfins and prawns.

The introduction of mechanised boats with inboard engines started in 1956, at first at Veraval, one of the most important fisheries harbours of the state, though a few country craft fitted with outboard engines had been in operation since 1953. But the traditional fisheries accounted for the bulk of the State's catches until the end of sixties. With the beginning of the seventies, however, the picture gradually began to change, owing to more and more private enterpreneurs entering the mechanised sector employing mechanised trawlers, dol-netters and gill-netters. Now the production in this sector clearly surpasses that in the traditional, some years even accounting for 82% of the total as in 1984. Nevertheless, the activities of this sector are centred around a few major landing centres only, such as Veraval, Mangrol, Porbander and Jaffrabad and the bulk of the products sent to other states for marketing. Local consumption of fish and fishery products is lowest in Gujarat, accounting for about 30% of state's fish landings. Compared to most of the other states, the coastal villages of Gujarat are still backward in respect of both infra-structure facilities and marine fish landings

As the Institute's survey programme for estimating fishery resources has not covered the Kutch region, the estimates for this region are obtained from the Commissionarate of Fisheries, Gujarat The data from the Union Territories of Daman and Diu are, however, included in this analysis.

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MARINE FISHERMEN POPULATION, CRAFT AND GEAR

During 1980 the CMFR Institute had undertaken, marine fishermen census in all the maritime states. The enumeration work in Gujarat was carried out during June-July 1980, except in Kutch area, which was cut off from the other areas due to heavy rains and floods. The census in this area was conducted during May-June 1981. The marine fishermen census was carried out in the districts of Valsad, Surat, Barooch, Kheda, Bhavanagar, Amreli, Junagadh, Jamnagar, Rajkot and Kutch. The details of the same were published in Marine Fisheries Information Service No: 30, an Institutes' publication, in 1981.

The districtwise figures of marine fishing villages and fishermen population of Gujarat are given in Table 1 and that of fishing craft and gear in Table 2.

Fishing Villages and Landing Centres

There were 179 fishing villages with 173 landing centres scattered all along the coast of 1640 km. Out of 179 villages, 29% were in Kutch, 23% in Valsad, 12% in Junagadh, 11% in Jamnagar and 8% in Surat. The rest of the districts accounts for less than 7% of the villages each. The distribution of landing centres over these districts also followed more or less the same pattern.

Population

The total marine fishermen population was about 1.52 lakhs in the state, Valsad accounting for 39%, Junagadh 28% and the remaining 8 districts less than 10% each. Of the total population, adult males and females constituted 28% each and the rest were children. There were about 23,000 fishermen households in the state. The maximum number of families (39%) were in Valsad, followed by Junagadh (26%) and Amreli (10%). Average size of fishermen family was 6.6. Gujarat ranked second among the maritime states in respect of family size, the largest size being 7.2 in Karnataka state. (Table 1).

Table 1. *Districtwise figures of marine fishing villages and fishermen population of Gujarat, 1980*

Sl. No.	Item	DISTRICT										TOTAL
		Valsad	Surat	Baruch	Kheda	Bhav-nagar	Amreli	Junagadh	Jam-nagar	Rajkot	Kutch	
1.	No. of fishing villages	41	15	12	1	4	8	22	20	5	51	179
2.	No. of landing centres	39	15	11	1	4	7	16	21	8	51	173
3.	No. of fishermen house-holds	9055	1361	926	82	197	2233	6105	1157	841	1118	23075
4.	Fishermen population											
	a) Male	18487	2719	1561	119	315	3649	10545	2211	1173	2056	42835
	b) Female	17478	2737	1478	109	289	3925	10774	2196	1176	2087	42249
	c) Children	22989	2984	2369	208	575	6985	21524	3691	2309	3297	66931
	TOTAL	58954	8440	5408	436	1179	14559	42843	8098	4658	7440	152015
5.	Educational status											
	a) Primary	13170	2815	285	6	79	896	6502	67	6	75	23901
	b) Secondary	2158	1052	32	—	7	147	663	1	—	7	4067
	c) Above secondary	705	112	4	—	—	27	63	—	—	—	911
	TOTAL	16033	3979	321	6	86	1070	7228	68	6	82	28879
6.	No. of fishermen engaged in actual fishing											
	a) Full time	8345	994	997	73	119	2619	8101	1582	1146	1640	25616
	b) Part time	1760	445	94	9	216	130	2731	174	1087	195	6841
	c) Occasional	3332	515	51	—	1	10	94	8	—	59	4070
	TOTAL	13437	1954	1142	82	336	2759	10926	1764	2233	1894	36527

Education

Among the population, only 16% completed primary standard (completed Vth std), 3% secondary standard (campleted Xth) and less than 1% above secondary.

Fishermen Engaged in Actual Fishing

About 24% of the fishermen population were engaged in actual fishing. Out of these, 70% belonged to full time category ie. those who spend at least 90% of their time in fishing, 19% part time and the remaining 11% engaged in fishing occasionally. Part time includes those who spend at least 30% but less than 90% of their time in fishing. Occasional are those who use less than 30% of their time in fishing.

Fishing Craft

There were about 2900 mechanised boats owned by the fishermen families, nearly half of them being trawlers. Gill netters constituted 42%. Mechanised boats were concentrated more in Junagadh, Valsad and Amreli districts. These 3 districts together constitute 96% of the total mechanised boats.

There were about 4100 non-mechanised craft of which 74% were plank-built boats and the rest dug-out canoes. Plank built boats were recorded more in Kutch, Valsad, Jamnagar, Rajkot and Junagath. Comparatively more number of dug out canoes were used in Valsad, Junagadh and Amreli districts. (Table 2)

Fishing Gear

There were about 2700 trawl nets owned by the fishermen. Among the non-mechanised gears, fixed bagnet was the most popular used in all the districts. Dol nets formed the major constituent of the fixed bag nets. Valsad was having the maximum number 5170 followed by Surat (4960). About 63% of the drift/set gill nets were from Junagadh and Valsad districts. Hooks & lines were mostly operated in Surat and Valsad districts. A large number of traps were also found in Bharuch district in operation. These traps are small contraptions meant for capturing gobids found in the marshy exposed coast of the district.

Table 2. *Districtwise figures of marine fishing craft and gear owned by fishermen Gujarat, of 1980*

Sl. No.	Items	DISTRICT										TOTAL
		Valsad	Surat	Baruch	Kheda	Bhav-nagar	Amreli	Junagadh	Jamnagar	Rajkot	Kutch	
1.	No. of fishing crafts											
	a) Mechanised											
	Trawler	348	—	—	—	—	117	900	28	—	17	1410
	Gill netter	285	3	—	—	1	93	790	51	—	2	1225
	Dol netter	99	—	—	—	—	51	91	—	—	—	241
	Others	18	—	—	—	—	—	—	—	—	—	18
	Total	750	3	—	—	1	261	1781	79	—	19	2894
	b) Non-mechanised											
	Plank built boats	658	136	160	—	—	90	233	586	504	673	3040
	Dug-out canoes	442	—	56	—	7	172	304	40	—	59	1080
	Total	1100	136	216	—	7	262	537	626	504	732	4120
2.	No. of fishing gears											
	Trawl net	614	—	—	—	—	222	1760	51	—	25	2672
	Drift/gill net	2253	464	313	3	25	448	2427	562	575	313	7383
	Fixed bagnet	5177	4964	2375	—	120	688	1066	13	4121	3333	21857
	Hooks & line	662	1131	260	40	38	—	226	13	—	6	2376
	Trap	729	673	85550	—	—	—	—	—	—	—	86952
	Others	12157	1882	804	35	742	597	2045	3716	2973	3062	28013

As per the last census number of fishermen per km coast line was lowest in Gujarat (125) whereas Kerala had the largest number, 1143. In the case of family size, Gujarat ranked second and it was 6.6 where as in Karnataka it was 7.2, maximum. In educational status, the percentage of persons completed at least primary section was 20%, slightly above the all India level of 19%. The census also revealed that maximum number of mechanised boats belonged to Gujarat (24%) next to Maharashtra. With regard to fixed bag net, Gujarat (45%) ranked first among the maritime states.

*Infrastructure Facilities**

Ice factories : There were 184 ice factories in the private sector with a capacity of 2051 tonnes/day and 1 in the Govt. Co-operative sector in 1984. But within a year, the number of ice factories in the private sector has increased to 208 with a total capacity of 2168 tonnes/day.

Cold storage : Under co-operative sector only 1 cold storage having 100 tonnes capacity existed in 1984. But in the private sector 52 cold storages functioned in 1985 with a capacity of 3412 tonnes. In the previous year only 35 cold storages with a capacity of 2868 tonnes worked.

Freezing plants : 5 plants working with a capacity of 44.5 tonnes in the co-operative sector reduced to 1 in 1985 with capacity diminished to 2.5 tonnes. But in the private sector 4 new plants were introduced with a capacity of 74.5 tonnes. During 84-85, there were 18 freezing plants with a load capacity of 245 tonnes/day functioned.

Frozen storages : By 84-85 period 18 frozen storages with a total capacity of 4341 tonnes were available in the private sector. There was no improvement either in the number or capacity in 84-85 period when compared to the previous year.

Fishmeal plants : Only 2 fish meal plants existed during 84-85 period with a capacity of 33 tonnes/day.

Fish pulverisers : 17 fish pulverisers were established in the private sector with a capacity 202 tonnes/day during 84-85. There were only 15 nos

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* Source - the publications of the Commissionarate of Fisheries, Gujarat 1984 and 1985

with 152 t/day existed during the same period, one pulveriser was introduced in the Co-operative sector with 5 t/day.

Canning plant : In the private sector 1 plant functioned with a capacity of 6.25 tonnes.

Oil extraction plant : In the public sector a shark liver oil plant with a capacity of 30,000 litres exists.

Boat building yards : There are 6 boat building yards in the state. In addition to this at 44 centres, open space, boat building construction work takes place.

Service stations : At present 12 service stations are functioning for the fisheries sector in the state, with other 9 service units.

Co-operatives : The state has got a 'Gujarat Fisheries Central Co-operative Association'. In addition to this central society at the state level, 4 district level 'sanghs' and 209 primary fisheries co-operatives-also exists.

MARINE FISHERIES

The estimated annual marine fish landings in Gujarat during the ten years (1975-84) ranged from 1.71 lakh tonnes (in 1976) to 2.51 lakh tonnes (in 1984). Though there were fluctuations, an increasing trend in landings was observable over the period. In the seventies under report, on an average 1.9 lakh tonnes of marine fish were landed annually, whereas during the eighties it increased to 2.2 lakh tonnes, mainly because of improvements in catches of certain groups of fishes and crustaceans such as catfishes, flat fishes, non-penaeid prawns, crabs and other crustaceans.

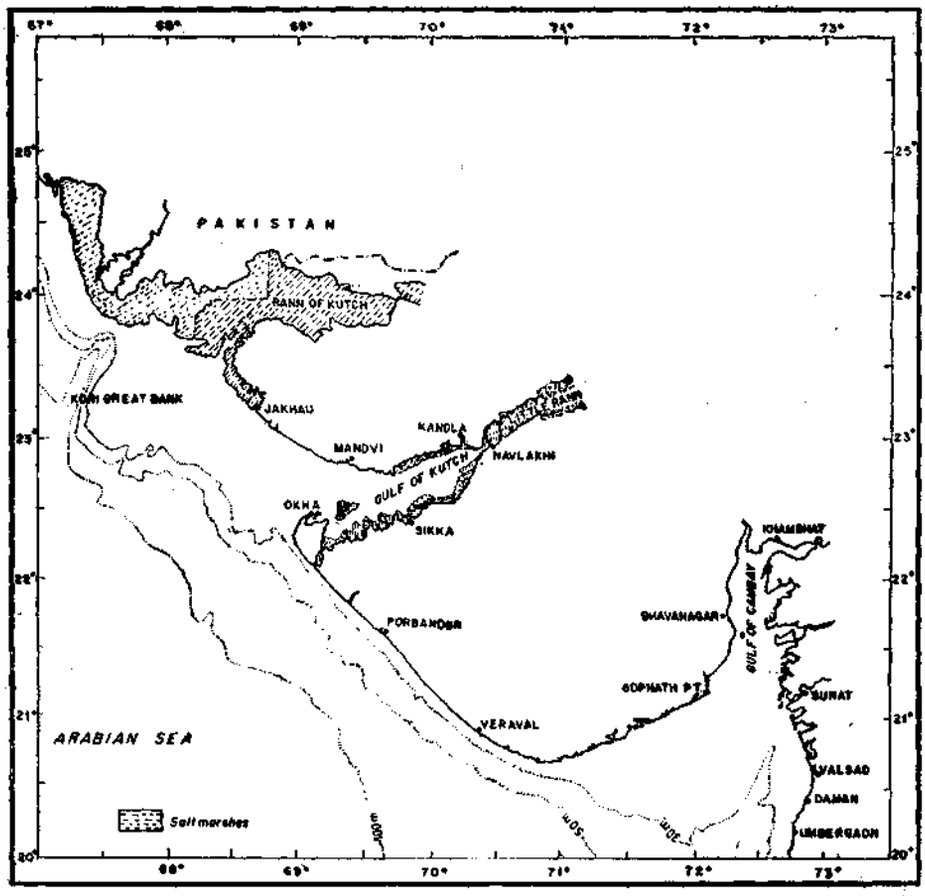

Fig. 1 Map of Gujarat Coast of showing depth contours

Major Groups of Fishes in the Landings

Bombayduck (Harpodon nehereus): The bombayduck, an important fish to the fishermen of the northwest coast, formed of late a major fishery of Gujarat. It was caught in large quantities from the south and southeast coast of Saurashtra. The annual landings and their percentage in total landings were:

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Landings	44554	34998	32289	53870	63984	36671	54114	37933	49851	55877
%age	23.0	20.4	17.0	26.7	33.4	18.0	23.0	18.3	23.1	22.3

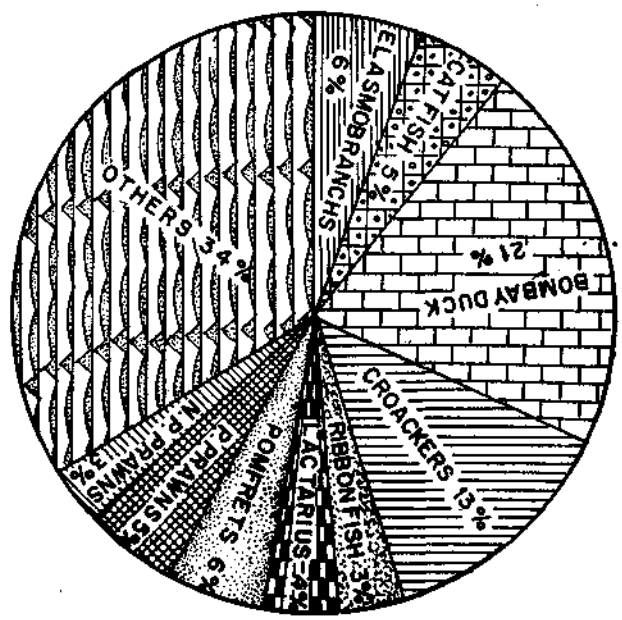

Fig. 2 Contribution of major groups of fishes in Gujarat (Average 1982-84)

The maximum landings (64000 tonnes) was in 1979, forming about 33% of the state's total landings. The fluctuations over different years were only marginal except for 1976 and 1977. On an average, 46000 tonnes of bombayduck were landed annually. The bombayduck was mainly caught in 'dol' net, a type of fixed bag net. The mode of fixing and operating the nets, varied slightly from region to region. The individual fish normally attains maturity when it reaches 210 mm. The commercial size range is

60-270 mm. Individual fish appears to breed only once a year, but the species as a whole breed almost throughout. The studies conducted have indicated that the stocks of Gujarat and Maharashtra coasts are independent (Bapat 1967).

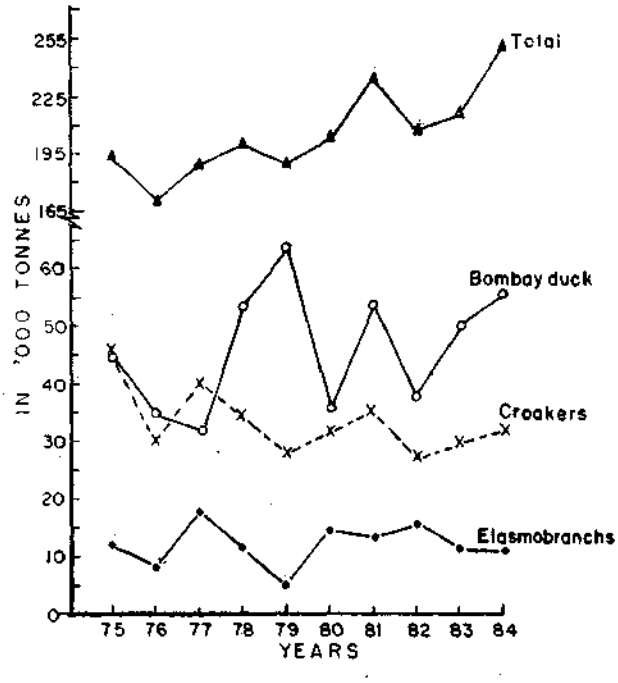

Fig. 3 Fluctuations in the landings of total and important groups of fishes in Gujarat, 1975-84

Croakers: Among the other groups which form important fisheries of the coast, croakers are a major one, which has contributed nearly 16% of the total landings. Next only to bombayduck, it has been landed in good quantities althrough these ten years. In 1975, the landings of croakers were to the tune of about 46,000 tonnes but, in the subsequent year, it has reduced to nearly 29,000 tonnes and thereafter increased to 40,000 tonnes. The landings during the other years did not vary much, most of the years' catch being about 32,000 tonnes. The average annual landings were to the tune of 33,200 tonnes (16%). The annual landings in tonnes and their percentage in the total landings are:

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Catch	45781	28698	39968	33968	28230	31625	35242	26962	29647	31887
%age	23.6	16.8	21.1	16.8	14.8	15.5	15.0	13.0	13.8	12.8

While considering the percentage contribution of this fishery to the total landings, a clear indication has been obtained; in 1975 it accounted for about 23.6% which steadily decreased over the years and came down to 12.8% in 1984, the minimum percent. Inspite of increasing effort and area of exploitation by mechanized craft, landings over the years have not improved.

Penaeid prawns: The penaeid prawns landings on an average contributes 5.3% of the total catch, which is an important fishery due of its high economic unit value and export market. In 1975, about 13400 tonnes (6.9%) of penaeid prawns landed, the same percentage contribution obtained in the subsequent year also. For the next three years it recorded a decreasing trend, and in 1979 it was to the tune of 8600 tonnes (4.5%) thereafter in 1980 it increased to 14500 tonnes (7.1%), which was the highest estimate during the decade. In 1984, it recorded an estimate of 10800 tonnes (4.3%) the other years, landings did not show much variations.

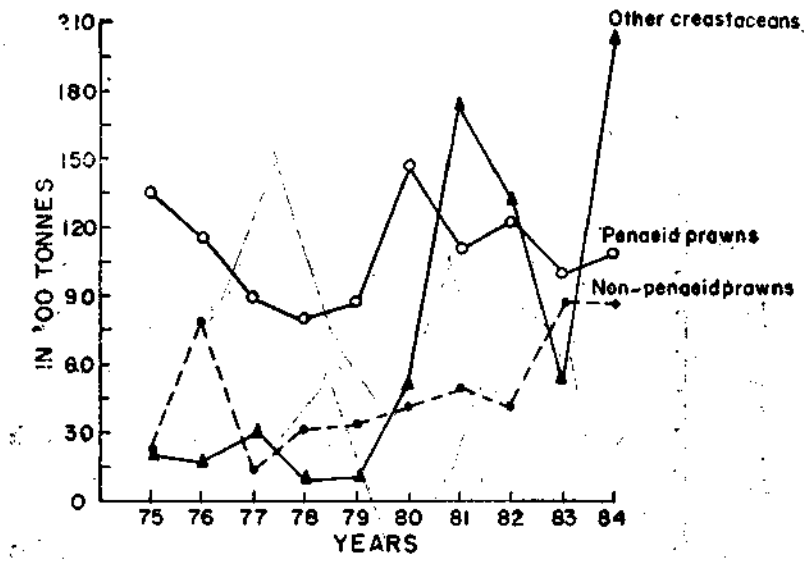

Fig. 4 Fluctuations in the landings of penaeid prawns, non-penaeid prawns and other crustaceans, 1975-84

Throughout the coast penaeid prawn landings take place. During the past decade, the fishery activities around Kutch area have increased enormously and fishermen from Veraval, Porbander and even Maharashtra flock there to fish for pomfret, prawns and hilsa. Jakhau, a very small

coastal village in the northern part of Kutch district, is one of those villages which has witnessed the high fishing activities. The area has several creaks, and tidal fishing is one of the most prevailing type of fishing in these creaks and inshore areas for prawns, mullets and other fishes. The shelf is very vast in this area; up to 50 m depth it covers about 14000 sq. km. Fishing is confined mostly to depths up to 30 m, covering a total area of 11470 sq. km. Prawn fishing is conducted in still shallower waters, below 20 m (Fishing Chimes, June 83). It is believed that the good prawn fishery in this area is due to the influx of the Indus in the Jakhau area and of other rivers in Kutch. It is estimated that between 1300 and 1500 boats operated in the area, out of which 400 to 600 were trawlers for fishing prawns. The important prawns were *P. merguiensis, P. stylifera, M. dobsoni, P. semisulcatus* and *M. affinis.*

Elasmobranchs In the case of elasmobranchs, the landings in the mid seventies was to the tune of 12,000 tonnes and in the eighties it was to the tune of 14,000 tonnes. Over these years there had not been much variations in the landings. The lowest record was made in 1976, which was to the tune of 7900 tonnes (4.7%). On an average, over the decade, elasmobranchs contributed about 12,000 tonnes, which works out to nearly 5.8% of the total landings The maximum landings of about 17500 tonnes (7.2%) was recorded in 1977.

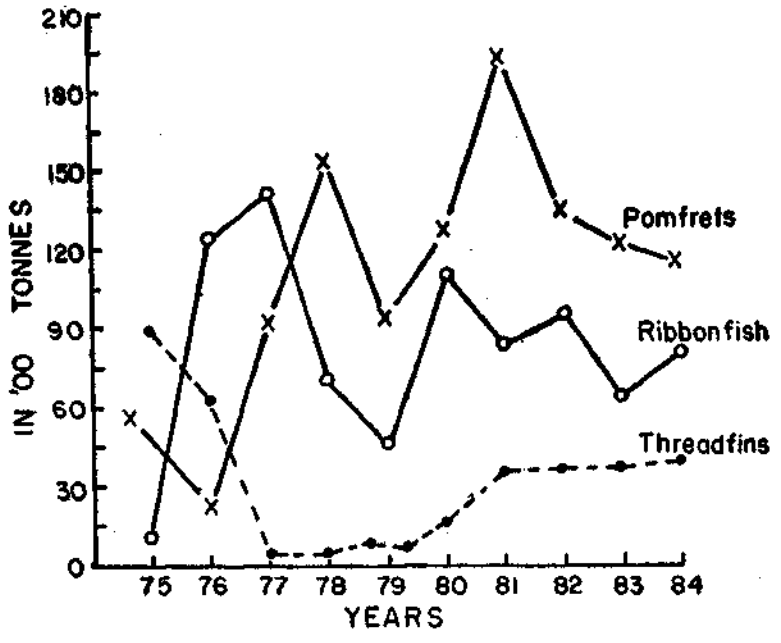

Fig. 5 Fluctuations in the landings of pomfrets, ribbon fish and threadfins in Gujarat, 1975-84

Pomfrets: The pomfret fishery is one of the major fisheries of the State. In mid-seventies, the pomfret landings was only 5600 tonnes annually. An increasing trend was noticed in this fishery throughout the state. The fishery recorded the highest catch of 19200 tonnes in 1981, which formed about 8.2% of the total catch of the year. Excepting 1981, the fishery was nearly to the tune of 12,000 tonnes yearly in the eighties. The percentage contributions of the fishery during 1982, 1983 and 1984 were 6.4%, 5.6% and 4.5% respectively.

Though the fishery occurs in all the areas of Gujarat State, off Jakhau seems to be a more fertile ground for pomfret. Though this village is yet to progress much for the basic infrastructure facilities, the areas of more than 13,600 sq. km. off of it have become popularly known as Jakhau fishing grounds (Fishing Chimes, June 83). The fishery season generally is from September to May. About 1000 boats operate gill nets in this area during the peak season. The two main gears currently used for pomfrets are surface drift gill net ('Tarti') and bottom drift gill net ('Tagli') in a depth of 30-50m. A boat in a month makes 4 to 5 trips, each lasting 4 to 5 days. Most of the boats operating in this area are with inboard engines and with 3 crew members.

Threadfins : The threadfin landings showed much fluctuations over the years though the average landings was nearly 3000 tonnes a year. It recorded the maximum catch in 1975, about 8900 and then dwindled down to only 700 tonnes in 1980. Then, it doubled in the subsequent year, thereafter almost stabilised and recorded nearly 3800 tonnes.

Bombay and Saurashtra waters are the richest, contributing about 80% (Kagwade, P. V.) of the polynemids of the country. Polynemids are caught using different types of gears viz., seine nets, gill nets, long-lines and hand lines which are operated by the country craft having engine for propulsion or sails. For this fishery live baits and dead baits are used. In the northern part of the country where they are found in abundance and fished with stake nets (Dol), bottom set long line (Khanda) and bottom drift gill net (Waghrajal). Among these gears, bottom drift gill net is a specialised gear employed almost exclusively for *Polydactylus indicus* during the season. These special types of gears are in use only in Gujarat and Maharashtra. This also forms a minor quantity in the trawl landings.

The species occurring in commercial abundance in the north western part of the country viz. Gujarat and Maharashtra, are *E. tetradactylum* ('Rawas'), *Polydactylus indicus* ('Dara') and *P. heptadactylus*) ('Shende') of which the first one is usually obtained in the inshore regions (Kagwade, op. cit.). 'Dara' is found off the areas of Veraval, Porbander, Dwaraka and Kutch. Formerly 'Dara' was obtained in large quanities off Dwaraka but later on a major shift in the resources was noticed towards the Kutch area.

Lactarius : Lactarius forms another important fishery of Gujarat coast. Estimated landings varied very much during the period and in 1979 the same was to the tune of 800 tonnes.

The annual landings in tonnes and their percentage in the total landings are as follows:

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Catch	6379	7765	7349	3360	783	2520	3769	6416	11562	7317
%	2.8	4.5	3.9	1.7	0.4	1.2	1.6	3.1	5.4	2.9

In 1975, it was to the tune of 5400 tonnes, it increased durnig the subsequent two years to 7800 and 7400 tonnes respectively. It came down to 3400 tonnes in 1978 and in 1979 it recorded the minimum catch of 800 tonnes. Maximum catch was recorded in 1983 which was to the tune of 11600 tonnes. The average landings for the decade worked out to be 5600 tonnes which comes to 2.7% of the total landings. In the beginning of the period, landings were moderate and thereafter a dull period was observed between 1978 and 1981. The landing of lactarius increased considerably during 1982-1984 period.

Non-penaeid prawns : In the case of non-penaeid prawn there is no much fluctuations. The fishing recorded a poor catch in 1977, with only 1300 tonnes (0.7%) of the total landings. In 1983 and 1984 it recorded considerably higher landings of 8700 tonnes (4.0%) and 8600 tonnes (3.4%) respectively. Average annual contribution for the decade was only 4800 tonnes which worked out to be 2.3% of the total estimated catch. During other years, except in 1976, it was to the order of 3 to 4 thousand tonnes annually. In 1976, the landings was to the tune of 7800 tonnes (4.5%)

Lobsters and other crustaceans : The landings of lobsters showed much variations over the years. In mid seventies it was to the tune of2100 tonnes

but later it declined to about 200 tonnes in 1980 and thereafter slightly increased to the order of 800 and then decreased to 500 tonnes. But in 1984 it again recorded estimated landings of about 1600 tonnes.

The landings of other crustaceans did show much variations. Upto 1979 it recorded less than 800 tonnes except in 1977, in which year the landings was to the order of 2500 tonnes. In 1980, it increased to 5000 tonnes and the subsequent two years to 16500 tonnes and 12800 tonnes respectively forming 7.1% and 6.2% of the total landings. Again in 1983 landings were poor, (5000 tonnes) whereas 1984 recorded the maximum catch for this group, to the tune of 18600 tonnes (7.4%).

Ribbonfishes : The contribution of ribbonfish to the total landings was only marginal, nearly 4% on an average. But studies on the ribbonfishes indicated that there seems to be very good potential stock available off Gujarat coast beyond 50 m depth. The annual ribbonfish landings in tonnes and their percentages in the total landings are as follows:

Year	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Catch	1098	12341	14180	6944	4491	10858	8327	9474	6305	7972
%	0.6	7.2	7.5	3.4	2.3	5.3	3.6	4.6	2.9	3.2

In 1975 landings of ribbonfish were unusually low (1100 tonnes) whereas in the subsequent two years it went upto 12,000 and 14,000 tonnes respectively. From 1981 onwards the catch did not vary very much, the annual landings in 1984 being 8000 tonnes. Over the decade, it landed on an average of 8200 tonnes annually.

Catfishes: The landings of catfishes varied widely during the ten year period. In 1975, catfishes landings were only 2500 tonnes but in 1977-80 period, on an average, 5900 tonnes landed. The period 1981-84 witnessed still higher landing of about 10600 tonnes, on an average. The annual catfishes landings in tonnes and their percentages in the total are as follows:-

Year	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Landings	2514	2140	8958	4159	5320	5235	10370	12662	10176	9313
%	1.3	1.2	4.7	2.0	2.8	2.6	4.4	6.1	4.7	3.7

The landings of catfishes increased considerably during 81-84 period.

Flat fishes: Flat fish landings was to the tune of 6800 tonnes in 1984 which was the record landings during the decade under study. From 1975 to 1979 it declined from 3000 tonnes to 400 tonnes and thereafter a spurt in the landings was noticed in 1980 and landed 2500 tonnes and it maintained the results in the subsequent two years and in 1983 it slashed down to 1200 tonnes.

Contribution of mechanised and non-mechanised landings

Mechanised landings

Annual mechanised landings in '000 tonnes and percent to the total — Gujarat.

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	Average
Mech. landings ('000)	126	102	142	121	130	141	173	162	151	205	145
%	65	59	75	60	68	69	74	78	70	82	71

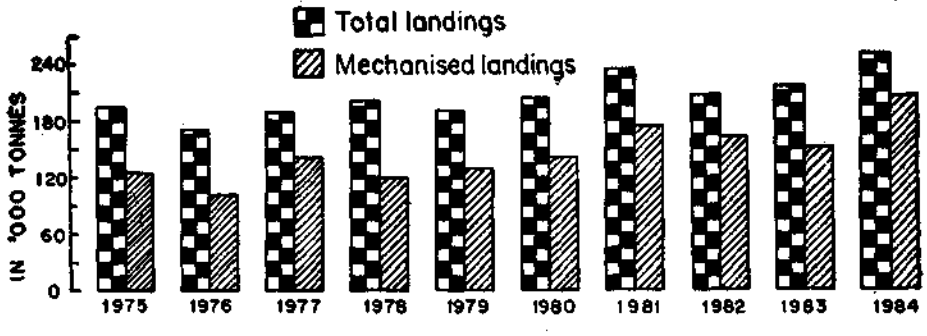

Fig. 6 Total and mechanifed landings in Gujarat, 1975-84

The mechanised contribution to the catch over the years showed an increasing trend. In the seventies it was slightly above 60% but in the eighties more than 70% of the catch was contributed by the mechanised landings. The contribution from this sector had been steadily increasing over the years, and in 1984 it reached 82% of the total landings.

In the mechanised craft mainly three gears were used, they were dol net, trawl net and drift/set gill net.

Dol net Fishery : The gearwise composition of the landings during 1980-84 indicated that dol net contribution to the total mechanised landings was 18%. Dol net landings was to the tune of 19300 tonnes (1980) but it increased to 37400 tonnes in 1983 and an unusually high landings observed in 1984, it was estimated at 54000 tonnes. All these years dol netters contributed a major chunk of bombayduck landings. The dominant groups of fishes/ crustaceans in the dol net were bombayduck, croakers, non-penaeid prawns, eels, ribbonfish and penaeid prawns in the order of abundance. Among these groups about 73%, on an average, of the dol net total catch was contributed by bombayduck. During 1980, it was nearly 13700 tonnes which accounted for 71% of the dol net landings. Its contribution steadily increased over the years and in 1984 a maximum of 40900 tonnes (76%) of bombayduck was accounted for this year. Next to bombayduck, croakers contributed a chunk of dol net fishery which worked out to be, on an average, 6% of the total landings. Croakers landings were to the tune of 1000 tonnes each during 1980-82 period; thereafter in 1983 it increased to 3600 tonnes and declined to 2400 tonnes in 1984. Similarly, non-penaeid prawns was to the order of 1100 in 1980 but in 1984 it increased to 4800 tonnes. Except in 1982, other years it was to the order of 1500 tonnes. On an average, 6% of the dol net fishery was contributed by non-penaeid prawns. Eels contribution varied from 6% (in 1980) to 1% in 1984 and on an overage during 1980-84, 3% of the total dol net landings was contributed by eels. Penaeid prawn landings during 1980 to 1984 did not vary much, contributing less than 2% of the total dol net landings. Ribbonfish contribution was also nearly 2% of the dol net landings. Over this period catch per unit (CPU) did not vary much except in 1983. CPU of dol net in the year 1980 was 913 kg and in 1984 the same was reduced to 683 kg. An unusually high landings recorded in the year 1984 did not result in increasing the CPU since the effort in unit operation also increased from 28000 (1983) to 79000 (1984). CPU in 1983 recorded a maximum of 1327 kg. All the dominent groups of the dol net fishery registered considerable increase in the landings during 1980-84.

Trawlnet fishery: The mechanised landings over the period 1975-84 clearly indicated an upward trend. Among the gears that contributed the mechanised fishery, trawl net ranked first. Of the total mechanised landings, the contribution by the trawl net worked out to beabout 55%, on an average for the period 1980 84. In 1980, trawl net contribution to the fishery was 84,000 tonnes whereas in 1984 it recorded the landings of 1,10,000 tonnes. The minimum catch was contributed in 1983, which was about 75,000

tonnes. In trawl net landings during 1980-84, on an average, 22% of the landings was recorded by croakers which was to the tune of 21,000 tonnes. The landings of croakers during 1981 was to the order of 26,700 tonnes (27%). Other years, catches of croakers did not show much variation. The other dominent groups were lobsters and crabs (10%), penaeid prawns (8%), ribbonfish (7%), big jawed jumper (6%), flat fishes (4%), elasmobranchs (3%), eels (3%), cephalopods (3%), perches (4%), anchovies (3%) and stomatopods (3%). The landings of lobsters and crabs group showed improvements over the five year period. In 1980 it was merely 4200 tonnes and in 1983, again it reduced to 2900 tonnes whereas in 1981 and 1984 it was near 15,000 tonnes each. In 1982, it recorded only 7800 tonnes. In general, during the five year period an upward trend in the landings was noticed. On an average 8900 tonnes (10%) of lobsters and crabs were landed by the fishery, annually. Eels landings from 1982 onwards was to the order of 2200 tonnes. In 1980 it contributed about 5600 tonnes to the fishery. Cephalopods landings almost stabilised during 1980-84 period. On an average 2900 tonnes of cephalopods landed each year. Perches and anchovies form other two important groups of fishes which contributed about 3% each to the trawl landings. The catch/unit for the years did not show much variation from 1980 to 1983. It was 812 kg in 1980 and 805 kg in 1983. But in 1984, catch/unit had increased to 1275 kg which was quite high. It was noticed that effort (no. of unit operation) during 1984 decreased considerably but the catch has marginally increased and thereby catch/unit has shot up to 1275 kg.

Drift net / set gill net : Of the mechanised gears drift/set gill net fetched about 26%, on an average (1980-84), of the total mechanised catch. Over the years there was not much variation in the contribution of this gear to the mechanised catch, except in 1984, in which year it was 20%. On an average 43,400 tonnes of landings accounted by drift/set gill net. The gill net fishery aims at high unit value priced fishes/crustaceans. The total landings during 1980 for the gear was estimated at 37500 tonnes. There was not much difference in other years, in 1984, it recorded about 41700 tonnes. The important groups of fishes which contributed to this fishery were pomfrets, elasmobranchs, catfishes, other shads, croakers and seerfishes in the order of abundance. Of the high unit value priced fish, pomfret comes first, and 23% of the annual landings by this particular gear was contributed by pomfret. In 1980 it was to the tune of 9000 tonnes whereas in 1981 it has increased to 13800 tonnes and subsequently it reduced to 10,800 tonnes. In 1984 the same was to the order of 8000 tonnes. Average annual pomfret

landings for the period 1980-84 was about 10,000 tonnes. Elasmobranchs contribution was also significant in the drift/gill net. Average annual landings by elasmobranchs worked out to be at 8000 tonnes, 18%. In 1982, elasmobranchs landings was to the tune of 10800 tonnes whereas in 1983 and 1984 the same was reduced to 6500 and 6600 tonnes respectively. During 1980, it worked out to be 10100 tonnes. Next to elasmobranchs, catfishes form 11% of the total landings of drift/set gill net catches. Average landings of catfishes was about 4700 tonnes annually. There was considerable fluctuations of this group during the period. Shads form an important group of fishes which landed, on an average, 4100 tonnes (9%). In 1981, it landed about 8000 tonnes whereas in 1934 it was to the tune of 3800 tonnes (9%). The croakers which ranked the second important fishery of the state formed about 9% (3700 tonnes) of the total landings of this gear. Althrough 1980-84, the landings of croakers did not show much variations. Seerfishes formed about 6% (2800 tonnes) of the landings. Year to year variation was not significant except in 1982, in which year it was only 1600 tonnes. Catch/unit in 1980 was to the tune of 199 kgs and in 1984 the same was at 161 kg, without showing much variations. The catch and effort of this gear seems to be steady over the years.

Other mechanised gears

Hook and line and stake net were the two important gears used apart from the gears described above. But their total contribution to the mechanised fishery was only less than 1%. Hook and line brought mainly croakers, catfishes and elasmobranchs whereas stake net brought bombay-duck, croakers and threadfins.

Non mechanised landings

Percentage contribution:-

	1975	76	77	78	79	80	81	82	83	84	(Average %)
%	35	41	25	40	32	31	26	22	30	18	29

The non-mechanised landings form only less than 30% of the total landings. The percentage contribution of this sector over the decade showed declining trend from 35% in 1975 to 18% in 1984. This clearly gives an idea of the shift in the fishery from the traditional sector to the mechanised sector. The important gears in the non-mechanised sector were dol net, drift/set gill net, stake net, cast net, hook and line and

traps. Among the non-mechanised gears, dol net contributed a lions share of the catches. Dol net (Bag net) is mainly aimed at bombayduck. Elasmobranchs, catfishes, other hilsa and other clupeids form groups which contributed considerably good catches of the non-mechanised sector.

Pelagic and Demersal Resources

Pelagic resources: -

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	Average
Catch (000 tonnes)	78	74	74	101	104	82	100	82	91	104	89
%	40	43	39	50	55	41	42	39	42	42	43

The pelagic groups include clupeids, bombayduck, halfbeaks and full beaks, flying fish, ribbon fishes, carangids, mackerel, seer fishes, tunnies, bill fishes, barracudas, mullets and unicorn cod. The landings of pelagic groups of fishes and its percentage were more or less stable during 1975-84. It was about 40% of the total landings except in 1978 and 1979. In 1979 a maximum of 55% of the landings were from pelagic resources. In 1978 also percentage contribution was high, 50%.

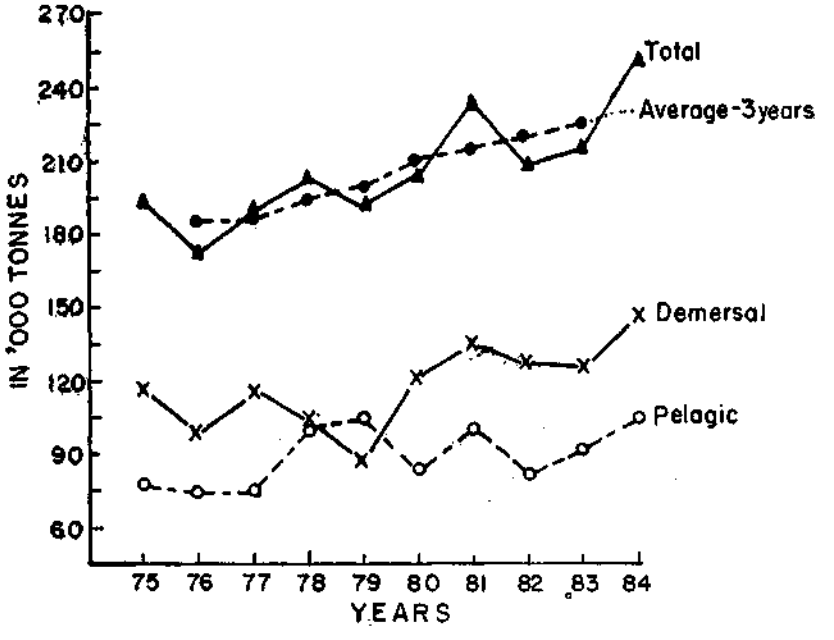

Fig. 7 Contribution of pelagic and demersal fishes, 1975-84

Demersal resources : Demersal group of fishes, crustaceans and molluscs include elasmobranchs, eels, cat fishes, lizard fishes, perches, goat fishes, threadfins, croakers, silver bellies, big jawed jumper, pomfrets, flatfishes, prawns, lobsters, crabs, stomatopods and cephalopods.

Annual demersal landings and percentage contribution

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Demersal catch (000 tonnes)	116	98	115	101	87	121	135	125	124	146
%	60	57	61	50	45	59	58	61	58	58

On an average over the ten year period, about 57% of the total was accounted for by the demersal groups. Except in 1979, althrough these years, more than 50% of the landings comprised demersal resources. The quality groups of fishes such as pomfrets, threadfins, big jawed jumper and penaeid prawns also landed during this period in good quantities. Among the demersal resources, croakers contributed maximum, on an average 16% of the annual total catches. Pomfrets' contribution was about 5%. During eighties, demersal catch was more or less was stabilised around 58% of the total landings.

Distribution of landings along the coast in different regions

The Gujarat coast is divided into four regions, namely, South Gujarat, Saurashtra coast, Jamnagar coast and Kutch for describing the landing pattern here.

Average annual landings in the different regions with percent to the total — Gujarat

Region	South Gujarat	Saurashtra coast	Jamnagar coast	Kutch
Landings (tonnes)	10,100	172,648	25,281	14,015
%	5	78	11	6

1. *South Gujarat*

This area covers the districts of Valsad, Surat, Bharuch and Kheda. The analyses of the estimates of the exploited marine resources of the past ten years revealed that inshore areas adjacent to these districts are not as productive as Saurashtra coast. Only 5% of the total landings was contributed by these districts. It was probable that a portion of the catch from this

area landed in Maharashtra state. During the last five years, though there was not much increase in the landings it was about 10,000 tonnes per year. There were variations in the composition of mechanised and non-mechanised landings over the years. In 1980, of the total catch of 5,300 tonnes, 84% was contributed by non-mechanised units, whereas in 1984 the contribution from the non-mechanised units decreased to 44%. The effort during these years did not show appreciable increase except in 1984, the effort was increased by 143,000 units of operation as compared to that of the earlier year. The catch/unit decreased to 121 kg in this year in respect of mechanised landings. The same was 287 kg in 1983 and in earlier years also the magnitude was more or less of the same order. Non-mechanised units catch/unit was very meagre.

2. *Saurashtra Coast*

This area comprises Bhavnagar, Amreli and Junagadh districts mainly. The inshore areas of this coast were highly productive and about 78% of the annual landings of Gujarat was accounted for by this area, contributing about 1,72,700 tonnes. The important fish landings centres viz. Veraval, Mangrol, Porbander, Vanakbara, Chorwad, Rajpara, Jafrabad, Navabander etc. all come under this area. The mechanised fishing activities in this area inreased very much in the late eighties.

	1980	1981	1982	1983	1984	Average
Catch (lakh tonnes)	1.57	1.98	1.57	1.64	1.86	1.73
Mech. catch (lakh tonnes)	1.08	1.52	1.35	1.32	1.76	1.41
%	(69)	(77)	(86)	(80)	(94)	(81)

The above table shows that on an average more than 81% of total landings (1.73 lakh tonnes) were accounted for by mechanised sector in this region. Though the contribution of non-mechanised sector was nearly 19% of the total landings, catch/unit of non-mechanised landings was far above the other regions.

Mech.	1980	1981	1982	1983	1984	Average
Catch/unit (kg)	398	440	390	405	522	433
Non-mech, catch/unit (kg)	273	426	348	406	270	341

In the case of mechanised landings, catch/unit was to the order of 400 kg except in 1983 and 1984 with a maximum of 522 kg. in 1984. In the case of non-mechanised landings also catch/unit was very high, on an average 341 kg. There had not been appreciable increase in the effort in the mechanised sector. On the contrary that two years witnessed slight reduction in the effort input, on an average effort input was to the order of 32000unit operation per year. In the non-mechanised sector, over the years, decreasing trend was noticed in respect of the landings, from 49000 tonnes in 1980 to 10,000 tonnes in 1984. But there was no corresponding decrease in catch/unit, it only reduced by 3 kgs. Excepting these two years, the catch/unit on the average was about 390 kg which was higher than that of 1980-84. Optimum catch and effort on non-mechanised sector had probably been in between 1981 and 1984, levels. In the non-mechanised sector dol net contributed maximum catch.

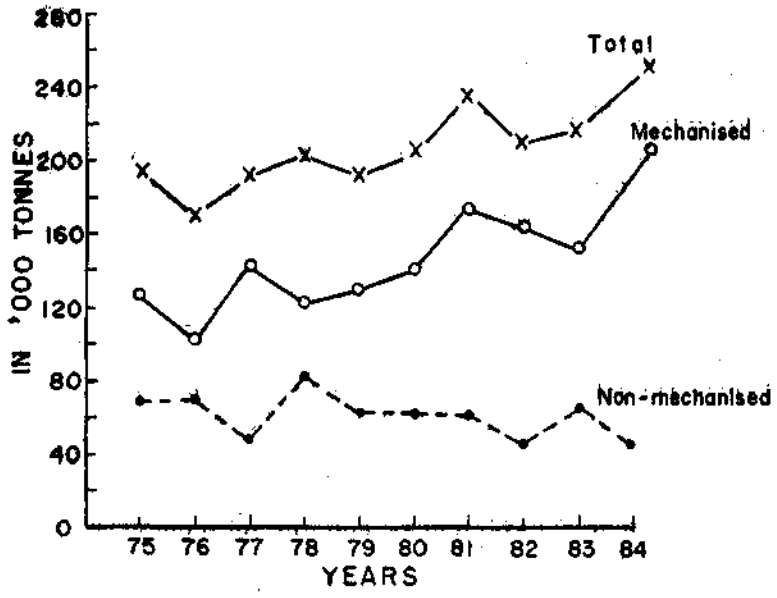

Fig. 8 Contribution of mechanised and non-mechanised landings in Gujarat, 1975-84

3. *Jamnagar Coast*

This area comprised of Jamnagar and Rajkot districts. Over the years 1980 to 84, the mechanised landings did not reveal any specific trend. In the

beginning, it was nearly 32,000 tonnes but in the subsequent year it was reduced to 19,000 tonnes. Further reduction noticed in the next two years. Again in 1984, it shot up to nearly 24,000 tonnes which formed 81% of the total landings for the area.

Year	1980	1981	1982	1983	1984	Average
Mech catch.	32,000	19,000	17,000	13,000	24,000	21,000
%	91	81	80	73	81	82

On an average 82% of the landings of this area was contributed by mechanised sector. Non-mechanised units contributed only about 18% on the average. Catch/unit by the mechanised craft in Jamnagar area was the maximum, (650 kg) on an average. Non-mechanised catch was poor and catch/unit was about 70 kg, on the average.

	1980	1981	1982	1983	1984	Average
Mech. Catch/unit	760	689	826	402	628	654
Non-Mech. Catch/Unit	34	59	103	92	83	67

The catch/unit in 1982 was maximum in mechanised and non-mechanised sectors it was upto 830 kgs in the mechanised sector and 100 kgs in the non-mechanised sector. Other years it did not show much variations in the mechanised sector except in 1983, which year it was only 400 kgs.

Kutch Region

Kutch region contributed only about 6% of the total landings of Gujarat coast. The landings presented here are provided by the Commissionarate of Fisheries, Gujarat State as the Institutes' stratified multistage random sampling technique for the collection of survey data does not cover this region. During 1980, Kutch region contributed only 5100 tonnes were as in 1982 it increased to 11,400 tonnes and the subsequent two years 24300 24600 tonnes respectively.

Seasons and the Landing Pattern

Early summer season: The landings during different seasons show distinct trends in the State. The period January to March, indicated as 'early summer' in this context, recorded good landings althrough these years. During these years, above 20% of the annual landings in the State was recorded in this season, except 1975, in which year, it was on 12%. In 1976, about

22% (37300 tonnes) of the landings were accounted for the season. It increased in 1977 to 28.0% (52,900 tonnes) but there was a fall in 1978 accounting for 20%. From 1979 onwards, early summer indicated above 26% and the maximum percent contribution was made in 1982, attaining 33% (68,400 tonnes).

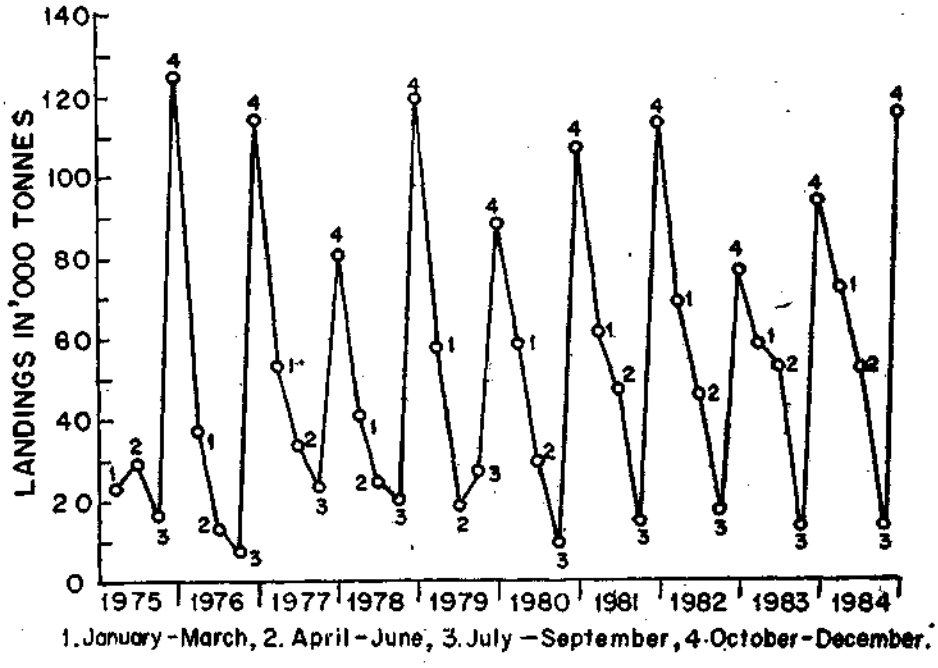

Fig. 9 Seasonal fluctuations in the landings, 1975-84

Pre-monsoon season: The period between April and June is considered as 'pre-monsoon' for the purpose of discussion. Compared to 'early summer'' landings in this season was generally poor in all the years except 1975. It was also noticed that 1975 early summer witnessed very poor landings and hence this year did not indicate the general trend. Pre-monsoon season accounted for by about 15% of the annual landings in 1975, which was more than 3% of the early summer period. It also indicated that maximum landings and percent was in 1983, the landings being 52150 tonnes (24.2%). The lowest percent was noticed in 1976, accounting only 7.7% with 13240 tonnes.

Monsoon season: The period July to September is treated as monsoon season. Although these ten-year period the percentage contribution was very

much less compared to the other seasons, the maximum was 14% (26870 tonnes) in 1979 and minimum 3.8% (6570 tonnes) in 1976. During the other years percentages varied between 5.1 and 12.1. During the eighties, the percentage contribution of this season was mostly 5 each except in 1982, in which year it was 8 percent. Fishing activities during monsoon season were minimum due to inclement weather conditions and heavy rains, thereby realising less landings.

Post monsoon season: The period under reference is October to December. Post monsoon season witnessed althrough the years highest catch, contributing above 50% of the annual landings during 1975, 76, 78 and 80. The year 1976 witnessed the maximum of about 67%, realising 114220 tonnes. During the other years, the landings were above 40 percent of the annual landings, except in 1982. In 1982 the contribution was only 37%.

The landings of early summer and pre-monsoon was less than the post monsoon season in most of these years. In 1982, the first two seasons together comprised of 54 percent and post monsoon season recorded only 37 percent. In general, post monsoon witnessed maximum landings compared to all the other three seasons and also most years greater than the first two seasons. The early summer records next to post monsoon althrough the years and then comes pre-monsoon season. The minimum landings were observed, generally, in the monsoon period.

Season and variety: The south Gujarat area, covering Valsad, Surat, Kheda and Bharuch districts, landed on an average only 5% of the annual estimated catch of the Gujarat during 1980-84. More or less the same trend prevailed during the earlier periods also. The area contributed bombayduck, pomfrets, polynemids, croakers, non-penaeid prawns and lobsters in good quantities. Of these groups, bombayduck and pomfrets together formed more than 50% of the total catches during the years 1980 to 1984. Among the important groups of fish, bombayduck formed bulk of the catch althrough the years. It was to the order of 2400 tonnes in 1980 and it increased to 3200 tonnes in 1984. In the early eighties, pomfret landing was less than 200 tonnes. But from 1982 onwards, it indicated clearly an upward trend. In 1982 it was to the order of 3800 tonnes whereas in 83 and 84 the same were at 3300 tonnes and 2200 tonnes respectively. The trends in the seasons in this region was also similar to that of the state; maximum landings recorded in post monsoon season and next to post-monsoon was the early summer. The least landings were recorded during the monsoon season as in

Table 3 *Seasonwise important groups of exploited resources along South Gujarat during 1980-84. (in tonnes)*

	1980					1981					1982				
	I	II	III	IV	Total	I	II	III	IV	Total	I	II	III	IV	Total
Shads	580	70	126	433	1209	285	742	313	375	1715	1661	40	241	489	2431
Bombayduck	393	121	366	1498	2378	266	105	322	2574	3267	409	100	600	2477	3586
Threadfins	4	1	25	5	35	10	3	814	—	827	356	3	2146	16	2521
Croakers	6	3	37	11	57	5	9	1	2	17	1815	—	1	26	1842
Pomfrets	9	11	12	99	131	14	159	7	19	199	3238	7	23	516	3784
Penaeid prawns	117	179	90	283	669	92	58	19	158	327	—	45	—	—	45
Non-penaeid prawns	55	2	19	94	170	17	69	151	96	333	253	71	60	82	466
Lobsters	21	7	5	27	60	14	3	1	56	74	63	31	—	145	239
Others	125	125	112	229	591	136	828	155	231	1350	1392	86	186	403	2072
Total	1310	519	792	2679	5300	839	1976	1783	3511	8109	9187	383	3257	4159	16986

	1983					1984				
	I	II	III	IV	Total	I	II	III	IV	Total
Shads	583	78	236	—	897	348	39	46	164	597
Bombayduck	385	128	174	423	1110	1019	58	160	1971	3208
Thread fins	116	546	53	—	715	41	314	47	278	680
Croakers	379	533	—	—	912	—	209	5	427	641
Pomfrets	2557	703	75	—	3335	14	91	7	2106	2216
Penaeid prawns	—	15	44	—	59	89	22	6	—	117
Non-penaeid prawns	139	184	81	32	436	354	81	95	166	696
Lobsters	—	—	—	—	—	783	23	—	40	843
Others	1135	172	445	177	1929	380	323	196	784	1688
Total	5294	2359	1108	632	9393	3028	1160	562	5936	10686

I Jan. – March II April - June III July - Sept. IV Octo. - Dec.

the case of the state. Catch per unit was very much low, 27.1kg in 1983 and 21.8 kg in 1984.

Bombayduck and lobsters were mostly abundant during post-monsoon season though other seasons landings took place in moderate quantities. The landings of shads indicated that its season was mainly during early summer. Pomfrets was mainly found in the catches during post-monsoon and early summer seasons. The threadfins were dominant, during monsoon followed by the pre-monsoon period.

The area covering Bhavnagar, Amereli and Junagadh districts and Union Territory of Diu along the Saurashtra Coast having 26 landing centres, contributed, on an average 78% of the total landings of the State. Among the commercially important varieties, the main contributors were elasmobranchs, eels, catfishes, clupeids, hilsa shad, bombayduck, croakers, ribbon fishes, pomfrets, seer fishes, penaeid prawns, non-penaeid prawns, lobsters and other crustaceans. The maximum contribution was made by bombayduck. It was to the order of about 33,600 tonnes in the beginning of eighties and 47,000 tonnes in 1984. Among the fishery seasons, bombayduck was found in good quantities in the post-monsoon for all the years. Out of 33,600 tonnes of total production in 1980, about 75% of the bombayduck catch was landed in post-monsoon season. Next to post-monsoon season, good landings of bombayduck were noticed in early summer. During the other two seasons landings in small quantities were recorded. Next to bombayduck, croakers formed an important component. It was to the tune of 26,300 tonnes in 1980 and in the subsequent year, 30,600 tonnes but later, it again came down to 24,000 tonnes in 1984. The croakers were predominantly present in the landings during early summer in most of the years whereas during 1980 and 1981 it was in the post monsoon season. It landed in good quantities, to the tune of 14000 tonnes in the post monsoon season in 1980 and in the subsequent year also about 12300 tonnes were landed during the same season. Later years, contribution of this season was reduced considerably; 4600 tonnes in 1982 and 7000 tonnes each in 1983 and 1984. But during these three years, early summer witnessed better catches, compared to the post monsoon, to the tune of 7900 tonnes in 1982, 8000 tonnes in 1983 and 9600 tonnes in 1984. During summer season, the landings were moderate and monsoon period recorded still lesser landings.

Ribbon fish landings was to the tune of 10700 tonnes in 1980 in this region. During the subsequent years, it showed a declining trend and recorded 6100 tonnes in 1983, but next year witnessed a slight increase.

Table 4 *Seasonwise important groups of exploited resources along Saurashtra Coast during 1980-84 in (tonnes)*

	1980					1981					1982				
	I	II	III	IV	Total	I	II	III	IV	Total	I	II	III	IV	Total
Elasmobranchs	7142	1641	369	3359	12511	4168	1566	795	4518	11047	3665	3706	1371	3892	12634
Eels	644	316	—	2526	3486	111	84	11	1510	1716	540	506	47	1169	2262
Cat fishes	533	833	477	2215	4058	2606	1616	913	3460	8595	3310	4109	1237	1966	10622
Wolf herring	1052	275	397	790	2514	1214	191	104	833	2342	890	418	163	549	2020
Other shads	834	352	141	970	2297	4606	649	373	2579	8207	566	725	3	928	2222
Other Clupeids	1653	1000	66	1650	4369	1810	312	25	1284	3431	593	1128	43	1009	2773
Bombayduck	2577	4048	1375	25577	33577	1670	11410	637	36498	50215	6207	6214	277	19086	31784
Croakers	8671	2515	119	13989	25294	11575	6168	566	12230	30539	7922	5753	408	4633	18716
Ribbon fishes	2914	4313	72	3361	10650	2419	2540	251	2942	8152	3438	4105	267	1345	9155
Pomfrets	671	2054	1921	2440	7086	945	2352	1781	9704	14782	3367	3957	1594	3741	12659
Seerfishes	1289	97	456	1713	3555	2888	117	221	834	4060	704	190	161	533	1588
Penaeid prawns	1246	1094	5	3915	6260	1710	601	32	4710	7053	2055	694	288	4765	7802
Non-penaeid prawns	630	1502	10	1113	3255	1092	1499	9	1478	4078	727	1043	137	1774	3681
Lobsters	58	29	—	54	141	70	26	—	93	189	41	31	2	41	115
Other crustaceans	3179	1494	—	109	4782	8824	7097	—	524	16445	5617	4380	56	2630	12683
Others	18676	3991	196	10595	33458	9916	4847	1479	11181	27423	10373	5635	1290	9555	26853
Total	51769	25554	5604	74366	157293	55624	41075	7197	94378	198274	50015	42594	7344	57616	157569

Table 4 contd.

	1983					1984				
	I	II	III	IV	Total	I	II	III	IV	Total
Elasmobranchs	2657	2540	754	2578	8529	3159	2515	1042	1554	8270
Eels	1044	564	47	2544	4199	701	377	46	1333	2457
Cat fishes	2551	3335	345	1611	7842	2821	2100	202	1093	6216
Wolf herring	851	304	206	597	1958	1201	308	333	357	2199
Other shads	554	612	439	46	1651	1824	735	299	622	3480
Other clupeids	953	299	46	645	1943	944	719	48	1011	2722
Bombayduck	6363	12649	565	25411	44988	5342	5552	40	35937	46871
Croakers	8089	8209	425	7057	23780	9635	6503	990	6948	24076
Ribbon fishes	1223	1923	27	2898	6071	2285	3367	102	1479	7233
Pomfrets	1110	1711	1472	2077	6370	657	2049	1774	1017	5497
Seerfishes	624	141	140	811	1716	1392	189	544	486	2611
Penaeid prawns	1528	1437	17	1922	4904	1103	1997	178	1975	5253
Non-penaeid prawns	1632	2829	45	1370	5876	372	1557	16	4817	6762
Lobsters	36	95	5	104	240	85	106	4	216	411
Other crustaceans	2507	1516	9	855	4887	9885	7003	14	1403	18305
Others	11247	7148	1378	19362	39135	17432	10891	1786	13545	43654
Total	42969	45312	5920	69888	164089	58838	45968	7418	73793	186017

I Jan - March II April - June III July - Sept. IV Octo. - Dec.

Ribbon fish was dominant during summer season althrough the years 1980-84, except in 1983, when maximum landings were recorded during post monsoon season.

Pomfret fishery in this region also witnessed good landings ranging from 12700 tonnes in 1982 to 5500 tonnes in 1984. The abundance of this group generally had been noticed during post monsoon season. In some years, maximum contribution was noticed during summer season also. But the fishing was carried out in all the seasons and the monsoon contribution was minimum as in the case of other resources.

Among the seasons, seer fish landings were more in most years, during post monsoon and in some years early summer. Seer fish catch fluctuated between 4100 tonnes in 1981 and 1600 tonnns in 1982. In other years fishery was poor except in post monsoon and early summer.

The penaeid prawns landings was to the tune of 6300 tonnes in early eighties but slightly increased in the subsequent year, then declined to 4900 tonnes in 1983. Post monsoon was the major season for penaeid prawns, during this period, more than 60% each, of the penaeid landings was accounted for during this season from 1980 to 1982. But in 1983 and 1984 the contribution of post monsoon was about 40% each of the total penaeid prawns landings. It was also noticed that though lesser prawn landings was noticed in 1983 and 1984 during post monsoon season, summer years contributed better catches, which were not so in the early eighties.

The non-penaeid prawn landings observed in this area were mostly confined in the two seasons, namely, summer and post monsoon. It was observed that in the early eighties this region contributed lesser non-penaeid landings, and the later years witnessed better catches. During 1983 and 1984, in fact, the contribution surpassed penaeid prawn landings; non-penaeid prawns was about 5900 tonnes and penaeid prawns nearly 4900 tonnes in 1983. In 1984, the two groups recorded 6800 tonnes and 5300 tonnes respectively. It was also noticed that prawns, both penaeid and non-penaeid, did not show much variations during 1980-84 years, it was nearly 9500 tonnes in 1980 and 12000 tonnes in 1984, in the other years contribution was around 11,000 tonnes.

In the Saurashtra region lobster fishery was found to be present during the post monsoon season. Among the other seasons, monsoon

recorded very poor landings. The annual landings recorded only a few hundred tonnes and the maximum record was in 1984 (400 tonnes).

Landings of other crustaceans showed wide fluctuations over the years. During 1980, it was to the tune of 4800 tonnes. In 1981 it recorded 16500 tonnes and in the subsequent year declined to 12700 tonnes. It further declined to 4900 tonnes in 1983 and in 1984 it recorded a higher landings of 18300 tonnes. The fishery season was early summer, during which season more than 50% of other crustaceans landings took place. The premonsoon season contributed next to early summer in the order of landings.

Jamnagar Coast, the coastal area covering Jamnagar and Rajkot districts, contributed about 11% of the total landings of the Gujarat coast annually, the average catch was to the tune of 25300 tonnes during 1980-84 period. Among the major groups croakers, penaeid prawns, pomfrets, elasmobranchs, clupeids, cat fishes and eels landed in good quantities. Maximum contribution in this region althrough the years was from croakers. During 1980, croakers landings were to the tune of 6200 tonnes, out of total landings of 25300 tonnes. In the subsequent two years lesser catches were recorded and in 1984 it was to the tune of 4700 tonnes, about 16% of the total estimated catch. Next to croakers, penaeid prawn contributed to the total catch, about 17% (6000 tonnes) during 1980 but next year it record only 10% (2400 tonnes) and later two years it steadily increased and again during 1984, it recorded the minimum landings of about 2300 tonnes (8%). The landings of penaeid prawns showed a decreasing trend. Pomfret landings also exhibited more or less the same trend as prawns. During 1984, it landed about 2300 tonnes (8%). Elasmobranchs landing in 1980 was to the tune of 1800 tonnes, in 1981 it was 1600 tonnes and in 1982 slightly increased. In 1984 it was about 2100 tonnes. In the early eighties, eels landed in good quantities but later period, only few hundred tonnes were recorded. The non-penaeid prawns landed a few tonnes (600) during 1980, but later almost completely absent. Catfishes landed maximum during 1984, it was to the tune of about 1900 tonnes. (Table 5)

Table 5 *Seasonwise important groups of exploited resources along Jamnagar coast during 1980-84 (in tonnes)*

	1980					1981					1982				
	I	II	III	IV	Total	I	II	III	IV	Total	I	II	III	IV	Total
Elasmobranchs	121	453	79	1147	1800	225	366	127	934	1652	520	175	1031	416	2142
Eels	138	—	—	4757	4895	74	18	120	215	427	218	—	156	87	461
Cat fishes	368	43	66	533	1010	162	331	301	754	1548	248	207	336	465	1256
Other clupeids	288	12	39	2904	3243	312	187	130	453	1082	240	36	146	304	726
Croakers	1172	269	9	4750	6200	787	845	980	1904	4516	2124	293	984	2236	5637
Pomfrets	464	395	283	4032	5174	348	255	1131	2312	4046	131	110	1458	837	2536
Penaeid prawns	240	16	417	5373	6046	358	46	74	1900	2378	304	50	416	1789	2559
Non-penaeid prawns	109	—	90	426	625	89	—	—	—	89	1	—	—	—	1
Others	1112	858	634	3727	6331	1505	908	1183	4103	7699	2801	528	658	1775	5762
Total	4012	2046	1617	27649	35324	3860	2956	4046	12575	23437	6587	1399	5185	7909	21080

	1983					1984				
	I	II	III	IV	Total	I	II	III	IV	Total
Elasmobranchs	259	108	164	1177	1708	374	243	100	1368	2085
Eels	29	—	—	95	124	23	—	—	200	223
Cat fishes	212	104	190	448	954	546	320	168	845	1879
Other clupeids	121	35	19	135	310	28	86	263	872	1249
Croakers	1196	174	41	1539	2950	1342	1007	121	2259	4729
Pomfrets	66	90	277	1407	1840	89	103	489	1642	2323
Penaeid prawns	556	98	240	1824	2718	673	172	133	1316	2294
Non-penaeid prawns	—	—	—	—	—	—	—	—	—	—
Others	1923	633	665	3585	6806	2701	1685	1016	8969	14371
Total	4362	1242	1596	10210	17410	5776	3616	2290	17471	29153

I - January-March, II - April-June, III - July-September, IV - October-December.

Among the seasons, post-monsoon contributed a lions' share and next season being early summer. Unlike in other areas of Gujarat, monsoon season was more productive than pre-monsoon season in most of the years, rather pre-monsoon recorded least landings. The variations in the total catches during pre-monsoon and monsoon seasons were not so obvious. Post monsoon season alone contributed more than 54% of the total landings except in 1982. In 1982, monsoon season was better and the two seasons together contributed 62%.

It is seen that post-monsoon season contributed more than 54% of the total landings. The fishery season for croakers, penaeid-prawns, clupeids, cat fishes, eels and pomfrets was post-monsoon, for all these important groups, fishery season was one and the same though lesser landings were recorded during the other seasons.

Out of 6200 tonnes of croakers, 4800 tonnes landed during 1980 post-monsoon season. But later years the trend was changed and percentage contribution declined. About 48% of the croaker landings accounted for by the post-monsoon season in 1984. Post-monsoon season contributed nearly 88% of the penaeid prawns landings during 1980, but percentage contribution during the successive years declined to 80, 70, 68 and 57 respectively. The pomfret fishery also contributed maximum during post-monsoon season, the percent of pomfret being more than 70 in most of the years.

Kutch region contributed only about 6% of the marine fish landings of Gujarat Coast. It was estimated, during 1980 this region contributed only 5100 tonnes but in 1982 it increased to 11,400 tonnes and in the subsequent two years to 24300 tonnes and 24600 tonnes respectively. With the increase in the landings in this region, new groups also contributed to the total landings. Bombayduck, penaeid prawns, pomfrets, clupeids, mullet and catfishes formed the important groups which landed in good quantities. (Table 6.)

In the Kutch region, bombay duck landings was to the tune of 5700 tonnes during 1984 whereas during the previous year it was only 3700 tonnes and earlier years, it was still less. Post monsoon season accounted for the maximum contribution of bombayduck, the next season being early summer. In the eighties, over 50% of the total landings was accounted for by the post-monsoon season.

Table 6 *Seasonwise important groups of exploited resources along Kutch region during 1980-84 (in tonnes)*

	1980					1981					1982				
	I	II	III	IV	Total	I	II	III	IV	Total	I	II	III	IV	Total
Cat fishes	21	67	18	42	148	38	24	52	44	158	171	99	49	221	540
Clupeids	427	74	171	436	1108	263	209	132	342	946	904	221	43	1030	2198
Bombayduck	221	2	97	389	709	183	6	3	434	626	535	17	25	1983	2560
Pomfrets	129	3	9	55	196	69	20	—	52	141	130	32	6	173	341
Mullets	132	61	55	111	359	32	33	87	165	317	62	86	68	253	469
Penaeid prawns	204	210	753	339	1506	88	7	526	606	1227	154	46	703	928	1831
Non-penaeid prawns	17	2	8	32	59	11	3	26	202	242	—	—	—	—	—
Others	263	275	86	357	981	184	278	188	312	962	627	488	174	2207	3496
Total	1414	694	1197	1761	5066	868	580	1014	2157	4619	2583	989	1068	6795	11435

	1983					1984				
	I	II	III	IV	Total	I	II	III	IV	Total
Catfishes	426	321	153	425	1352	199	81	86	728	1094
Clupeids	961	831	679	2133	4604	1010	72	238	3787	5107
Bombayduck	766	84	146	2748	3744	1154	41	114	4404	5713
Pomfrets	98	73	153	205	529	297	22	88	847	1254
Mullets	268	411	195	555	1429	188	67	68	591	914
Penaeid prawns	508	132	727	911	2278	118	43	1352	1671	3184
Non-penaeid prawns	—	—	—	—	—	132	34	39	942	1147
Others	1906	1340	2042	5134	10422	819	300	588	4502	6209
Total	4933	3192	4095	12111	24331	3917	660	2573	17472	24622

I Jan-March II April-June III July-Sept. IV Oct.-Dec.

Penaeid prawns landed in good quanties during post-monsoon and monsoon seasons. The clupeids and mullets also landed predominantly during post-monsoon in this region.

Landings at Veraval Fisheries Harbour

Veraval is one of the important fisheries harbours of Gujarat where fishing activities take place almost throughout the year. The annual landings at this harbour alone was to the tune of about 49000 tonnes on an average during 1980-84. In the beginning of eighties it was to the tune of about 62700 tonnes but in 1981 it came down to 48600 tonnes and more or less the same magnitude prevailed in 1982 and in 1983 it came down to 34200 tonnes which was the lowest in the past five years. In 1984 it recorded landings of about 49400 tonnes. At Veraval there are two landing points, Old Light House and Bhidiya, where landing take place. Among the gears, trawl net was used most commonly; the other important gear being drift/set gill net.

The contribution of the trawler catch was about 93% of the total annual average catch and the rest by drift/set gill net.

Trawl-net fishery : Among the groups that contributed the trawler landings, major components were croakers, penaeid prawns, crabs, cephalopods, ribbon fishes, elasmobranchs, perches, big-jawed jumper, flat fishes, non-penaeid prawns and cat fishes. The landings from the other groups were of lesser order. During 1980, out of 51600 of trawl landings, about 11100 tonnes was accounted by croakers followed by ribbon fish which was to the tune of 6200 tonnes. Penaeid prawns was to the order of 3300 tonnes during this year, the crabs landings was nearer to 3000 tonnes. Cephalopods and big-jawed jumper were to the tune of about 2200 tonnes each. In the subsequent year also, maximum contribution was by croakers (about 10,000 tonnes). During this year, crabs landings was to the tune of 9400 tonnes and ribbon fishes landed to the tune of about 4700 tonnes. During 1982, though there were fluctuations in the landings, overall trend remained the same, maximum contribution was made by croakers. In the subsequent year, fishery was very poor, the annual landings was to the order of 32200 tonnes which was very much less than the other years. Still croakers maintained its rank. In 1984, the total landings increased to about 46,000 tonnes. The catch per unit in the case of trawler was 785 kg. during 1980. In the subsequent

years they were 620 kg and 549 kg, but in 1983 it again increased to 800 kg. In 1984, the same was to the tune of 1416 kg. The increased c/u in 1984 was due to the long trip trawlers which carried the operations of a unit about 3 days on an average.

Drift/set gill-net fishery : In the case drift/set gill net catches in the centre, it contributed nearly 7% each of the annual landings during 1980-84 period except in 1980 in which year contribution was nearly 18% which was unusual. Catch per unit varied differently in different years. During 1980 it was unusually high, about 377 kg. But in the subsequent years the same were 113 kg, 124 kg, 54 kg and 154 kg. On an average, excluding 1980, 111 kg of fish landed in a drift/gill net unit.

The composition of drift/gill net landings consisted of mainly elasmobranchs, hilsa ilisha and other shads, pomfrets, clupeids, carangids, seer fishes, cat fishes and ribbon fishes. All these years elasmobranchs groups, especially sharks and rays, landed in good quantities. The next groups in the order of abundance were other shads followed by pomfrets In the later years seer fishes landed in good quantities.

Fishery seasons at Veraval : Elasmobranchs was generally landed during early summer, eventhough all the seasons witnessed landings of the same in small quantities. Cat fish was predominantly present during summer season and also post-monsoon period. Bulk of the perches was landed during early summer. Other shad groups were present generally during the early summer season. Ribbon fishes caught in drtft/gill nets were mostly dominant during post-monsoon season. Bulk of pomfret was caught during early summer and post-monsoon seasons.

In general, landings at Veraval in the drift/gill net catches were throughout the year, and no specific seasonal pattern was noticed. In some years (maximum contribution was attributed to early summer season whereas subsequent year it was due to summer and another year monsoon etc.

The major contribution of trawler catches were made by croakers, penaeid prawns, ribbon fishes, perches, big-jawed jumper, elasmobranchs, cat fishes, eels, crabs, cephalopods, non-penaeid prawns and flat fishes. In most years, maximum contribution of croaker landing was noticed in early summer. Ribbonfishes were predominant during pre-monsoon

season. During the other seasons also catches were there but of lesser quantities, monsoon season contributing the least. Penaeid prawns landed in all the seasons but maximum contribution being made in post-monsoon. The non-penaeid prawns were mostly found in post-monsoon and pre-monsoon seasons. The landings of crabs were maximum during early summer, next season being pre-monsoon. Caphalopods landings were mainly noticed during early summer and post-monsoon seasons at the harbour. Big-jawed jumper and flat fishes were mostly found during post-monsoon season. Maximum contribution of elasmobranchs catch was during early summer. Eels landings were mainly during post-monsoon, next season being early summer. Other seasons, catches were moderate. Cat fish and perches were predominent during early summer.

The general seasonal trend in Gujarat is that the post-monsoon catches are always on the higher side compared to other seasons and the monsoon catches are the lowest. But, at Veraval it is the early summer season which accounts for the maximum, and the monsoon season, like in the rest of the state, is minimum.

MANAGEMENT OF FISHERY RESOURCES

The effective management of any living resource is possible only when a correct information on its availability is known. The nature of the resources and intensity of exploitation also should be known so as to assess the impact of exploitation. An attempt is made to get an estimate of the availability of exploitable resources.

Potential Yield

There are various methods for estimating the potential yield. Taking into account factors like average annual growth rate of fish production, organic production and fish yield per unit area, the potential yield for north west area is estimated at 14.20 lakh tonnes (George et al, 1977), the north west area comprises Gujarat and Maharashtra. Gulland (Manual of methods for fish stock assessment, 1969) considers potential yield as the greatest average annual yield that can be taken over a period, or under average environmental conditions, with any pattern of fishing. Considering the greatest estimates of landings of important groups of fish over a period of years and cumulating these estimates over the groups, an estimate of potential yield can be worked out. Another approach is by taking the average of greatest peak and the next below of each important group and cumulating these estimates over the groups. The latter procedure is followed in this paper and by taking a ten year period the estimate of the maximum average yield of Gujarat works out 3.3 lakh tonnes.

DISCUSSION

Predominantly vegetarian in habit, there had always been general public apathy towards fishery development in Gujarat state in the early years. To get employed in the fisheries department itself was something abhorrent to youngsters in those days. In the erstwhile Saurashtra state, there were even objections to have a fisheries department. Consequently, the government had to start a fisheries department under the name of 'department of marine products'. After the formation of Gujarat state, a fisheries department has been established.

Though in the beginning there were little activities in the fisheries developmental programmes in the State, there has been tremendous improvements noticed in this sector for the past fifteen years. The annual fish production was to the order of 89,000 tonnes in 1970 and it increased to about 2,61,000 tonnes in 1984 registering a three-fold increase. The increase in the production may not be attributed to a single species or a group, but, a steady upward trend was noticed in many of the groups of fishes of the state. The bombayduck landings, the most important fishery of the state, did not improve significantly. The state witnessed steady and remarkable progress in the fishing and fishery activities of both mechanished and non-mechanised sectors. But the stress during the last fifteen years was on the mechanised sector, and it had really improved the status of fishermen and the entrepreneurs engaged in this industry and allied activities.

General Hydrography of the Region

Investigations in the inshore areas over the shelf on the west coast on the whole indicate that the region is very fertile and productive (Jones et al, 1973).

On the hydrography of the Gujarat coast, in the pre-monsoon period, Patil et al (1962) had stated that the stable summer conditions of the shelf waters gradually progress towards the unstable conditions with the onset of south west monsoon by about the middle of May. For the upper layers of waters, a tongue like drift was also observed, moving towards the south. The tidal influence of this region and the cold

waters off Veraval and neighbouring regions may possibly bring about this effect. In the southern region a north-east bound weak drift was also observed. This tongue appears to be formed as a result of the mixing of river water off Sabarmathi, Tapti and Narmada which enter the Gulf of Cambay.

Organic Production and Marine Fishery Resources

Several investigations on the production of organic matter which enable us to assess the relative fertility of the different regions of the seas were made earlier for the west coast of India. The hydrographic features governing organic production on the west coast of India showed pronounced seasonal variations and four different seasons were postulated. The summer months exhibit stagnant condition. During monsoon and immediate monsoon periods, upwelling occurs along the entire coast with regional varivations in intensity. The upwelling brings up nutrients from the deeper layers and thus enrich the surface layers. The nutrients brought by the upwelling or turbulence to the surface waters are used by the phytoplankton.

Relationship between plankton production and fisheries was investigated by several authors and it was concluded (Subramaniam, 1959) that movements of fish could be related to the water movements and plankton bloom and that it is possible as observed by Settle (1950) that the fishes reach various areas along their route of migration, at times, when, on the average feeding conditions were favourable. In other words, fish catches coincide with plankton concentration suggesting that fish tend to tarry in waters rich in plankton.

A wider shelf area results invariably a greater abundance of fishery resources, especially demersal groups. In the case of Gujarat, the shelf area is vast and the trawling grounds are extensive. Also a number of rivers and creeks available in the state also contribute to the nutrients thereby increasing organic production.

Gujarat state contributes over 2 lakh tonnes to all India catch annually. The small mechanised sector and non-mechanised sector contribute above 99% of the catch. A very small fraction (less than 1%) of the catch by the larger trawlers operating off the coast is also included in the total estimated landings.

Kutch region is very rich in the resources of clam, cockle, oyster, chank, seaweed, coral etc. Several investigators had studied these resources and found that the resources are not fully exploited from this area. Concerted efforts have to be made to exploit the same. The oysters and clams are of a good sources of protein, glycogen and are easily digestible animal foods for man (K. Alagarswami and K. A. Narasimham, 1973).

The shells are extensively used in the lime industry, and cement manufacturing. The edible oysters *Crassostrea gryphoides* and *C. discoides* are found in the west coast. The species *C. discoides* is found in the muddy creeks of Kutch, Aramra creek and off Poshetra Point, Port Okha, Dwaraka and Porbander.

The window-pane oyster, *Placenta placenta*, used for seed pearls, is largely found in the Gulf of Kutch and is exploited to a limited extent at present. The peral oyster, *Pinctada fucata*, found in the Kutch region, is used as food also.

The pearl fishery of the Gulf of Kutch is small in magnitude when compared to Tuticorin fishery and lasts for three months after the onset of monsoon (S. Mahadeven and K. Nagappan Nayar, 1973).

In the Gulf of Kutch, local fishermen make chank collection by picking them from the intertidal flats. There is good demand for the chank flesh as an item of food as well as for shell also. (K. Nagappan Nayar and S. Mahadevan, 1973).

The major seaweed growing regions in India are the coastal areas of Gujarat, Veraval to Okha and Dwaraka.

Corals are also found in the Gulf of Kutch (C. S. Gopinatha Pillai, 1973).

Most of the resources such as clams, oysters, chanks, corals etc. found in the Gulf of Mannar are also available in the Gulf of Kutch apart from the resources of prawns, pomfrets, hilsa etc. and thus a similarity among these two regions, in molluscan resources can be discerned.

Future Prospects:

There has been a steady increase in the effort of mechanised craft and a corresponding increase in the total landings. It is also observed that catch per unit has not reduced generally. This indicates that there is further scope for introducing new units so as to reap the potential harvestable yield. Further analyses on the exploited catches and potential yield on regionwise and gearwise are required for the allocation of different units. With the expected exploitable yield of 3.3 lakh tonnes, an additional catch of 15000 tonnes in dolnet, 44,000 tonnes in trawl net and 21,000 tonnes in drift/set gill net can be expected.

Introduction of Additional Units

Drift / set gill netters: An additional units of 300 drift/set gill netters may be requited to exploit the additional expected catches. These additional units of may be introduced in South Gujarat and Jamnagar coast in a phased manner.

Trawlers : The expected trawler landings of 44,000 tonnes may be obtained by introducing additional 380 units over a period of years and these rawlers may be introduced in the Jamnagar coast and Kutch region.

Dol netters : In order to obtain an additional expected landings of about 15,000 tonnes, 100 dol netters may be needed. These units may be introduced in the Saurashtra coast.

CONCLUSIONS AND SUGGESTIONS

The major conclusions emerging out of the discussions on the exploited resources are as follows:

1. Though the fishing activities expanded almost three times and the industry flourished during the last one and a half dacades in Gujarat, there is good scope for further development, especially in the Jamnagar and Kutch regions for fin fish and crustacean fisheries

and

2. Seaweed resources are found in abundance in Saurashtra region and molluscan resources such as edible oysters, pearl oysters and chanks in the Kutch region and intensified efforts are required to exploit these resources.

Based on the appraisal, the following management measures are proposed:

1. In the south Gujarat an additional 75 units of drift/set gill netters may be introduced in the first year and by assessing the results, further increase can be thought of upto 150 units.

2. In the Saurashtra coast an additional 100 units of dol netters can be introuduced at the rate of 50 units per year and performance reviewed.

3. In the Jamnagar coast an additional 75 drift/set gill netters may be introduced in the first year. Also, an additional 150 trawlers may be introduced in the Jamngar and Kutch regions in the first phase. Further increase of trawlers may be considered based on the feed back information.

4. In the Kutch region the fishery sector is comparatively less developed and it should be strengthened by providing new mechanised units and shore based infrastructure facilities to promote tapping of the resources. Establishment of a good marketing net-work would also go a long way in the development of the sector.

5. Efforts should be made to exploit identified potential resources (Fishery resources of the Exclusive Economic Zone of the north west coast of India, 1983) such as *Trichiurus*, carangids, cat fishes and sciaenids in the off-shore areas of Gujarat by introducing medium and larger vessels.

6. Mechanisation or any innovation when introduced, may be done in a phased manner to reduce inter sector conflicts and care should be taken to protect the interests of the large number of traditional fishermen.

7. A sound data base is a pre-requisite for a comprehensive studies of the stocks and their dynamics. It is essential to maintain an information base which cover data on fishery, biological and environmental aspects collected in a continuous and integrated way to arrive at the results needed for objective decision making.

APPENDIX

QUARTERWISE AND SPECIESWISE MARINE FISH

Name of fish	1975					1976				
	I	II	III	IV	Total	I	II	III	IV	Total
1. ELASMOBRANCHS	2653	1312	1188	6777	11930	2976	765	341	3814	7896
2. EELS	442	615	2	1438	2497	1069	242	—	1972	3283
3. CATFISHES	966	315	344	889	2514	1125	449	36	530	2140
4. CLUPEIDS										
a. Wolf herring	451	11	9	1854	2325	639	186	7	1323	2155
b. Oil sardine	—	—	—	—	—	—	—	—	—	—
c. Other sardines	—	—	—	—	—	3	5	—	—	8
d. Hilsa shad	59	36	1973	1327	3394	588	503	7	—	1098
e. Other shads	924	1480	17	1425	3846	922	183	146	2116	3367
f. Anchovies										
Stolephorus	—	121	—	9	130	—	—	—	—	—
Thryssa	40	4	3	70	117	189	25	5	50	269
g. Other clupeids	1232	1846	1852	8282	13192	3879	1066	209	6144	11098
5. BOMBAYDUCK	3891	1779	1694	37190	44554	3203	1202	678	29815	34998
6. LIZARD FISHES	—	—	—	1267	1267	1448	168	—	1181	2797
7. HALF BEAKS & FULL BEAKS	—	2	1	—	3	—	—	—	101	101
8. FLYING FISHES	—	—	—	—	—	—	—	—	—	—
9. PERCHES	189	240	271	2581	3281	2459	632	8	1542	4641
10. GOATFISHES	—	—	—	—	—	—	—	—	680	680
11. THREADFINS	385	1546	201	6700	8832	1825	561	188	3656	6230
12. CROAKERS	7216	12338	1895	24332	45781	4777	1784	2141	19996	28698

LANDINGS (IN TONNES) IN GUJARAT DURING 1975 - 79

1977					1978					1979				
I	II	III	IV	Total	I	II	III	IV	Total	I	II	III	IV	Total
5839	5419	1371	5136	17565	4202	2429	1394	3486	11511	1326	1283	498	1819	4926
1412	73	40	6938	8463	973	73	50	790	1886	1507	212	208	695	2622
3305	2035	313	3305	8958	1477	1027	346	1309	4159	2119	859	288	2054	5320
1640	599	103	985	3327	974	398	106	391	1869	928	199	98	745	1970
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
18	299	—	12	329	—	14	17	18	49	173	13	18	27	231
2024	1927	340	1256	6547	2100	1085	300	2218	5703	1038	442	263	2094	3837
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5	94	6	—	105	91	253	6	258	608	201	115	40	330	686
2249	388	298	6523	9458	2216	773	152	10141	13282	1962	479	330	2781	5552
5782	2948	491	23068	32289	5283	1917	469	46201	53870	8351	2887	3194	49552	63984
—	6	36	—	42	32	48	2	—	82	5	—	—	1	6
1	—	—	103	104	—	1	—	—	1	—	—	3	182	185
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
199	446	50	518	1213	1616	256	2093	209	4174	641	49	19	264	973
613	38	38	90	779	2	—	—	—	2	—	—	8	—	8
168	49	7	44	268	21	34	282	2	339	4	132	503	97	736
9893	2430	13161	14684	39968	6489	4339	3351	19789	33968	11486	2096	10983	3665	28230

Name of fish	1975 I	II	III	IV	Total	1976 I	II	III	IV	Total
13. RIBBONFISHES	58	1	16	1022	1097	1563	2139	497	8162	12341
14. CARANGIDS										
c. Leather-jackets	—	—	—	—	—	—	—	—	14	14
d. Other carangids	301	512	1	212	1026	358	305	14	979	1656
15. SILVERBELLIES	—	—	—	1	1	—	908	—	—	908
16. BIG-JAWED JUMPER	204	585	—	4590	5379	799	—	—	6966	7765
17. POMFRETS	395	1501	2121	1595	5612	726	312	179	899	2116
18. INDIAN MACKEREL	—	—	—	—	—	—	—	—	—	—
19. SEER FISHES	332	445	51	1051	1879	581	156	51	846	1634
20. TUNNIES	61	71	2	412	546	252	146	—	336	734
21. BILL FISHES										
22. BARRACUDAS	—	22	1	3	26	3	6	—	—	9
23. MULLETS	87	162	134	217	600	294	118	97	588	1097
24. UNICORN COD	—	—	—	—	—	—	—	—	—	—
25. FLATFISHES	297	381	—	2313	2991	1281	111	24	1553	2969
26. CRUSTACEANS										
a. Penaeid prawns	1826	2237	996	8336	13395	2076	295	1678	7448	11497
b. Non penaeid prawns	5	2	13	2366	2386	768	30	16	6964	7778
c. Lobsters	107	—	—	1998	2105	899	55	—	537	1491
d. Crabs & others	—	—	10	—	10	197	1	—	26	224
27. CEPHALOPODS	11	3	—	597	611	813	334	3	1136	2286
MISCELLANEOUS	1204	1627	3764	5913	12468	1769	557	243	4757	7316
TOTAL	23336	29193	16559	124687	193775	37261	13244	6568	114221	171294

Table - 1 Contd.

1977					1978					1979				
I	II	III	IV	Total	I	II	III	IV	Total	I	II	III	IV	Total
5700	4403	745	3332	14180	2480	1038	256	3170	6944	1265	783	944	1499	4491
58	83	224	36	401	140	27	97	56	320	60	22	87	297	466
132	830	20	20	1002	24	190	21	35	270	55	24	308	123	510
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2507	464	973	3405	7349	2887	307	—	166	3360	209	—	—	574	783
700	3964	1581	2929	9174	1425	2701	8034	2981	15141	1048	1930	2547	3794	9319
—	—	—	—	—	—	—	—	—	—	—	35	—	—	35
853	338	118	713	2022	1378	247	158	1951	3734	1444	64	100	1074	2682
137	87	40	68	332	139	29	251	32	451	97	1	8	336	442
134	3	—	17	154	—	—	—	—	—	—	—	—	—	—
107	206	209	378	900	543	176	200	345	1264	217	103	129	302	751
—	—	—	—	—	108	9	—	46	163	274	17	21	50	362
394	48	27	260	729	133	12	—	123	268	101	22	97	191	411
2166	503	2326	3866	8861	1086	624	906	5322	7938	4076	527	578	3425	8606
46	224	130	860	1260	398	377	138	2183	3096	557	287	86	2417	3347
110	57	6	251	424	192	51	6	90	339	88	25	13	85	211
1272	1182	17	—	2471	279	70	40	195	584	434	66	50	233	783
732	518	—	189	1439	1077	581	140	161	1959	3662	856	101	732	5351
5075	3425	373	1652	10525	2809	4508	704	16674	24595	14459	5002	5349	8686	33496
52871	33086	23043	80638	189638	40574	23594	19519	118242	201929	57787	18530	26871	88124	191312

QUARTERWISE AND SPECIESWISE MARINE FISH LANDINGS (IN

Name of fish	1980					1981				
	I	II	III	IV	Total	I	II	III	IV	Total
1. ELASMOBRANCHS	6184	234	112	154	6684	—	—	—	—	—
a. Sharks						142	64	81	20	307
b. Skates						—	—	—	—	—
c. Rays						126	54	63	76	319
2. EELS						—	—	—	2	2
3. CATFISHES	88	47	30	100	265	46	164	40	14	264
4. CLUPEIDS										
a. Wolf herring	348	41	26	72	487	96	16	21	42	175
b. Oil sardine										
c. Other sardines	—	—	—	—	—	—	—	—	—	—
d. Hilsa shad	—	—	—	—	—	—	—	—	—	—
e. Other shads	583	82	14	280	959	177	57	25	154	413
f. Anchovies										
Colia										
Setipinna										
Stolephorus										
Thryssa	—	—	—	—	—	—	—	5	1	6
g. Other clupeids	60	80	14	30	184	24	36	3	5	68
5. BOMBAYDUCK	—	—	—	—	—	—	—	—	—	—
6. LIZARD FISHES	—	—	—	—	—	26	—	—	—	26
7. HALFBEAKS & FULLBEAKS	—	—	—	6	6	—	—	—	—	—
8. FLYING FISHES										
9. PERCHES										
a. Rock cods	—	—	—	—	—	—	—	—	—	—
b. Snappers	—	—	—	—	—	—	—	—	—	—
c. Pig-face breams										
d. Threadfin breams										
e. Other perches	—	—	—	—	—	—	—	—	—	—
10. GOATFISHES										
11. THREADFINS	—	—	—	—	—	—	—	—	—	—
12. CROAKERS	18	32	100	30	180	18	45	16	11	90
13. RIBBONFISHES	76	12	22	54	164	8	7	—	6	21
14. CARANGIDS										
a. Horse mackerel	—	—	—	—	—	10	86	27	—	123
b. Scads	—	—	—	—	—	—	—	—	—	—
c. Leather-jackets	—	13	10	12	35	—	7	24	5	36
d. Other carangids	—	178	26	8	212	—	—	—	—	—

TONNES) BY DRIFT/SET GILL NET AT VERAVAL DURING 1980-84

1982					1983					1984				
I	II	III	IV	Total	I	II	III	IV	Total	I	II	III	IV	Total
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
229	359	115	59	762	110	93	24	35	262	17	110	152	98	377
10	—	—	2	12	18	—	—	—	18	—	—	—	—	—
26	113	27	59	225	14	24	13	9	60	61	16	—	5	82
—	—	—	80	80	—	—	—	—	—	—	—	—	2	2
34	294	34	79	441	39	58	4	31	132	19	16	28	46	109
118	38	57	58	271	107	42	66	89	304	69	26	100	52	247
—	—	—	—	—	—	16	16	14	46	13	3	6	1	23
—	—	—	—	—	—	—	—	69	69	—	—	—	22	22
86	93	34	230	443	98	71	36	40	245	200	152	116	251	719
—	—	—	4	4	—	—	—	2	2	22	1	4	2	29
22	46	2	62	132	27	21	4	39	91	61	71	13	51	196
—	—	—	—	—	—	4	—	—	4	—	—	—	—	—
—	—	2	18	20	—	—	—	—	—	—	—	—	6	6
—	—	—	1	1	—	—	—	—	—	3	4	5	3	15
—	—	—	3	3	—	—	—	—	—	—	—	—	1	1
—	—	—	—	—	—	1	—	1	2	—	2	—	1	3
—	16	3	4	23	1	—	—	3	4	1	—	—	1	2
1	—	1	9	11	—	1	—	5	6	1	2	—	18	21
12	90	9	121	232	13	26	1	26	66	14	52	11	51	128
10	12	5	21	48	8	14	4	64	90	40	72	19	30	161
1	49	40	10	100	5	6	47	2	60	16	10	81	13	120
—	—	—	—	—	—	—	8	23	31	—	—	—	—	—
1	9	29	24	63	—	1	—	2	3	6	5	35	12	58
—	—	—	2	2	3	—	—	—	3	3	7	4	14	28

Name of fish	1980					1981				
	I	II	III	IV	Total	I	II	III	IV	Total
15. SILVER BELLIES										
16. BIG-JAWED JUMPER	—	—	—	—	—	—	—	—	—	—
17. POMFRETS	127	316	158	34	635	—	—	—	—	—
a. Black pomfret						12	129	57	3	201
b. Silver pomfret						20	55	49	8	132
c. Chinese pomfret										
18. INDIAN MACKEREL	82	—	—	—	82	—	—	—	—	—
19. SEER FISHES	815	10	64	136	1025	—	—	—	—	—
a. *S. commersoni*						12	—	—	—	12
b. *S.guttatus*						77	2	42	55	176
c. *S. lineolatus*										
d. *Acanthocybium* Sp.										
20. TUNNIES	18	10	68	78	174	—	—	—	—	—
a. *E. affinis*						3	4	65	7	79
b. *Auxis* spp.										
c. *K. pelamis*										
d. *T. tonggol*										
e. Other tunnies						—	—	—	—	—
21. BILL FISHES										
22. BARRACUDAS						—	1	—	—	1
23. MULLETS										
24. UNICORN COD	—	6	—	—	6	—	—	—	—	—
25. FLATFISHES	—	—	—	14	14	—	—	—	—	—
a. Halibut	—	—	—	—	—	—	—	—	—	—
b. Flounders										
c. Soles	—	—	—	—	—	—	—	—	—	—
26. CRUSTACEANS										
a. Penaeid prawns										
b. Non penaeid prawns	—	—	—	—	—	—	—	—	—	—
c. Lobsters	—	—	—	—	—	—	—	—	—	—
d. Crabs										
e. Stomatopods										
27. CEPHALOPODS										
28. MISCELLANEOUS	6	—	—	4	10	—	—	—	1	1
Total	8405	1061	644	1012	11122	797	727	518	410	2452
No. of operations of fishing units (in '000	10	7	4	9	30	6	7	3	6	22

Table - 6 contd

1982					1983					1984				
I	II	III	IV	Total	I	II	III	IV	Total	I	II	III	IV	Total
—	2	—	8	10	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	243	7	5	255	2	35	12	21	70	8	53	34	10	105
16	38	10	30	94	13	11	56	8	88	4	9	55	12	80
—	—	—	—	—	—	—	—	—	—	—	—	—	16	16
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	1	1
105	7	74	181	367	63	15	61	104	243	57	17	309	132	515
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8	32	18	2	60	—	16	10	30	56	16	29	63	112	220
—	—	—	—	—	—	—	—	—	—	—	—	—	13	13
38	5	—	—	43	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	2	1	3	1	—	3	—	4	—	—	1	2	3
—	1	—	3	4	—	—	—	—	—	—	—	—	—	—
—	—	—	26	26	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	1	1	—	—	—	—	—
1	—	—	21	22	—	2	23	1	26	—	1	—	2	3
718	1447	469	1123	3757	522	457	388	619	1986	631	658	1036	980	3305
6	10	4	10	30	5	22	2	7	36	4	6	5	6	21

DISTRICTWISE LANDING CENTRES IN GUJARAT*

VALSAD**

1. Dehri
2. Umbergaon
3. Nargol
4. Khatalwad
5. Tadgaon
6. Maroli
7. Phansa
8. Kalai
9. Motidaman
10. Nanidaman
11. Devka
12. Kadeya Machhiwad
13. Kolak
14. Udwada
15. Umarsadi Mangalwad
16. Umarsadi Machhiwad
17. Magod Dungri
18. Surwada
19. Kosamba Pardifalia
20. Kosamba Machhiwad
21. Hanuman Bagada
22. Bhadeli Jagalala
23. Bhagalnam
24. Nanidanti
25. Motidanti
26. Dholai
27. Vagrech
28. Bilimora
29. Mendhar
30. Bat
31. Movasa
32. Kankara
33. Onjalmachhiwad
34. Sampore (Samapur)
35. Wansiborsi (Machhiwad)
36. Danti

SURAT

1. Bhimpore
2. Dumas
3. Magdala
4. Umra
5. Surat
6. Rander
7. Hajira
8. Suvali
9. Vansava
10. Dandi
11. Delasa
12. Morbhagva (Bhagva)
13. Karanj (Pardi-Jangri)

* Excluding Kutch.

** Including landing centres of Union Territory of Daman.

BHARUCH

1. Bhadbhut
2. Dahej
3. Tankaria (Tankari)
4. Sarod
5. Kavi

KHEDA

1. Dahewan
2. Dhuvaran
3. Cambay (Khambhat)

BHAVNAGAR

1. Bhavnagar

AMRELI

1. Jafrabad
2. Seemar
3. Kotda
4. Madhwad
5. Muldwarka

JUNAGADH

1. Rajpara
2. Navabander
3. Dhamlej
4. Sutrapada
5. Hirakot
6. Veraval (Old Light House)
7. Veraval (Bhidiya)
8. Jaleshwar
9. Chorwad
10. Mangrol Bara
11. Mangrol
12. Shil
13. Madhavpur
14. Navibander
15. Porbandar (Cement Factory)
16. Porbandar (Aswatighat)
17. Mianl

DIU

1. Goghala
2. Diu
3. Vanakbara

JAMNAGAR

1. Rupan
2. Okha
3. Balapur
4. Salaya
5. Bharana
6. Vadinar
7. Sikka (F.P.)
8. Sarmat
9. Bedi
10. Rosi
11. Sachana
12. Balachadi
13. Jodia

RAJKOT

1. Navlakhi
2. Malia
3. Hanjiasar
4. Kajarada
5. Jajasar
6. Bayasara

GEARWISE AND SPECIESWISE MARINE FISH LANDINGS (IN

	Name of fish	1980 TN	1980 D/G	1980 Dol net	1980 Others	1980 Total	1981 TN	1981 D/G	1981 Dol net	1981 Others	1981 Total
1.	ELASMOBRANCHS	1805	10110	39	—	11954					
	a. Sharks						3514	3911	36	—	7461
	b. Skates						65	12	—	—	77
	c. Rays						883	2612	65	—	3560
2.	EELS	5638	385	1169	—	7192	1052	261	592	—	1905
3.	CAT FISHES	1470	2120	24	—	3614	2615	6176	104	1	8896
4.	CLUPEIDS										
	a. Wolf herring	1425	1782	—	—	3207	842	1590	1	—	2433
	b. Oil sardine										
	c. Other sardines	—	—	—	—	—	—	—	—	—	—
	d. Hilsa shad	—	42	—	—	42	—	2	—	—	2
	e. Other shads	—	2706	—	—	2706	290	7904	—	—	8194
	f. Anchovies										
	Coilia						1153	—	789	2	1944
	Setipinna										
	Stolephorus										
	Thryssa	28	—	—	—	28	750	6	—	—	756
	g. Other clupeids	3908	1043	708	1	5660	2536	1329	85	—	3950
5.	BOMBAYDUCK	13	—	13640	15	13668	2532	—	16382	66	18980
6.	LIZARDFISHES	64	—	11	—	75	84	26	—	—	110
7.	HALF BEAKS & FULL BEAKS	—	6	—	—	6	—	—	—	—	—
8.	FLYING FISHES										
9.	PERCHES	1478	491	—	9	1978					
	a. Rock cods						30	137	—	—	167
	b. Snappers						251	—	—	—	251
	c. Pig face breams						—	—	—	—	—
	d. Threadfin breams						2055	—	—	—	2055
	e. Other perches						1155	615	—	—	1770
10.	GOATFISHES	—	—	—	—	—	294	—	—	—	294
11.	THREADFINS	239	213	29	—	481	106	239	—	—	345
12.	CROAKERS	18036	3069	1061	5	22171	26685	4661	1045	—	32391
13.	RIBBONFISHES	7932	326	895	—	9153	7190	169	440	—	7799
14.	CARANGIDS										
	a. Horse Mackerel						71	677	—	—	748
	b. Scads						—	—	—	—	—
	c. Leather-jackets	24	650	—	—	674	28	2129	—	—	2157
	d. Other carangids	190	259	—	—	449	80	9	—	—	89

TONNES) BY MECHANISED CRAFT IN GUJARAT DURING 1980-84

1982					1983					1984				
TN	D/G	Dol net	Others	Total	TN	D/G	Dol net	Others	Total	TN	D/G	Dol net	Others	Total
1301	8446	38	7	9792	1031	3807	58	5	4901	1212	4297	224	—	5733
509	435	18	—	962	406	172	28	—	606	333	144	—	—	477
1401	1934	79	5	3419	1232	2473	168	8	3881	1292	2195	186	—	3673
2244	488	—	—	2732	2106	121	1953	—	4180	2090	543	363	—	2996
4261	6546	232	106	11145	3067	4286	249	40	7642	2616	4333	387	—	7336
1073	1521	2	—	2596	776	1914	3	1	2694	616	1682	25	—	2323
—	—	—	—	—	—	46	—	—	46	173	65	—	—	238
—	89	1	—	90	65	654	—	—	719	—	72	—	—	72
14	3869	22	—	3905	16	2268	—	—	2284	121	3848	47	—	4016
1299	—	1111	67	2477	255	—	815	8	1078	1654	3	975	—	2632
4719	4	33	—	4756	3694	57	—	—	3751	2315	128	23	—	2466
2209	981	74	—	3264	1166	707	135	—	2008	1970	1641	125	—	3736
464	—	15115	829	16408	141	5	24563	67	24776	374	70	40880	—	41324
778	29	—	—	807	627	—	—	—	627	1569	51	—	—	1620
—	1	—	—	1	—	331	—	—	331	—	15	—	—	15
13	42	—	50	105	270	46	—	1	317	524	16	—	—	540
166	4	—	—	170	546	248	6	2	804	425	285	—	—	710
—	—	—	—	—	—	—	—	—	—	72	36	—	—	108
1754	—	—	—	1754	1185	—	—	—	1185	4254	4	—	—	4258
705	340	—	—	1045	1640	617	—	3	2260	1803	347	—	—	2150
—	—	—	—	—	514	—	—	—	514	319	—	—	—	319
237	720	31	—	988	1024	1524	—	96	2644	1059	1503	930	—	3492
19852	4081	991	54	24978	17201	3715	3626	226	24768	22049	3889	2436	—	28374
8384	299	293	—	8976	3697	413	1159	2	5271	5814	570	876	—	7260
21	265	—	—	286	1	341	—	—	342	220	750	9	—	979
2	15	—	—	17	97	575	—	—	672	—	—	—	—	—
891	1619	1	—	2511	152	986	—	—	1138	483	1930	16	—	2429
158	8	1	—	167	227	89	—	—	316	251	391	—	—	642

Name of fish	1980					1981				
	TN	D/G	Dol net	Others	Total	TN	D/G	Dol net	Others	Total
15. SILVERBELLIES	—	—	—	—	—	—	—	—	—	—
16. BIG-JAWED JUMPER	2520	—	—	—	2520	3281	24	—	—	3305
17. POMFRETS	992	9078	70	—	10140					
a. Black pomfret						313	2423	1	—	2737
b. Silver pomfret						2300	11348	226	1	13875
c. Chinese pomfret						—	—	—	—	—
18 INDIAN MACKEREL	30	82	—	—	112	—	—	—	—	—
19. SEER FISHES	394	3306	—	—	3700					
a. *S. commersoni*						26	1130	—	—	1156
b. *S. guttatus*						880	2819	—	—	3699
c. *S. lineolatus*										
20. TUNNIES	—	275	—	—	275					
a. *E. affinis*						6	1297	—	—	1303
b. *Auxis* spp.										
c. *K. pelamis*										
d. *T. tonggol*						14	—	—	—	14
e. Other tunnies						120	83	—	—	203
21. BILL FISHES	—	—	—	—	—	—	—	—	—	—
22. BARRACUDAS	—	—	—	—	—	—	1	—	—	1
23. MULLETS	—	—	—	—	—	—	—	—	—	—
24. UNICORN COD	—	362	—	—	362	152	299	—	—	451
25. FLATFISHES	1942	66	32	—	2040					
a. Halibut						78	79	—	—	157
b. Flounders										
c. Soles						3445	4	18	—	3467
26. CRUSTACEANS										
a. Penaeid prawns	8975	252	365	1	9593	7949	—	419	7	8375
b. Non penaeid prawns	1339	—	1087	5	2431	851	—	1698	—	2549
c. Lobsters	102	8	2	—	112	669	16	4	7	696
d. Crabs	4100	—	44	—	4144	13970	2	—	—	13972
e. Stomatopods	622	—	—	—	622	2447	—	9	—	2456
27. CEPHALAPODS	2737	84	15	—	2836	2555	—	—	—	2555
28. MISCELLANEOUS	18019	823	137	5	18984	5482	396	193	3	6074
TOTAL	84022	37538	19328	41	140929	98799	52386	22107	87	173379
No. of operations of fishing units (in '000)	103	189	21	3	316	121	230	30	3	384

TN - Trawl nes D/G Drift/Set gill net

Table - 3 contd.

1982					1983					1984				
TN	D/G	Dol net	Others	Total	TN	D/G	Dol net	Others	Total	TN	D G	Dol net	Others	Total
—	—	—	—	—	37	—	—	—	37	456	—	—	—	456
6387	10	—	—	6397	9418	160	1659	—	11237	7189	18	91	—	7298
46	1967	5	—	2018	139	2161	—	—	2300	429	2723	8	—	3160
1042	8857	126	24	10049	884	6537	319	29	7769	799	5198	546	—	6543
—	—	—	—	—	—	—	—	—	—	1	111	—	—	112
—	—	—	—	—	—	—	—	—	—	24	27	—	—	51
—	—	—	—	—	—	—	—	—	—	33	101	—	—	134
432	1640	3	8	2083	418	2479	—	—	2897	529	2538	235	—	3302
12	259	—	—	271	25	372	—	—	397	209	1200	—	—	1409
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
32	60	—	—	82	12	—	—	—	12	36	548	—	—	584
—	889	—	—	889	98	19	—	—	117	5	13	—	—	18
—	471	—	—	471	207	257	—	—	464	65	—	—	—	65
22	—	—	—	22	18	—	—	—	18	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
374	41	—	—	415	316	87	—	—	403	383	72	—	—	455
2587	15	4	—	2606	1087	18	45	—	1150	6304	1	26	—	6331
9517	85	291	—	9893	5637	218	960	—	6815	6543	4	458	—	7005
1649	26	675	138	2488	2286	100	1331	80	3797	1558	8	4803	—	6369
240	—	—	—	240	287	43	1	—	331	514	51	7	—	572
7540	2	—	—	7542	2611	78	—	—	2689	14412	6	—	—	14418
5132	—	9	—	5141	1734	78	240	—	2052	3914	—	28	—	3942
3017	—	6	—	3023	3857	2	15	—	3874	2185	—	68	—	2253
4164	762	199	71	5186	4609	371	95	19	5094	10615	220	244	—	11079
94638	46810	19360	1359	162167	74818	38375	37428	587	151208	109813	41646	54016	—	205474
149	202	27	27	405	93	251	28	8	380	86	269	79	—	424

Others - Hooks & line, stake net etc.

QUARTERWISE AND SPECIESWISE MARINE FISH LANDINGS (IN

Name of fish	1980					1981				
	I	II	III	IV	Total	I	II	III	IV	Total
1. ELASMOBRANCHS	690	259	—	114	1063	—	—	—	—	—
a. Sharks						37	128	8	176	349
b. Skates						—	—	—	61	61
c. Rays						93	147	35	304	579
2. EELS	598	286	—	84	968	111	30	11	357	509
3. CAT FISHES	377	391	—	38	806	84	111	5	235	435
4. CLUPEIDS										
a. Wolf herring	285	75	—	48	408	87	27	—	93	207
b. Oil sardine										
c. Other sardines										
d. Hilsa shad										
e. Other shads						3	3	—	—	6
f. Anchovies										
Coilia						—	—	124	334	458
Setipinna										
Stolephorus										
Thryssa						47	—	—	—	47
g. Other clupeids	472	360	—	58	890	—	43	4	158	205
5. BOMBAYDUCK	—	10	—	—	10	—	16	—	796	812
6. LIZARDFISHES	—	—	—	64	64	—	—	—	84	84
7. HALF BEAKS & FULL BEAKS										
8. FLYING FISHES										
9. PERCHES	1203	5	—	50	1258	—	—	—	—	—
a. Rock cods						—	—	—	28	28
b. Snappers						—	—	—	249	249
c. Pig-face breams						—	—	—	—	—
d Threadfin breams						179	—	—	1876	2055
e. Other perches						75	328	—	460	863
10. GOATFISHES						—	—	—	294	294
11. THREADFINS						—	28	—	75	103
12. CROAKERS	6315	2119	4	2686	11124	3541	2461	379	3575	9956
13. RIBBONFISHES	1354	4039	—	774	6167	1448	1521	240	1499	4708
14. CARANGIDS										
a. Horse Mackerel						—	1	—	—	1
b. Scads						—	—	—	—	—
c. Leather-jackets	—	—	—	6	6	—	—	—	16	16
d. Other carangids	190	—	—	—	190	—	—	—	76	76

TONNES) BY TRAWL NET AT VERAVEL DURING 1980-84

1982					1983					1984				
I	II	III	IV	Total	I	II	III	IV	Total	I	II	III	IV	Total
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
92	234	13	64	403	122	89	1	61	273	62	65	4	68	199
150	—	23	42	215	170	14	—	55	239	85	96	—	36	217
361	404	18	22	805	363	118	2	126	609	343	321	7	25	696
241	228	42	728	1239	598	371	46	241	1256	330	180	46	467	1023
110	291	476	145	1022	245	184	1	168	598	91	101	9	94	295
170	180	23	107	480	165	109	—	82	356	109	48	1	62	220
—	—	—	14	14	—	—	—	—	—	—	—	—	—	—
—	12	—	880	892	—	51	48	—	99	592	294	6	20	912
299	529	—	1768	2596	230	295	74	396	995	437	198	108	191	934
87	496	—	177	760	381	95	1	72	549	108	84	5	362	557
—	—	—	463	463	—	78	—	—	178	86	78	—	—	164
393	8	107	120	628	200	143	—	202	545	977	141	—	216	1334
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	1	—	269	270	138	98	1	116	353
73	1	—	52	126	86	44	—	393	523	103	32	7	33	175
—	—	—	—	—	—	—	—	—	—	—	60	—	6	66
669	208	76	45	998	469	—	—	546	1015	544	865	—	676	2085
252	3	—	56	311	284	466	—	529	1279	646	428	34	333	1441
—	—	—	—	—	—	79	—	424	503	196	28	—	95	319
7	11	—	13	31	6	212	—	298	516	167	354	53	156	730
2727	2118	143	1546	6534	1638	2895	14	2361	6908	2234	2568	706	3205	8713
1503	3635	205	741	6084	337	1000	10	565	1912	585	1050	72	598	2305
2	—	—	7	9	—	—	—	1	1	1	10	—	1	12
—	—	—	2	2	—	—	—	39	39	—	—	—	—	—
—	—	—	639	639	—	—	—	4	4	7	—	—	6	13
62	6	41	30	139	72	24	—	32	128	23	41	18	52	124

Name of fish	1980					1981				
	I	II	III	IV	Total	I	II	III	IV	Total
15. SILVERBELLIES	—	—	—	—	—	—	—	—	—	—
16. BIG-JAWED JUMPER	879	100	—	1186	2165	897	—	210	895	2002
17. POMFRETS	322	48	—	10	380	—	—	—	—	—
a. Black pomfret						2	10	—	1	13
b. Silver pomfret						60	44	—	118	222
c. Chinese pomfret										
18 INDIAN MACKEREL	30	—	—	—	30	—	—	—	—	—
19. SEER FISHES	263	13	—	28	304	—	—	—	—	—
a. *S. commersoni*										
b. *S. guttatus*						68	2	—	34	104
c. *S. lineolatus*										
d. *Acanthocybium* Sp.										
20. TUNNIES										
a. *E. affinis*						3	—	—	3	6
b. *Auxis* spp.										
c. *K. pelamis*										
d. *T. tonggol*						—	—	—	14	14
e. Other tunnies						—	—	—	—	—
21. BILL FISHES						—	—	—	—	—
22. BARRACUDAS						—	—	—	—	—
23. MULLETS										
24 UNICORN COD										
25. FLATFISHES	407	283	—	788	1478	—	—	—	—	—
a. Halibut						—	—	—	78	78
b. Flounders										
c. Soles						666	817	158	578	2219
26. CRUSTACEANS										
a. Penaeid prawns	847	754	2	1686	3289	790	208	26	1784	2808
b. Non penaeid prawns	232	359	—	220	811	607	47	—	84	738
c. Lobsters	38	23	—	22	83	39	12	—	32	83
d. Crabs	1590	1345	—	50	2985	5323	3887	—	210	9420
e. Stomatopods	577	—	—	—	577	1111	343	—	296	1750
27. CEPHALOPODS	1459	527	—	242	2228	723	494	11	322	1550
28. MISCELLANEOUS	10407	2228	6	1644	14285	1563	559	33	842	2997
TOTAL	28535	13224	12	9798	51569	17557	11267	1244	16037	46105
No. of operations of fishing units (in '000)	25	20	—	21	66	30	19	1	24	74

Table - 5 Contd.

1982					1983					1984				
I	II	III	IV	Total	I	II	III	IV	Total	I	II	III	IV	Total
—	—	—	—	—	—	—	—	24	24	305	—	34	117	456
874	1281	152	763	3070	619	561	574	2349	4103	1266	357	178	1554	3355
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1	—	—	1	2	—	1	—	1	2	29	174	—	—	203
77	119	—	119	315	138	63	—	15	216	53	40	1	112	206
—	—	—	—	—	—	—	—	—	—	—	—	—	24	24
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
97	6	—	52	155	103	26	—	17	146	58	25	1	10	94
—	—	—	—	—	—	—	—	—	—	—	—	2	6	8
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
26	—	—	—	26	12	—	—	—	12					
					—	—	—	98	98	5	—	—	—	5
					—	3	—	195	198	13	21	—	31	65
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
55	26	45	12	137	78	5	—	104	187	61	50	2	159	272
294	538	46	250	1128	106	124	—	276	506	649	2059	61	665	3434
652	236	286	3335	4509	568	321	12	682	1583	363	1328	177	686	2554
23	18	115	1357	1513	471	135	10	120	736	170	467	13	43	693
22	26	2	29	79	12	23	4	60	99	52	94	4	112	262
1378	1663	56	820	3917	349	138	9	97	593	2083	3257	1	273	5614
513	1337	—	815	2665	24	15	—	174	213	285	346	13	286	930
763	683	223	240	1909	287	882	8	1115	2292	271	299	4	506	1080
921	1257	90	822	3090	368	1411	17	724	2520	731	1021	223	1946	3921
12894	15553	2182	16276	46905	8501	9976	831	12915	32223	14256	16678	1791	13348	46073
20	19	5	41	85	13	16	—	11	40	9	11	3	10	33

QUARTERWISE AND SPECIESWISE MARINE FISH

Name of fish	1980 I	II	III	IV	Total	1981 I	II	III	IV	Total
1. ELASMOBRANCHS	7349	2162	465	4582	14558					
a. Sharks						3642	1732	570	3190	9134
b. Skates						12	27	—	62	101
c. Rays						792	781	378	2247	4198
2. EELS	782	316	—	7305	8403	200	103	131	1745	2179
3. CAT FISHES	922	952	569	2792	5235	2812	1979	1289	4290	10370
4. CLUPEIDS										
a. Wolf herring	1339	317	402	1734	3792	1476	321	164	1025	2986
b. Oil sardine	—	—	—	—	—	—	—	—	—	—
c. Other sardines	—	—	—	—	—	—	—	—	—	—
d. Hilsa shad	—	14	—	42	56	—	14	2	1	17
e. Other shads	1558	601	374	1432	3965	5005	1577	737	2964	10283
f. Anchovies										
Coilia						1249	320	37	860	2466
Setipinna						—	—	—	—	—
Stolephorus	—	—	—	—	—	—	—	—	—	—
Thryssa	28	6	—	879	913	601	—	148	525	1274
g. Other clupeids	2251	1028	269	4990	8538	2138	504	211	1748	4601
5. BOMBAYDUCK	3192	4171	1838	27470	36671	2119	11527	962	39506	54114
6. LIZARDFISHES	—	—	—	85	85	26	—	—	84	110
7. HALF BEAKS & FULL BEAKS	—	—	—	6	6	—	—	—	—	—
8. FLYING FISHES	—	—	—	—	—	—	—	—	—	—
9. PERCHES	1266	71	68	1049	2454					
a. Rock cods						10	—	—	177	187
b. Snappers						2	—	—	326	328
c. Pig face breams						—	—	—	—	—
d Threadfin breams						179	—	—	1876	2055
e. Other perches						427	397	306	1132	2262
10. GOATFISHES	—	—	—	—	—	—	—	—	294	294
11. THREADFINS	24	224	34	385	667	59	247	852	427	1585
12. CROAKERS	9862	2793	170	18800	31625	12405	7059	1655	14223	35242
13. RIBBONFISHES	2921	4313	81	3543	10858	2435	2557	252	3083	8327
14. CARANGIDS										
a. Horse Mackerel						88	370	299	—	757
b. Scads						—	—	—	—	—
c. Leather-jackets	122	57	110	733	1022	79	188	890	1607	2764
d. Other carangids	190	199	59	13	461	2	2	—	85	89

Table - 2

LANDINGS (IN TONNES) IN GUJARAT DURING 1980 - 84

1982					1983					1984				
I	II	III	IV	Total	I	II	III	IV	Total	I	II	III	IV	Total
3072	2892	1322	3594	10880	2367	1665	675	2111	6818	1872	1884	939	2082	6777
365	35	259	325	984	360	14	—	237	611	118	114	98	147	477
1026	1021	851	685	3583	763	1239	426	1726	4154	1685	797	125	1189	3796
761	507	203	1319	2790	1166	565	49	2658	4438	725	380	47	1897	3049
3751	4425	1725	2761	12662	3201	3797	688	2490	10176	3592	2528	464	2729	9313
2141	464	171	761	3537	1911	589	214	629	3343	1647	369	338	504	2858
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	16	27	14	57	18	10	19	227	274
—	14	137	2	153	—	—	—	832	832	22	28	—	22	72
2360	919	260	1451	4990	1418	890	1268	107	3681	2392	810	442	1200	4844
2405	659	61	2106	5231	2657	884	179	2297	6017	1644	833	82	4066	6625
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1604	653	—	2538	4795	1464	295	74	1918	3751	1144	376	155	799	2474
978	1221	196	1606	3901	1186	561	131	936	2814	1033	817	398	2638	4886
7151	6331	902	23549	37933	7514	12861	833	28643	49851	7515	5651	324	42397	55887
439	17	109	242	807	282	143	—	202	627	1123	141	—	356	1620
—	—	—	1	1	—	19	—	312	331	4	4	5	3	16
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9	—	3	99	111	6	1	—	325	332	302	107	4	264	677
112	6	—	52	170	106	45	—	657	808	545	96	7	69	717
—	—	—	—	—	—	—	—	—	—	26	60	—	26	112
1189	366	76	123	1754	637	2	—	552	1191	1975	1065	—	1218	4258
624	82	100	593	1402	501	746	110	1338	2695	1191	872	245	616	2924
—	—	—	—	—	—	79	—	435	514	196	28	—	95	319
742	468	2183	180	3573	711	1746	244	645	3546	1814	1045	176	811	3846
12003	6074	1405	7480	26962	10029	9014	856	9748	29647	11151	7789	1130	11807	31877
3566	4173	277	1458	9474	1289	1932	27	3057	6305	2304	3380	130	2158	7972
19	147	113	51	330	10	69	370	7	456	132	95	228	527	982
—	—	26	—	26	—	5	364	545	914	—	—	—	—	—
186	139	413	1878	2618	247	236	—	780	1262	292	237	1019	1093	2641
70	25	41	33	169	224	24	9	196	453	266	84	56	242	648

Name of fish	1980					1981				
	I	II	III	IV	Total	I	II	III	IV	Total
15. SILVERBELLIES	—	—	—	—	—	—	—	—	—	—
16. BIG-JAWED JUMPER	1234	100	—	1186	2620	941	—	252	2576	3769
17. POMFRETS	1273	2463	2225	6626	12587					
a. Black pomfret						107	1252	954	539	2852
b. Silver pomfret						1101	1534	1965	11548	16148
c. Chinese pomfret						169	—	—	—	169
18. INDIAN MACKEREL	112	—	—	—	112	—	—	—	—	—
19. SEER FISHES	1480	159	499	2042	4180					
a. *S. commersoni*						1467	—	—	—	1467
b. *S. guttatus*						1831	312	306	1620	4069
c. *S. lineolatus*						—	—	—	—	—
20. TUNNIES	20	111	68	78	277					
a. *E. affinis*						881	4	139	359	1383
b. *Auxis* spp.						—	—	—	—	—
c. *K. pelamis*						—	—	—	—	—
d. *T. tonggol*						—	—	—	14	14
e. Other tunnies						122	81	—	—	203
21. BILL FISHES						—	—	—	—	—
22. BARRACUDAS	—	—	—	—	—	—	1	—	—	1
23. MULLETS	315	199	210	310	1034	228	174	327	389	1118
24. UNICORN COD	15	94	3	645	757	451	—	—	—	451
25. FLATFISHES	881	328	52	1198	2459					
a. Halibut						—	—	26	154	180
b. Flounders						—	—	—	—	—
c. Soles						918	1797	158	832	3705
26. CRUSTACEANS										
a. Penaeid prawns	1807	1499	1265	9910	14481	2248	712	651	7374	10985
b. Non penaeid prawns	811	1506	127	1665	4109	1209	1571	186	1776	4742
c. Lobsters	60	38	5	81	204	84	29	1	672	786
d. Crabs	3198	1520	59	190	4967	7561	6244	37	241	14083
e. Stomatopods						1279	881	—	306	2466
27. CEPHALAPODS	1877	835	—	959	3471	1521	696	11	515	2743
28. MISCELLANEOUS	13775	3045	287	5920	23027	3386	1594	244	2229	7453
TOTAL	58684	28921	9239	106650	203494	61262	46587	14040	112621	234510

Tab'e - 2 Contd.

1982					1983					1984				
I	II	III	IV	Total	I	II	III	IV	Total	I	II	III	IV	Total
—	—	—	—	—	—	—	—	37	37	305	—	34	117	456
2872	1412	152	1980	6416	2361	667	581	7953	11562	2591	684	187	3855	7317
87	1616	230	256	2189	137	1058	932	831	2958	270	1310	438	1251	3269
4182	1089	2699	3069	11039	3697	1619	1065	2858	9139	787	946	1840	4341	7914
1	—	—	—	1	—	—	—	—	—	—	9	81	22	112
—	—	—	—	—	—	—	—	—	—	—	—	—	52	52
—	—	—	—	—	[illegible]	[illegible]	—	—	—	—	—	—	144	144
1547	248	200	661	2656	1435	366	564	1408	3773	1841	251	677	943	3712
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
125	80	62	9	276	77	16	100	222	415	680	66	65	607	1418
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
32	—	50	—	82	12	—	—	—	12	559	12	—	13	584
—	—	—	869	869	—	—	—	117	117	8	—	—	10	18
453	5	15	—	473	242	3	—	219	464	13	21	—	31	65
419	229	219	367	1234	475	631	443	738	2287	486	589	366	943	2384
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
306	25	48	38	417	153	31	3	219	406	120	64	4	268	456
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1164	904	46	495	2609	540	259	9	370	1178	1530	3784	61	961	6336
2513	835	1407	7482	12237	2592	1682	1028	4657	9959	1983	2234	1669	4962	10848
981	1114	197	1856	4148	1897	3215	860	2685	8657	858	1666	141	5871	8539
219	62	2	200	483	57	109	5	311	482	886	135	4	579	1604
3764	2371	88	1415	7638	1659	821	52	247	2779	8096	5590	27	737	14450
1879	2039	—	1223	5141	848	741	—	610	2199	1808	1519	71	712	4110
1348	885	223	567	3023	1266	1122	43	1541	3972	1019	447	4	842	2312
1925	1832	384	3276	7417	2126	2471	493	4222	9312	3024	2502	746	8280	14552
68392	45384	16855	76573	207204	57623	52147	12720	92842	215332	71592	51429	12846	114723	250590

SPECIESWISE CONTRIBUTION OF MARINE FISH LANDINGS AND NON-MECHANISED UNITS IN

Name of fish	1980			1981		
	Mech.	N. Mech.	Total	Mech.	N. Mech.	Total
1. ELASMOBRANCHS	12034	2524	14558			
a. Sharks				7465	1669	9134
b. Skates				77	24	101
c. Rays				3560	638	4198
2. EELS	7192	1211	8403	1905	274	2179
3. CAT FISHES	3615	1620	5235	8896	1474	10370
4. CLUPEIDS						
a. Wolf herring	3207	585	3792	2433	553	2986
b. Oil sardine	—	—	—	—	—	—
c. Other sardines	—	—	—	—	—	—
d. Hilsa shad	42	14	56	2	15	17
e. Other shads	2706	1259	3965	8194	2089	10283
f. Anchovies						
Coilia	—	—	—	1944	522	2466
Setipinna	—	—	—	—	—	—
Stolephorus	—	—	—	—	—	—
Thryssa	28	885	913	756	518	1274
g. Other clupeids	5660	2878	8538	3950	651	4601
5. BOMBAYDUCK	13668	23003	36671	18980	35134	54114
6. LIZARDFISHES	75	10	85	110	—	110
7. HALF BEAKS & FULL BEAKS	6	—	6	—	—	—
8. FLYING FISHES	—	—	—	—	—	—
9. PERCHES	1997	457	2454			
a. Rock cods				167	22	189
b. Snappers				251	77	328
c. Pig-face breams				—	—	—
d. Threadfin breams				2055	—	2055
e. Other perches				1775	485	2260
10. GOATFISHES	—	—	—	294	—	294
11. THREADFINS	481	186	667	345	1240	1585
12. CROAKERS	22171	9454	31625	32396	2846	35242
13. RIBBONFISHES	9153	1705	10858	7806	521	8327
14. CARANGIDS						
a. Horse Mackerel				748	9	757
b. Scads						
c. Leather-jackets	674	348	1022	2157	607	2764
d. Other carangids	449	12	461	89	—	89

Table - 4

(IN TONNES) BY MECHANISED (INCLUDING OFF-SHORE) GUJARAT DURING 1980-1984

1982			1983			1984		
Mech.	N-mech.	Total	Mech	N-mech.	Total	Mech.	N-mech.	Total
9802	1078	10880	4907	1911	6818	5733	1044	6777
962	22	984	606	5	611	477	—	477
3419	164	3583	3884	270	4154	3673	123	3796
2733	57	2790	4180	258	4438	2997	52	3049
11149	1513	12662	7647	2529	10176	7340	1973	9313
2596	941	3537	2694	649	3343	2323	535	2858
—	—	—	46	11	57	238	36	274
90	63	153	719	113	832	72	—	72
3905	1085	4990	2284	1397	3681	4016	828	4844
2477	2754	5231	1078	4939	6017	2632	3993	6625
4756	39	4795	3751	—	3751	2466	8	2474
3264	637	3901	2008	806	2814	3736	1150	4886
16408	21525	37933	24776	25075	49851	41324	14563	55887
807	—	807	627	—	627	1620	—	1620
1	—	1	331	—	331	15	1	16
105	6	111	317	15	332	540	137	677
170	—	170	804	4	808	710	7	717
—	—	—	—	—	—	108	4	112
1754	—	1754	1191	—	1191	4258	—	4258
1052	350	1402	2262	433	2695	2158	766	2924
—	—	—	514	—	514	319	—	319
988	2585	3573	2644	902	3546	3492	354	3846
25015	1947	26962	24794	4853	29647	28400	3477	31877
9007	467	9474	5301	1004	6305	7299	673	7972
286	44	330	342	114	456	979	3	982
17	9	26	672	242	914	—	—	—
2511	107	2618	1138	124	1262	2429	212	2641
167	2	169	316	137	453	645	3	648

Name of fish	1980			1981		
	Mech.	N. Mech.	Total	Mech.	N. Mech.	Total
15. SILVERBELLIES	—	—	—	—	—	—
16. BIG-JAMED JUMPER	2520	—	2520	3305	464	3769
17. POMFRETS	10140	2447	12587			
a. Black pomfret				2737	116	2853
b. Silver pomfret				13876	2271	16147
c. Chinese pomfret				—	169	169
18. INDIAN MACKEREL	112	—	112	—	—	—
19. SEER FISHES	3700	480	4180			
a. *S. commersoni*				1156	360	1516
b. *S. guttatus*				3699	321	4020
c. *S. lineolatus*				—	—	—
20. TUNNIES	275	2	277			
a. *E. affinis*				1303	80	1383
b. *Auxis* spp.						
c. *K. pelamis*						
d. *T. tonggol*				14	—	14
e. Other tunnies				203	—	203
21. BILL FISHES						
22. BARRACUDAS				1	—	1
23. MULLETS	—	1034	1034	—	1118	1118
24. UNICORN COD	362	395	757	451	—	451
25. FLATFISHES	2040	419	2459			
a. Halibut				157	23	180
b. Flounders						
c. Soles				3467	238	3705
26. CRUSTACEANS						
a. Penaeid prawns	9593	4888	14481	8375	2610	10985
b. Non penaeid prawns	2431	1678	4109	2549	2193	4742
c. Lobsters	112	92	204	696	90	786
d. Crabs	4766	201	4967	13972	111	14083
e. Stomatopods				2456	10	2466
27. CEPHALOPODS	2864	607	3471	2557	186	2743
28. MISCELLANEOUS	19367	3660	23027	6121	1332	7453
TOTAL	141440	62054	203494	173450	61060	234510

Mech.—Mechanised N. Mech. Non-mechanised

1982			1983			1984		
Mech	N. Mech.	Total	Mech.	N. Mech.	Total	Mech.	N. Mech.	Total
—	—	—	37	—	37	456	—	456
6405	11	6416	11244	318	11562	7314	3	7317
2018	185	2203	2300	658	2958	3160	109	3269
10064	961	11025	7772	1367	9139	6546	1368	7914
—	1	1	—	—	—	112	—	112
—	—	—	—	—	—	51	1	52
—	—	—	—	—	—	134	10	144
2083	573	2656	2897	876	3773	3302	410	3712
271	5	276	397	18	415	1409	9	1418
82	—	82	12	—	12	584	—	584
889	—	889	117	—	117	18	—	18
471	2	473	464	—	464	65	—	65
22	1212	1234	18	2269	2287	—	2384	2384
415	2	417	403	3	406	455	1	456
2606	3	2609	1150	28	1178	6331	5	6336
9893	2344	12237	6815	3144	9959	7005	3843	10848
2488	1660	4148	3797	4860	8657	6369	2167	8536
240	243	483	331	151	482	572	1032	1604
7542	96	7638	2689	90	2779	14418	32	14450
5141	—	5141	2052	147	2199	3942	168	4110
3023	—	3023	3879	93	3972	2260	52	2312
5207	2210	7417	5110	4202	9312	11084	3468	14552
162301	44903	207204	151317	64015	215332	205586	45004	250590