AN APPRAISAL OF THE MARINE FISHERIES IN ORISSA

K. S. SCARIAH, VARUGHESE PHILIPOSE, S. S. DAN,
P. KARUNAKARAN NAIR AND G. SUBBARAMAN

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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 standardised, stratified, multi-stage 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 and consequent increase in the capability of fishing of both traditional and mechanised sectors.

With continued increase in fishing effort and intense exploitation of certain resources in different parts of the country, 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 gear, other infrastructural facilities for handling storage, transportation and marketing of the catches, the status of the under exploited resources, and new or additional resources available beyond the presently exploited areas of each maritime state for providing necessary techni-

cal 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 Orissa, highlighting the status of the exploited resources and the level of exploitation. It also gives guidelines for increasing the catches by proper development, management and conservation of resources.

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INTRODUCTION

The State Orissa is situated between latitudes 17.75°N and 22.5°N and longitudes 81.5°E and 87.6°E, bordered by the Bay of Bengal in the east, West Bengal in the north-east, Bihar in the north, Madhyapradesh in the west and north-west, and Andhra Pradesh in the south.

Orissa, with an area of 155,842 sq. km. accounts for 4.7% of the geographical area of India. The state has 13 districts, of which four are coastal. The coastal districts are Balasore, Cuttack, Puri and Ganjam. These together have a coastline of 480 km. forming 8% of the coastline of India.

The continental shelf up to 200m depth covers an area of 25,000 sq. km, which is 4.5% of the total area of the country's continental shelf. In the northern part of Orissa, the continental shelf extends up to 120 km and in the southern part up to 40 km. (Fig. 1).

Orissa has a moderate climate, consisting of three seasons, summer from March to May, rainy season from June to September-November, and winter from December to February. Of the two monsoons, the active is the S. W., during June-September, and the weak is the N. E. in November. The S. W. monsoon contributes 90% of the annual rainfall, averaging about 148 cm. Orissa's coastal area is cyclone-prone and is likely to be worst

affected during the S. W. monsoon. Cyclones may also occur in May, during the inter-monsoonal period.

Two major currents along the coast prevail throughout the year a north-easterly one flows during the period January to July and a south-westerly during the period August to December.

The distribution of marine craft and gear in Orissa is in relation to the diversity of the marine ecology from south to north Orissa. South Orissa, comprising Ganjam, Puri and the southern part of Cuttack district, has a narrow continental shelf and open sandy beaches, where as north Orissa, comprising central and northern Cuttack district and Balasore is characterised by an extended continental shelf, intertidal flats and extensive river deltas.

In recent years, Orissa is fast developing in the fisheries sector introducing a large number of mechanised boats improving techniques of fishing in indigenous sector and establishing a well-developed fishery harbour at Paradeep. The status of marine fisheries in the state of Orissa during the past ten years (1975-1984) is detailed in this book, mainly based on the works of this Institute listed in the next-chapter (Bibliography).

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MARINE FISHERMEN POPULATION AND CRAFT AND GEAR IN ORISSA

For planning developmental programmes in marine fisheries sector, the information such as the number of fishing villages, landing centres, fishermen population, active fishermen and fishing craft and gear in a maritime state is a prerequisite. Such information also provides the frame needed for conducting sample survey for estimation of marine fish production and fishing effort. Further, periodic frame surveys are necessary to understand the status of the traditional small scale fisheries sector in the changing pattern of fishing industry. The National Commission on Agriculture has emphasised in its recommendation that CMFRI should conduct quinquennial census in order to update the inventory of fishing resources available in the coastal villages with the help of state governments. Keeping this in view, Central Marine Fisheries Research Institute (CMFRI) has been conducting frame surveys periodically since 1948-'49.

An account of all India census of marine fishermen and craft and gear carried out by CMFRI in 1980 with the co-operation of the maritime states was published (CMFRI) 1981. This report gives statewise and districtwise details of marine fishing villages, landing centres, fishermen population, educational status, number of fishermen engaged in actual fishing and fishing craft and gear.

Fishing Villages and Landing Centres

According to the census conducted by C.M.F.R.I. in 1980 the number of fishing villages in Orissa state was 236, the maximum being in Balasore (169), followed by Ganjam, Puri and Cuttack with 28, 27 and 12 villages respectively. There are 68 landing centres in Orissa, 24 in Balasore, 20 in Ganjam, 12 in Puri and 12 in Cuttack (see Appendix).

TABLE—1

Districtwise fishing villages and landing centres along the Orissa coast

District	Coastline	Fishing village	Landing centre
Balasore	130 km	169	24
Cuttack	135 km	12	12
Puri	155 km	27	12
Ganjam	60 km	28	20
TOTAL	480 km	236	68

Balasore District : In the Balasore district marine fishing villages are covered by 7 'blocks' namely Balasore (Sadar), Baliapal, Bhogarai, Basudebpur, Remuna, Bahanage and Chandabali. The maximum number of marine fishing village was observed in Baliapal (49) the next highest was in Balasore (Sadar) (33), followed by Bhogarai (32), Basudebpur (19), Remuna and Bahanage (16 each) and Chandabali (4).

Cuttack District : There are only 3 'blocks' in this district where marine fishing villages are situated with 4 fishing villages in each.

Puri District : The marine fishing villages in Puri are covered by 4 'blocks' viz. Astarang, Krishnaprasad, Puri Sadar and Gop. The maximum number of fishing villages was observed in Astarang (16), followed by Krishnaprasad (6), Puri Sadar (3) and Gop (2).

Ganjam District : Ganjam has 28 marine fishing villages situated in Chatrapur, Rangailunda, Chikiti and Ganjam 'blocks'.

Households :

The total number of marine fishermen households in orissa states was 20,329. Districtwise analysis of the fishermen families showed that maximum number of families was in Balasore district (61%), the next highest in Ganjam (20%) followed by Puri (17%). Minimum number of fishermen families was in Cuttack district (2%). In Balasore district maximum number of fishermen households was noted in Balasore (Sadar) block (32%) the next highest being in Baliapal block (22%). The least was in Chandabali block (1%). In case of Cuttack district, block Kujang was having maximum number of fishermen households (46%) followed by Mahakalpada block (38%) and Rajanagar block (16%). Puri (Sadar) block in Puri district led all other blocks in that district in respect of fishermen house holds (55%) followed by Astarang (29%), Krishnaprasad (12%) and Gop (3%). Among the blocks of Ganjam district, Rangailunda block was having maximum number of fishermen households (38%), Chatrapur (35%), Chikiti (20%) and Ganjam (7%).

Population

The total fishermen population in the state was 1.17 lakhs out of which adult males constitute 32%, adult female 29% and children 39%. On an average the number of persons per village was estimated to be 496.

Districtwise analysis of the fishermen population showed that maximum number was in Balasore district (64%) followed by Puri (18%), Ganjam (16%) and Cuttack (2%), with 496 persons per village on an average.

Balasore District : Among the blocks of Balasore district, the maximum number of fishermen population was found in Balasore (Sadar) (35%) followed by Baliapal (19%), Basudebpur (16%), Bhogarai (13%) Bahanage and Remuna (9% each) and Chandabali (1%). The average family size was the highest in Basudebpur block (7) and least in Baliapal and Remuna (5 each). The highest number of persons per fishing village was in Balasore (Sadar) block (743) and least in Chandabali block (240).

Puri District : In respect of fishermen population, Puri (Sadar) block in Puri district led all other blocks in that district. 56% of the fishermen population was in Puri (Sadar) block. Those were 30% in Astarang, 11% in Krishnaprasad and 3% in Gop. The average family size in all the blocks was found to be 6. The number of persons per fishing village was highest in Puri (Sadar) block (3,844) and least in Gop block (351).

Ganjam District : The highest fishermen population was in Rangailunda block (38%) followed by Chatrapur (34%), Chikiti (22%) and Ganjam (6%). The average family size was 5 in Chatrapur, Rangailunda and Chikiti block and 4 in Ganjam blocks. The number of persons per fishing village was highest in Rangailunda block (903) and least in Ganjam block (311).

Cuttack District : The maximum number of fishermen population in this district was found to be in Kujang block (53%) followed by Mahakalpada (32%) and Rajanagar (15%). The average family size was highest in Kujang block (8) and in other two blocks it was 6 each. The number of persons per fishing village was highest in Kujang block (353) and lowest in Rajanagar block (98).

Education

Among the fishermen population in Orissa, those who have completed primary standard forms 7% secondary 2% and beyond secondary standard less than 1%.

Balasore District : 13% of the fishermen population of the block of Balasore (Sadar), Baliapal and Chandabali of the Balasore district passed any one of the following, viz. primary, secondary and above standards. Out of the remaining 4 blocks their percentage were as follows, Bhogarai (11%), Bahanage (8%), Basudebpur (6%) and Ramuna (2%).

Cuttack District: Among fishermen population, none was recorded to have passed any of the three categories coming under educational status in Mahakalpada and Kujang block of Cuttack district. In Rajanagar block, those who have passed primary and secondary standards put together worked out to only 7% of which those who have passed primary standard constituted 6%.

Puri District : More fishermen came under educated category in Astarang block (25%) as compared with other blocks of this district, where as in Gop it was 4% and 2% each in Krishnaprasad and Puri)Sadar). The percentages of those who have passed primary, secondary and above secondary standards came to 60%, 33% and 7% respectively in Astarang block.

Ganjam District : The percentage of fishermen who had education under the three categories was found to be poor in all the four blocks of Ganjam district. It ranged from 2% observed in Rangailunda block to 4% observed in Ganjam block.

Fishermen Engaged in Actual Fishing

The number of fishermen engaged in actual fishing in this state was found to be 30,724 forming 26% of the total fishermen population, of this, the number of fishermen who were engaged in full time fishing constitutes 67%, part time 20% and occasional 13%. Among actual fishermen in Puri district as much as 82% belonged to full time category, 11% to part time and 7% to the occasional. In Ganjam district 68% belong to full time category and 20% and 12% to the remaining two categories respectively. In Balasore district, the percentage of fishermen engaged in full time fishing was 62, part time and occasional being 23 and 15 respectively. The percentage of fishermen belonging to full time category in Cuttack district was 55, part time being 44 and occasional 1.

Balasore District : From the fishermen population of the blocks of Balasore district, 32% of Chandabali block, 26% each of Remuna and Balasore (Sadar) blocks, 25% each of Bahange and Basudebpur block and 22% of Bhogarai block were engaged in actual fishing. However among the three categories of fishermen doing actual fishing viz. full time, part time and occasional, those coming under full time category were highest in Bhogarai (84%), closely followed by Basudebpur (83%) and Bahange (70%) the least being observed in Chandabali block (32%). In the rest of the blocks the percentage varied between 57 noted in Balasore (Sadar) and 44 observed in

Remuna. In Chandabali and Baliapal blocks part time fishermen constituted sizeable numbers of the fishermen engaged in actual fishing, their percentage being 51 and 43 respectively.

Cuttack District : In Kujang block, 32% of the fishermen population were found to be engaged in actual fishing, while in Rajanagar and Mahakalpada blocks the corresponding figures were 28% and 27% respectively. While 97% of those engaged in actual fishing came under full time category in Kujang block, all engaged in actual fishing in Mahakalpada and Rajanagar blocks came under part time category.

Puri District : As much as 48% of fishermen population were found to be engaged in actual fishing in Gop block, the next highest being recorded in Krishnaprasad block, (31%), followed by Astarang (29%) and Puri (Sadar) blocks (27%). In all the blocks, except in Astarang, more than 80% of the fishermen population were engaged in full time fishing, whereas in Astrang this figure was only 67%.

Ganjam District : The number of fishermen engaged in actual fishing among the total fishermen population was found to be the highest in Chatrapur block (30%) followed by Chikiti and Ganjam (29% each) and Rangailunda blocks (26%). More than 75% of fishermen engaged in actual fishing came under full time category in Chatrapur, Rangailunda and Ganjam blocks, while in Chikiti block 61% of those engaged in actual fishing came under part time category.

Fishing Craft

Total number of mechanised boats operating in Orissa coast was 745 of which 470 were trawlers the rest being gillnetters. Maximum number of mechanised boats, they being mostly gillnetters, were in Balasore district. There were only two mechanised gillnetters in Ganjam district and all other craft in this district were non-mechanised boats. Total number of non-mechanised craft in Orissa was 10,550. Maximum number of non-mechanised boats were found in Cuttack district (3,064), followed by Ganjam (2,963), Balasore (2,555) and Puri (1968).

Fishing Gear

There were 33,936 fishing gear in Orissa, maximum being in Puri district (12,220). In Balasore district, there were 11,383 fishing gear followed by Ganjam (6,566) and Cuttack (3,767). The types of gear found in this states were trawlnets, drift/gillnets, hooks and lines, shore seines, small purse-seines, fixed bag nets and boat seines.

Of the different types of gear observed in Balasore (Sadar) block of Balasore district, fixed bag nets were the dominant one (55%) followed by drift/gill nets (38%) and hooks and lines (5%). Janjal, a small purse-seine, was the dominant gear in Baliapal block (59%) followed by shore-seines (25%) and fixed bag nets (9%). In Bhogarai shore-seine (40%) constituted the dominant one followed by fixed bag net (32%), while in Basadebpur traps (39%) constituted the dominant one followed by drift/gill nets (26%). Fixed bag nets and drift/gill nets were the common gear in the rest of the blocks.

In Cuttack district, fixed bag net was found only in Mahakalpada block, being numerically the most abundant gear (71%) followed by hooks and lines and drift/gill nets. Drift/gill nets was the dominant one in Rajanagar and Kujang blocks.

In Puri district, boat-seines (57%) formed the dominant gear in Astarang block while in Krishnaprasad block drift/gill net (79%) was the dominant gear. Hooks and lines were most abundant in Puri Sadar.

Drift/gill net was the abundant gear in Chatrapur and Rangailunda blocks of Ganjam district followed by hooks and lines and boat seines. In Chikiti and Ganjam blocks drift/ gill net and hooks and lines were found to be the two most common gear.

Infrastructure Facilities

Tables (see Appendix) show the districtwise infrastructure facilities available in the four coastal districts of Orissa. Among the blocks of Balasore district, Balasore (Sadar) blocks is generally better endowed with infrastructure facilities such as electricity, tap water, schools and hospitals, Chandabai was found to be least developed in respect of many such facilities. In Cuttack district were the Paradeep fishery harbour is situated Kunjung block in general was better developed in respect of infrastructure facilities when compared with the other blocks. Among the four blocks of Puri district a special feature noted was that in Astarang block 33% fishermen houses were "Pucca". In Ganjam district, Rangailunda block had better infrastructure facilities when compared to other 'blocks'.

MARINE FISH LANDINGS

An account of the marine fish landings in Orissa state, both district-wise and gearwise, is given below.

Catch Estimate for the State

The average annual marine fish production in Orissa state during 1975-'84 period has been estimated at 34,027 tonnes. The maximum catch of 46,773 tonnes was in 1984 and minimum 15,072 tonnes in 1977. Quarterwise analysis of fish landings for the above period (January-March being considered as first quarter) showed that, on an average, the landings were highest in the fourth quarter (17,167 tonnes) followed by the first quarter (7,723 tonnes) and the third quarter (5,603 tonnes).

The lowest catch was observed in the 2nd quarter (3,514 tonnes) comprising the rainy season. Peak landings during the fourth quarter may be associated to the south westerly sea current flowing during this period.

The landings by mechanised units over the ten year period (1975-'84) constituted on an avergage 21,126 tonnes/year forming 53% of the total catch. In 1980 and '84 the contribution from mechanised sector was higher, respectively at 65% and 62%. However, in 1982, the catch from the non-mechanised sector was found to be higher (54%). The catch per unit effort (CPUE) of mechanised sector was found showing a rising trend from 73 kg. per boat in 1980 to 232 kg. per boat in 1984, while CPUE of non-mechanised sector showed a narrow fluctuation between 23 and 29 kg.

Two types of gear, viz. trawl and gill nets, were in operation in the mechanised sector during the period 1980-84, the contribution from trawl net to the total mechanised catch on an average being 60% (Figs. 4

TABLE - 2

Mechanised and non-mechanised marine fish landings (in tonnes) in Orissa in different years

Units		Years										Average
		1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	
Mechanised	(a)	—	—	—	12639	20650	25625	19176	15328	25245	29220	21126
Effort (in units operation)	(b)						351019	221637	132115	130139	125667	
Non-mechanised	(a)	16804	29823	15072	23801	20720	13750	16479	18229	20154	17553	18669
Effort (in units operation)	(b)						585442	707468	738868	692667	726870	
TOTAL	(a)	16804	29823	15072	36440	41370	39375	35655	33557	45399	46773	39795

TABLE - 3

Groupwise total marine fish landings (in tonnes) in Orissa in different years

Groups	Years										Average
	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	
Pelagic	9281	18245	8497	18525	22173	16608	16562	15688	18753	15600	15993
Demersal	7523	11578	6575	17915	19197	22767	19093	17869	26646	31173	18034
TOTAL	16804	29823	15072	36440	41370	39375	35655	33557	45399	46773	34027

and 5) during the years 1980 and 1981, contribution by gill net alone was 67% and 69% respectively. However, from 1982 onwards a change in this pattern was noticed. Contribution to the mechanised catch by trawl net showed steady increase, reaching the peak of 87% during 1983 and 1984. The CPUE of this net showed a significant increase from 63 kg in 1980 to 308 kg in 1983 and 358 kg in 1984. The CPUE of gill net remained steady at 79 kg during the years 1980 and 1981 and declined to 56 kg in 1983.

Contribution of pelagic fisheries to the total fish landings in Orissa during 1975-84 showed a declining trend. The highest contribution was during the year 1976 (61%) and lowest (33%) during the year 1984. Except in 1976, the trend in the contribution of demersal group to the total catch was increasing, going up to 67% during 1984.

Specieswise analysis of average annual catch for 10 years under consideration showed that pomfrets formed the highest constituent (15%), followed by croakers (13%) *Hilsa ilisha* (12%), catfish (9%) and other sardines (8%). The Maximum contribution of pomfrets was during the year 1976 (36%) and that of *Hilsa ilisha* was during 1975 (29%), contribution from prawns was only meagre 4%.

A new development noticed in the fisheries of Orissa, was the landings of oil sardines. For the first time in Orissa, 539 tonnes of oil sardine was landed during 1984.

DISTRICTWISE CATCH ESTIMATE

Balasore District

Balasore came first in respect of marine fish production for the period 1980-84 with an average annual production of 19,099 tonnes, accounting for about 48% average annual production in the state (Fig. 6). The maximum landings in Balasore district was during the year 1980 (24,278 tonnes) and minimum was observed during 1982 (9,445 tonnes). There was a sharp declining trend in the contribution of pelagic fisheries to the total fish landings in Balasore district during 1980-'84 (Fig. 7) where as in the case of demersal fisheries an increasing trend was noticed. During the year 1984, contribution by demersal sector was as high as 83%.

TABLE - 4

Groupwisefish landings (in tonnes) in different years

District ; Balasore

Group	YEARS					Average
	1980	1981	1982	1983	1984	
Pelagic	9395	6167	3041	4201	4008	5362
Demersal	14883	11677	6404	16136	19583	13737
TOTAL	24278	17844	9445	20337	23591	19099

Mechanised landings started in this district from 1980 onwards. Landings by mechanised units for the five year period (1980-'84) constituted on an average 15,738 tonnes/year forming 82% of the total marine fish catch of this district. In 1983 and 1984 the contribution from mechanised sector was higher at being 90% and 93% respectively. The CPUE of mechanised sector remained more or less the same during the period 1980-'82. But there was a sharp increase during the years 1983 and 1984. The maximum CPUE was noticed during the year 1984 (224 kg. per boat) and the minimum (77 kg.) during 1981. The CPUE for non-mechanised sector during this period varied from 37 to 55 kg. per boat.

TABLE -5

Marine fish landings (in tonnes) for mechanised and non-mechanised units in different years.

District : Balasore

Units		YEARS					Average
		1980	1981	1982	1983	1984	
Mechanised (a)		17104	14416	6894	18288	21989	15738
Effort (b) (in units operation)		216542	187442	89323	98871	97044	137844
Non-mechanised (a)		7174	3428	2551	2049	1602	3361
Effort (b) (in units operation)		194927	79936	51388	43118	29017	79677
Total	(a)	24278	17844	9445	20337	23591	19099
	(b)	411469	267378	140711	141989	126061	217521

Two types of gear viz. trawl and gill nets were in operation in mechanised sector in this district during the period 1981-'84, the contribution from trawl net to the total mechanised catch on an average was 48%. During the year 1980, '81 and '82 the contribution by gill nets was 100%, 91% and 80% respectively. However, from 1983 onwards a change in this pattern was noticed. Contribution by trawl nets was 82% and 83% during 1983 and 1984 respectively. The CPUE of the trawl net showed a significant increase from 60 kg. during 1981 to 429 kg. during 1984. However there was not such change of CPUE in the case of gill nets. It remained between 56 kg. (in 1983) and 83 kg. (in 1982).

TABLE - 6

Gearwise mechanised fish landings (in tonnes) in different years

District : Balasore

Year	Trawl Net		Gill Net	
	Catch	Effort *	Catch	Effort *
1980	—	—	17104	216542
1981	1262	21040	13154	166402
1982	1419	23440	5475	65883
1983	14978	39872	3310	58999
1984	18203	42408	3786	54636
Average	7172	25352	8566	112492

* in units operation

Quarterwise analysis of fish landings for the period 1980-'84, showed that maximum landings were observed during the fourth quarter of every year followed by first quarter and third quarter. On an average 10,038 tonnes were landed in the fourth quarter and 1923 tonnes in the second quarter. Specieswise analysis of average catch for the five years during 1980-'84 showed that croakers formed highest constituent (26%) followed by pomfrets (18%), cat fish (18%) and *Hilsa ilisha* (9%) (Fig. 8). The maximum contribution of croakers was during the year 1984 (57%) and 1983 (51%) and that of pomfrets was during 1980 (32%). Contribution by prawns was less than 1%.

Puri District

TABLE - 7

Marine fish landings (in tonnes) for mechanised and non-mechanised units in different years.

District : Puri

Units	YEARS					Average
	1980	1981	1982	1983	1984	
Mechanised (a)	—	—	4201	3750	3046	3666
Effort (b) (in units operation)	—	—	19650	14594	10746	10632
Non-mechanised (a)	944	6940	6384	6009	8168	5689
Effort (b) (in units operation)	56559	280520	215379	206722	251851	202206
Total (a)	944	6940	10585	9759	11214	7888
(b)	56559	280520	235029	221316	262597	211204

Puri district came next to Balasore in respect of average annual marine fish production in Orissa state during the period 1980-'84, with an average production of 7,888 tonnes per year accounting for 19.6% of average annual production in Orissa state. The maximum landings in Puri district was noticed during the year 1984 (11,214 tonnes) and the minimum (6,940 tonnes) during the year 1981. Mechanised landings started in this district from 1982 onwards. On an average 46% catch was from mechanised sector. Trawl net was the only gear used in this district in mechanised sector. The CPUE of mechanised sector showed an increasing trend from 214 kg./day during 1982 to 283 kg./day during 1984. The CPUE for non-mechanised sector was between 17 kg./day during 1980 and 32 kg./day during 1984. There was a decline in trend in the contribution of pelagic fisheries to the total fish landings in Puri district during 1980-'84, where as in the case of demersal fisheries it showed an increasing trend (Fig. 9).

TABLE-8

Districtwise catches in tonnes and effort (in units operation) of trawlers in different years

	District Puri		District Cuttack	
	Catch	Effort	Catch	Effort
1980	—	—	8521	134477
1981	—	—	4760	34195
1982	4201	19650	4233	23143
1983	3750	14594	3207	16674
1984	3046	10746	4185	17877
Average	3666	10632	4981	45273

TABLE - 9

Groupwise fish landings (in tonnes) in different years

District : Puri

Group	YEARS					Average
	1980	1981	1982	1983	1984	
Pelagic	596	4610	3686	4513	5386	3758
Demersal	348	2330	6899	5246	5828	4130
Total	944	6940	10585	9759	11214	7888

As in the case of Balasore, it was observed that maximum landings in Puri were during the 4th quarter of every year except 1981 and minimum during 2nd quarter. On an average 49% of the landings were during the 4th quarter.

Specieswise analysis of average catch for the five years during 1980-'84 in Puri district showed that other sardines formed the highest constituent (13.8%) followed by elasmobranchs (11%) and croakers (11%). Prawns formed only 7% of the total catch. (Fig. 10).

Cuttack District.

TABLE - 10

Marine fish landings (in tonnes) for mechanised and non-mechanised units in different years.

District : Cuttack

Units	YEARS					Average
	1980	1981	1982	1983	1984	
Mechanised (a)	8521	4760	4233	3207	4185	4981
Effort (in units operation) (b)	134477	34195	23142	16674	17877	45273
Non mechanised (a)	—	—	1149	1515	2134	960
Effort in units operation) (b)	—	—	37660	18527	32174	17672
Total (a)	8521	4760	5382	4722	6319	5941
(b)	134477	34195	60802	35201	50051	62945 ~~244097~~

Fifteen percent of average annual marine fish production in the Orissa state during the years 1980-'84 was from Cuttack district including Paradeep. On an average 5,941 tonnes were caught annually in this district during the above period. Average annual contribution of mechanised landings was 84% of the total catch. The CPUE of mechanised sector was showing an increasing trend from 63kg. / day in 1980 to 234kg./day in 1984. Type of gear used in this sector was trawl net. Contribution of pelagic fisheries to the total landings showed a declining trend from 35% in 1980 to 25% in 1984 (Fig. 11)

TABLE - 11

Groupwise fish landings (in tonnes) in different years

District : Cuttack

Group	YEARS					Average
	1980	1981	1982	1983	1984	
Pelagic	3053	753	888	1243	1636	1515
Demersal	5468	4007	4494	3479	4683	4426
Total	8521	4760	5382	4722	6319	5941

Quarterwise analysis of fish landings for the period 1980-'84 showed that the maximum landings were observed during fourth quarter of every year, followed by first quarter as observed in other districts. On an average 3,058 tonnes were landed in the fourth quarter and 1,503 tonnes in the first quarter.

Croakers formed the highest constituent (26%) of average yearly marine fish catch during the years 1980-'84. Contribution of prawns was 14% and other clupeids formed 9% (Fig. 12). The bulk of marine fish catch in Cuttack district was landed at Paradeep Fisheries Harbour.

Paradeep Fisheries Harbour

Paradeep is the most important mechanised fish landing centre in Orissa and 13% of average yearly fish landing in Orissa was at Paradeep. The major gear used in this centre was trawl net. Quarterly gearwise marine fish landings at this centre during the years 1980-'84 is given in Appendix. It was observed that on an average 53% annual marine fish landings in this centre was during the fourth quarter, and 29% in the second. Croakers constituted 30% of average annual landings during the years 1980-'84, followed by prawns (17%) and other clupeids.

TABLE - 12

Groupwise fish landings (in tonnes) in different years in the Single Centre Zone.

Centre : Paradeep

Group	YEARS					Average
	1980	1981	1982	1983	1984	
Pelagic	3053	753	390	405	541	1028
Demersal	5468	4007	3843	2802	3647	3953
Total	8521	4760	4233	3207	4188	4981

Contribution of pelagic fisheries to the total fish landings in Paradeep during 1980-'84 showed a declining trend. The highest contribution was 36% during 1980 and lowest being 9% in 1982. The trend in the contribution of demersal group to the total catch showed an increasing trend and it was 87% during 1984 (Fig 13).

Ganjam District

TABLE – 13

Marine fish landing (in tonnes) for mechanised and non-mechanised units in different years.

District : Ganjam

Units		YEARS					Average
		1980	1981	1982	1983	1984	
Mechanised	(a)	—	—	—	—	—	—
Effort (in units operation)	(b)						
Non-mechanised	(a)	5632	6111	8145	10581	5649	7224
Effort (in units operation)	(b)	333956	347012	434441	424300	413828	390707
Total	(a)	5632	6111	8145	10581	5649	7224
	(b)	333956	347012	434441	424300	413828	390707

Average annual marine fish production of Ganjam district during the years 1980-84 was 7,224 tonnes, accounting for 18% of average annual fish production in Orissa state. The maximum landings in this district was noticed in 1983 (10,581 tonnes). There were no mechanised landings in this district. All landings were by the non-mechanised crafts. On an average CPUE for non-mechanised sector was 18 Kg. per day which was very low, as compared to Balasore district. On an average, contribution of pelagic fisheries to the total fish landings in Ganjam district during the period 1980-84 was 80%. There was a decreasing trend in the contribution of demersal fisheries during this period (Fig 14). Maximum landings were observed during the fourth quarter of every year followed by first, third and second quarters. On an average 2,834 tonnes were landed in the fourth quarter and 1,111 tonnes in the second quarter.

TABLE-14

Groupwise fish landings (in tonnes) in different years

District : Ganjam

Group	YEARS					Average
	1980	1981	1982	1983	1984	
Pelagic	3535	5063	7133	8647	4454	5766
Demersal	2097	1048	1012	1934	1195	1457
TOTAL	5632	6111	8145	10581	5649	7223

Other sardines formed the highest constituent (37%) of the average annual marine fish catch in this district during the years 1980-84, followed by mackerel (10%) and anchovies (8%). Contribution of prawns was only 4% during this period (Fig 15)

MAJOR FISHERIES OF ORISSA STATE

Croakers, catfish, pomfrets, other sardines, elasmobranchs, hilsa shad, in this order of abundance from the major fisheries of the Orissa state.

Croakers : The annual average landings of croakers during 1980-84 in Orissa was 7676 tonnes forming 19.2% annual marine fish landings. During this period maximum landings was observed during 1984 (16,903 tonnes). Major landings of croakers in Orissa state (66%) were in Balasore district followed by Cuttack district (20%), Puri district (12%), and Ganjam district (2%). This group formed 26.44% of marine fish landings in Balasore district. Similarly 25.96% of landings in Cuttack district and 11.24% in Puri district were croakers. Croakers constituted 30% of average annual landings in Paradeep Fisheries Harbour during the years 1980-84. Croakers were mainly landed by trawlnet forming 46.52% of trawlnet catch in Orissa. Landings of this fish take place throughout the year, peak season being the fourth quarter. 69% of the average annual landings were in the fourth quarter, 19% in the first, 8% in the third and 4% in the second respectively. Percentage contributions from different districts to the quarterwise landings of croakers are given in the following table.

TABLE-15

Percentage contribution from different districts to the quarterwise landings of croakers

District	Quarter			
	1	2	3	4
Balasore	54	26	36	74
Cuttack	29	44	42	14
Puri	14	20	9	11
Ganjam	3	10	13	1

Catfishes : Catfishes contributed 11.45% of average annual marine fish landings in Orissa during 1980-84. Maximum landings of catfishes in Orissa state

(76%) were in Balasore district followed by Puri (13%), Cuttack (8%) and Ganjam (3%). Catfishes formed 18.37% of marine fish landings in Balasore district. In Puri and Cuttack districts, the landings of catfish account for 7.69% and 6.17% respectively of the districts total fish landings. Maximum catch of catfishes was by gill net. During the period 1980-84, 24.59% of gillnet catch and 9.47% of trawlnet catch was formed by catfishes in Orissa. Peak landings of catfishes were during the fourth quarter of every year (45%) followed by first quarter (23%), third quarter (21%) and second quarter (10%) respectively. Contribution from different districts (%) to the quarterwise landings of catfishes are given below:

TABLE-16

Contribution from different districts (%) to the quarterwise landings of catfishes

District	Quarter			
	1	2	3	4
Balasore	83	62	78	75
Cuttack	6	11	10	7
Puri	10	19	7	16
Ganjam	1	8	5	2

Pomfrets : Pomfrets constituted 10.3% of annual marine fish landings in Orissa during 1980-84. Peak landings of pomfrets were during fourth quarter (44%) followed by third (20%), first (20%) and second (16%). Percentage contribution from different districts to the quarterwise landings of pomfrets were as follows :

TABLE-17

Contribution from different districts (%) to the quarterwise landings of pomfrets

District	Quarter			
	1	2	3	4
Balasore	93	91	88	77
Cuttack	1	1	4	14
Puri	5	5	4	9
Ganjam	1	3	4	—

Maximum landings of pomfrets in Orissa state (85%) were in Balasore district followed by Cuttack (7%), Puri (7%) and Ganjam (1%). 18.38% of marine fish landings in Balasore district was pomfrets. There were significant landings of pomfrets in Cuttack district. Pomfrets were mostly landed by gillnet forming 28.1% of the landings by gillnet.

Other sardines : Other sardines constituted 9.52% average annual marine fish landings in Orissa during 1980–84. These fishes were mostly landed by non-mechanised boats. Maximum landings of other sardines were from Ganjam district (78%) followed by Puri (21%) and Cuttack (1%). There were no landings of other sardines in Balasore district. During the period 1980-84, 37.44% of average annual marine fish landings of Ganjam district and 13.77% of Puri district were other sardines. Peak landings of other sardines were observed during fourth quarter (56%) followed by first (32%) second (9%) and third (3%) respectively. Percentage contribution from different districts to the quarterwise landings of other sardine were as follows:

TABLE - 18

% contribution from different districts to the quarterwise landings of other sardines

District	Quarter			
	1	2	3	4
Ganjam	64	91	100	83
Cuttack	1	—	—	1
Puri	35	9	—	16

Elasmobranches: Contribution of Elasmobranches to the total landings of marine fish in Orissa during 1980-84 was on an average 5.33%. It was mainly landed by gillnet. Maximum landings of Elasmobranches (43%) were in Balasore district followed by Puri (34%), Cuttack (12%) and Ganjam (11%) respectively. Maximum landings of this fishes were during the third quarter (31%) followed by first (25%) fourth 24%) and second (20%). Contributions from different districts (%) to the quarterwise landings of Elasmobranches are given below:

TABLE - 19

Percentage contributions from different districts to the quarterwise landings of Elasmobranches

District	Quarter			
	1	2	3	4
Balasore	61	50	23	44
Puri	30	29	38	36
Cuttack	6	10	22	8
Ganjam	3	11	17	12

Hilsa shad : During 1980-84, 5.17% of average annual marine fish landings in Orissa state were hilsa shad. Major landings of hilsa shad were in Balasore district (84%) followed by Puri (12%), Ganjam (3%) and Cuttack (1%). This group formed 9.16% of marine fish landings in Balasore district. It was mostly landed by non-mechanised boats. Peak landings were observed during fourth quarter (46%) followed by third (38%), second (11%) and first (5%) respectively. Percentage contributions from different districts to the quarterwise landings of hilsa shad are given in the following table.

TABLE-20

Percentage contributions from different districts to the quarterwise landings of hilsa shad

District	Quarter			
	1	2	3	4
Balasore	93	67	71	98
Puri	7	25	22	1
Cuttack	—	2	1	1
Ganjam	—	6	6	—

ASSESSMENT OF FISH STOCKS

For detailed assessment of exploited fish stocks micro and macro models can be used. The micro analytic model, like Beverton and Holt yield model requires knowledge of many parameters which affect the population. The macro analytic model, like Schaeffers model, requires a time series data on catch and effort. These models are species and gear specific and as such cannot be applied to multi-species-multi-gear fisheries of Indian waters. In order to see whether by increasing effort, catch can be increased by a reasonable rate, the following mathematical model has been used.

$C = ae^{bf}$.....(1), where C = catch
f = effort, a and b are constants.

A study of the trends of the catch and effort indicate that the above model (1) fit well with the data for the state. The data were smoothened by taking a three-point moving average.

Time series data for catch and effort by the small scale mechanised sector for the three districts of Orissa were fitted to the equation $C = ae^{bf}$.

The following relationships were obtained.

District	Gear	Estimated value of a	Estimated value of b	R^2	Rate of growth per unit change in effort
Balasore	Trawl net	72.1769	0.13179	99.5	13.00%
	Gill net	2316.5632	0.00968	94.4	0.97%
Puri	Trawl net	2136.70457	0.03541	94.1	3.60%
Cuttack	Trawl net	3451.38197	0.00687	90.4	0.69%

Note: Effort in thousand unit operation

It is clear from the above that the fit is very good. But the rate of growth of catch per unit change in effort is low in all the cases other than trawl net in Balasore district. Hence there is a case for increasing

trawl net effort in Balasore district. It may be mentioned here that there is no mechanised fishing in Ganjam district. The catch per hour record provided by the Fishery Survey of India (FSI) using vessels of 17.5 m length with the same horse power and gear from different basis gives an indication of the abundance of demersal fish in the coastal areas of various zones up to a depth of 58 m. Compared to 76.6 kg./h and 97.5 kg./h for Andhra Pradesh and Tamil Nadu respectively, the figure for the fishing grounds off the Orissa coast was 153 kg./h. The figures are based on average values for five years between 1976–77 and 1980-81.

From the demersal fishery surveys conducted by F. S. I, Joseph and John (1986) have reported that the distribution of mackerel extends along the entire east coast inside the 100 m contour with increasing catch rates in northern latitudes. According to them mackerel formed 12.4% of catch in upper east coast with an average catch rate of 28.3 kg/h. During 1985 Matsya Darshini recorded for mackerel, which formed 61.5% of trawl catch, an average catch rate of 105 kg/hr in lat. 20°-21° N within 60-120 m depth. This indicated the presence of rich mackerel fishery resources in deep waters along the Orissa coast also. The FSI vessels have also recorded very high catch rate of 53.21 kg/h for catfish in 50-100 m depth belt of upper east coast. Highly productive carangids ground yielding on an average of 46.11 kg/h below 50 m depth, 31.77 kg/h between 50-100 m and 22.82 kg/h between 100-200 m depth were located along the upper east coast of India.

Productive areas of other sardines were identified during trawl surveys in 1983 and 1984 from the deeper waters along upper east coast. The abundance was predominantly in 50-110 m depth range with peak concentration (123 kg/h) in 71-100 m belt. Though possibilities of higher production of this group from other sections of Indian coast is marginal, other sardines have promising potential in the deeper waters of upper east coast.

There are good grounds of *Priacanthus*, popularly known as 'Big eye' or "Bull eye", in the upper east coast, in the depth range 100-200 m depth. with a catch rate of 44.23 kg/h.

According to George *et al.* 1977, the areas which need immediate attention are the upper east coast particularly, for prawns and cephalopods.

Potential Yield

The demersal fisheries potential (exploitable fish stock) in the continental shelf of Orissa has been estimated at 1,00,000/- to 1,20,000/- tonnes by the Indian Institute of Foreign Trade (BOBP /INF/7). Based on the values of organic productivity and shelf area, Jones and Banerji (1973) have estimated the potential marine fishery resources including demersal, off Orissa coast at about 2,08,000 tonnes. Out of this 1,80,000 tonnes was from the shelf area up to 50 m depth and the rest from beyond 50 m depth and up to 200 m depth. Contribution of demersal group of fishes was 95,000 tonnes in the area up to 50 m depth, which was comparable with the figure arrived at by Indian Institute of Foreign Trade. From the ten year trend in landings, we observed that the estimates corresponding to 0.50 m depth zone (or 0-70 m depth) are in the lower side as exploitation is mostly confined to this zone alone.

Since there is no commercial exploitation beyond 50 m depth, the potential yield from these waters is also to be taken into account.

Alagaraja (1986) has proposed an approach called "maximum contribution approach" which would provide some indication on the potential harvestable yield that could be obtained. This involves considering the maximum catch over a period of time as an indicator of potential yield.

The maximum catch that could be obtained under the conditions of exploitation during the period was obtained by considering the maximum catch of important components for the last 10 years period. Estimated total landings was 75,462 tonnes which may be taken as an indicator of potential harvestable yield of the state, and it is on the lower side, when compared with the estimates arrived at by Jones and Banerji (1973). We can safely assume that the potential harvestable yield of the Orissa state will be of the order of 1,00,000 tonnes. Maximum exploited so far was 46,773 tonnes during 1984. There is an additional quantity of 54,000 tonnes which can be exploited in a phased manner. 50% of the additional resources can be exploited in the next five years. After watching the condition of the stock, we can expand our effort to take the remaining resources.

At the present rate of exploitation, some more additional effort is needed in the next five years to get additional 27,000 tonnes. With this aim, in view, the following table has been prepared from the average annual marine fish landings in Orissa during 1983-84.

TABLE - 21

Percentage contributions and CPUE of different fishing crafts during 1983-84.

Craft	%	CPUE (in kg)
(a) Mechanised Trawler	51	333
Gill nets	8	62
(b) Non-mechanised	41	26

Using the above table and assuming that there are 250 fishing days in an year, we can obtain the additional number of fishing crafts needed in Orissa during the next five year to tap the additional resource of 27,000 tonnes of marine fishes.

Prospects for Future Development

(i) A new development noticed in the marine fisheries sector in Orissa is the landings of oil sardines. There are indications for the development of mackerel fishery along Orissa coast. These resources can be exploited further. Thus pelagic group of fishes have sufficient scope to be exploited intensively in Orissa and particularly in Balasore and Ganjam Districts.

(ii) There are indications of the abundance of demersal fish like catfish and *priacanthus* in the coastal areas of Orissa.

(iii) The following additional number of fishing craft can be introduced in Orissa during the next five year period.

1. Mechanised trawler	160
2. Mechanised gill netter	140
3. Non-mechanised boats	1,700

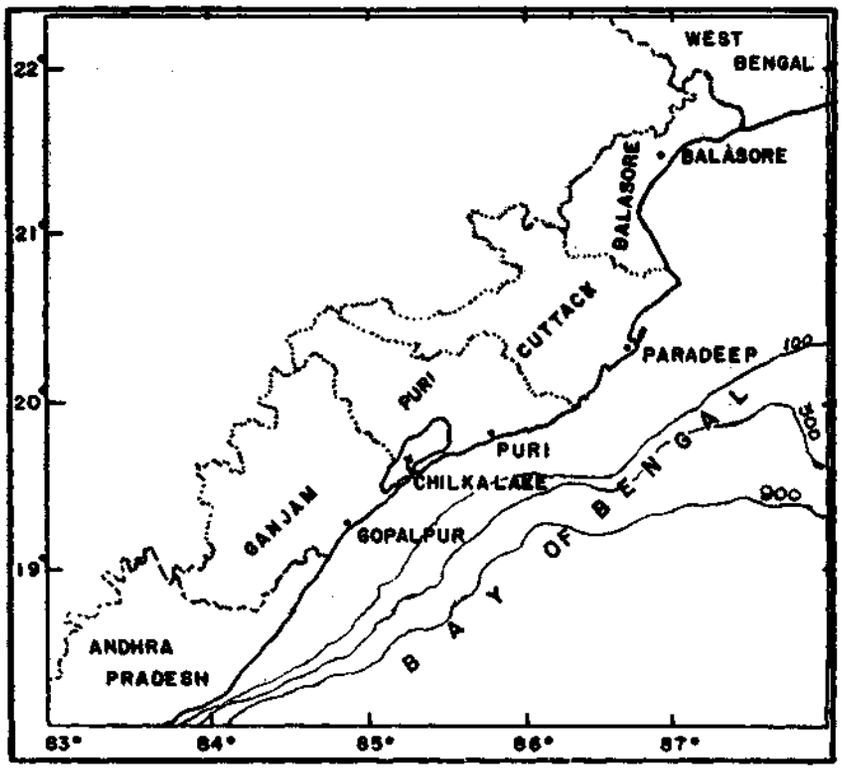

Fig. 1 Map showing the four maritime districts of Orissa state with configuration of continental shelf

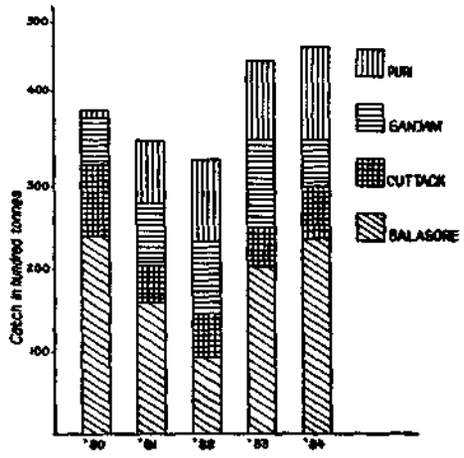

Fig. 2 Districtwise annual marine fish landings in Orissa

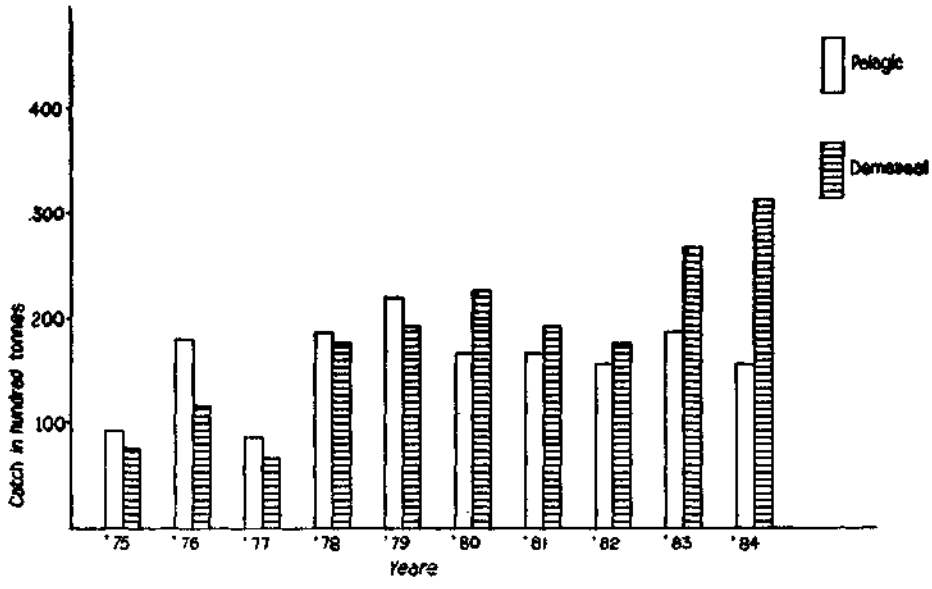

Fig. 3 Annual pelagic and demersal fish landings in Orissa

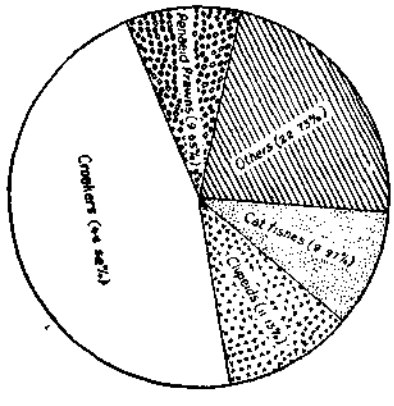

Fig. 4 Average annual contributions of major species/groups in trawl net catch in Orissa during 1980-'84

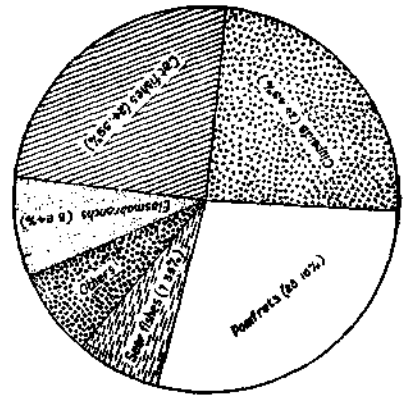

Fig. 5 Average annual major contributions of species/groups in gill net catch in Orissa during 1980-84

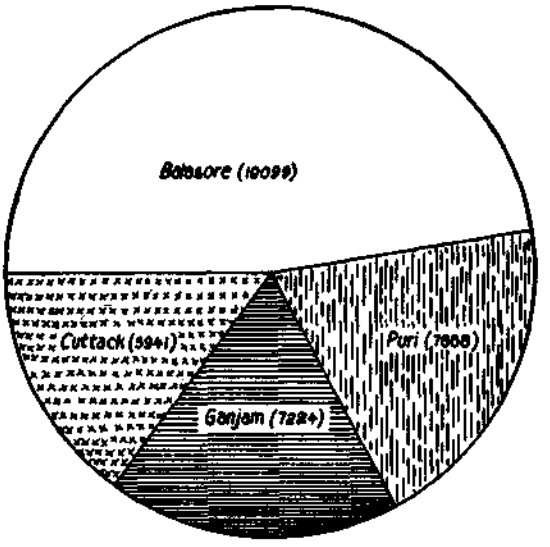

Fig. 6 Average annual marine fish landings in different districts in Orissa during 1980–'84 (in tonnes)

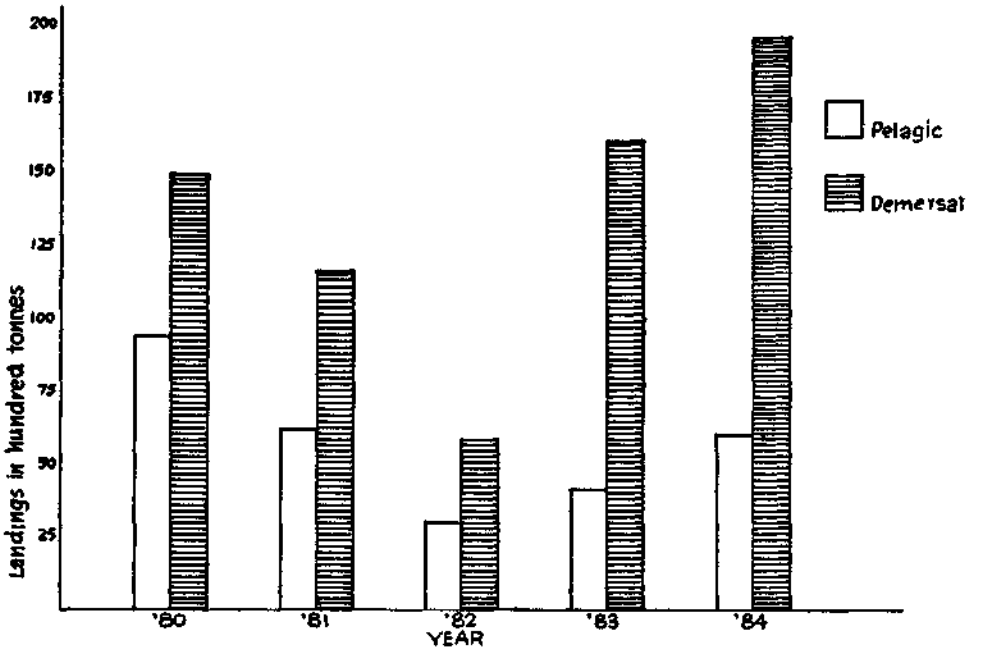

Fig. 7 Annual pelagic and demersal fish landings in Balasore district

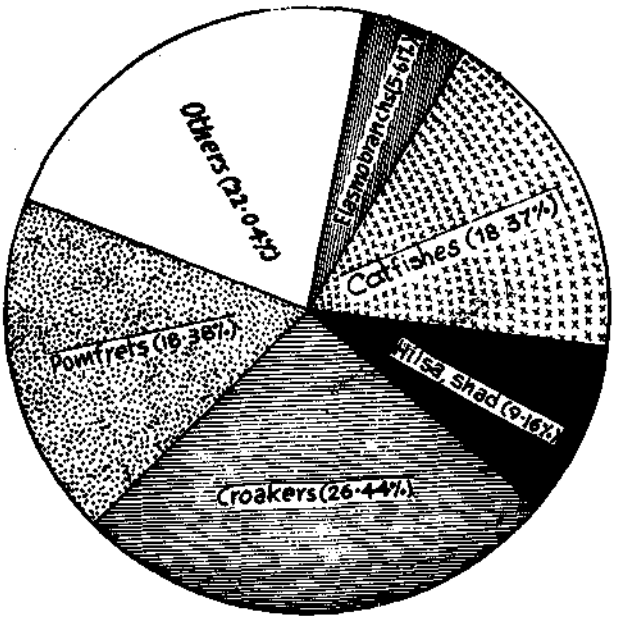

Fig. 8 Average annual contributions of major species/groups in Balasore district during 1980-'84 (in %)

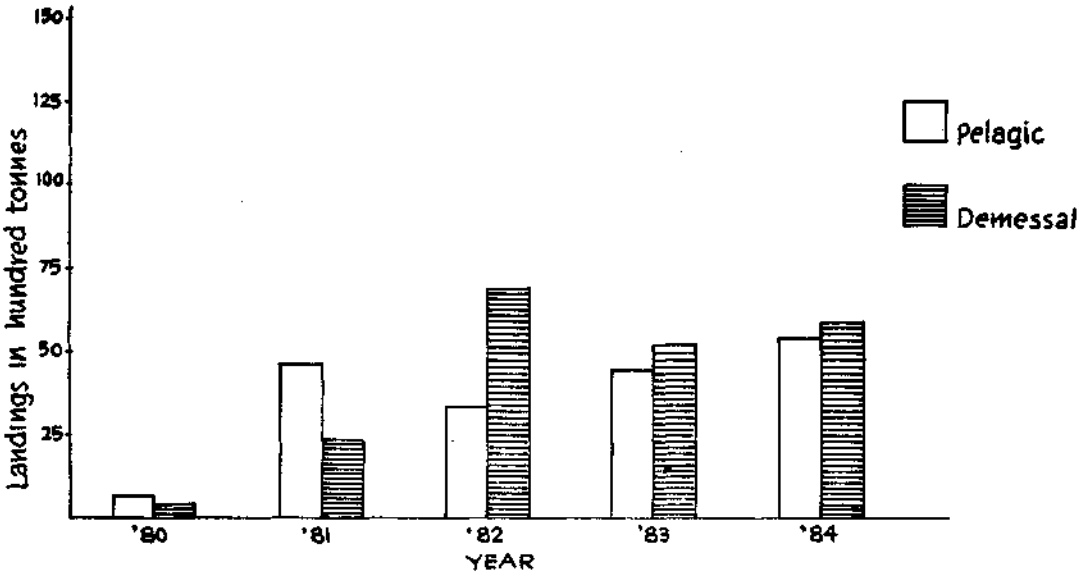

Fig. 9 Annual pelagic and demersal fish landings in Puri district

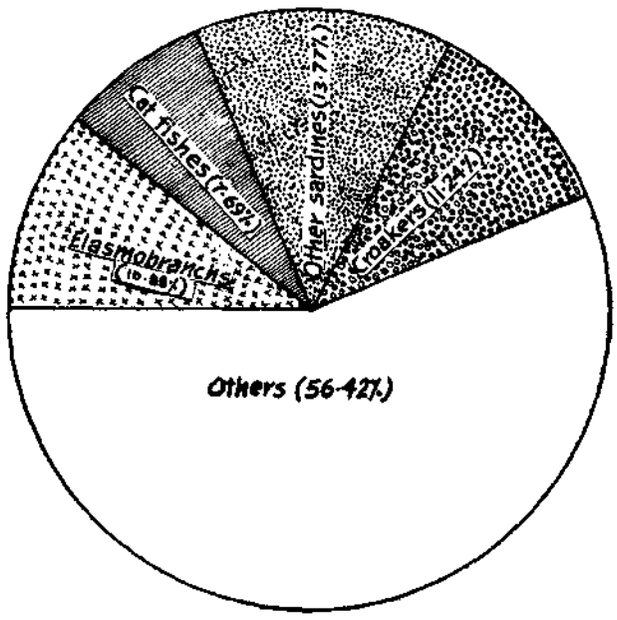

Fig. 10 Average annual contributions of major species/groups in Puri district during 1980-'84 (in %)

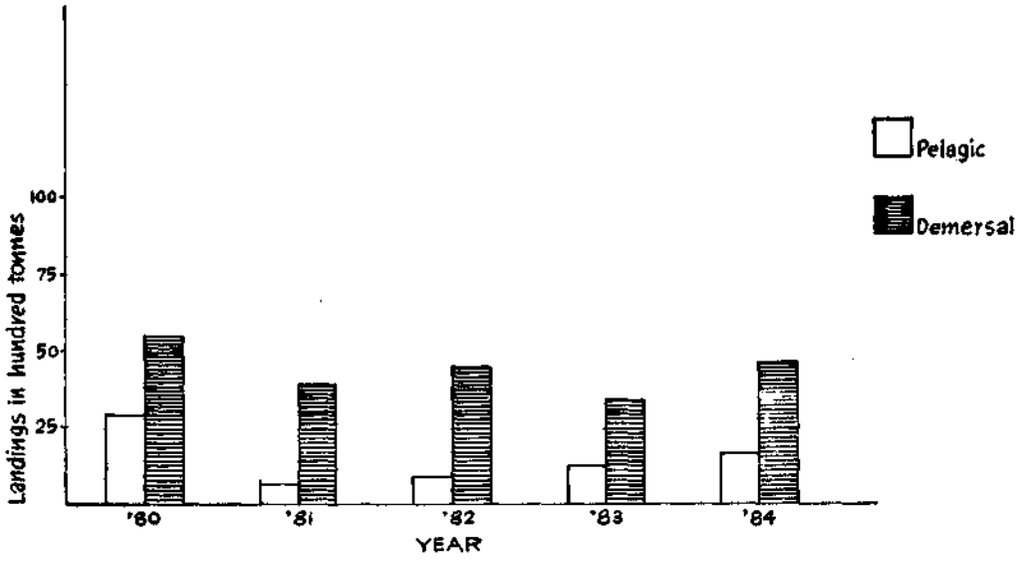

Fig. 11 Annual pelagic and demersal fish landings in Cuttack district

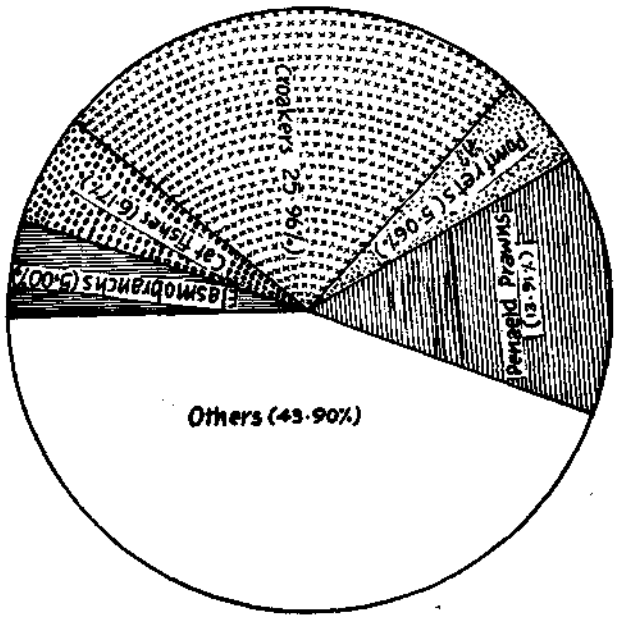

Fig. 12 Average annual contributions of major species/groups in Cuttack district during 1980-'84 (in %)

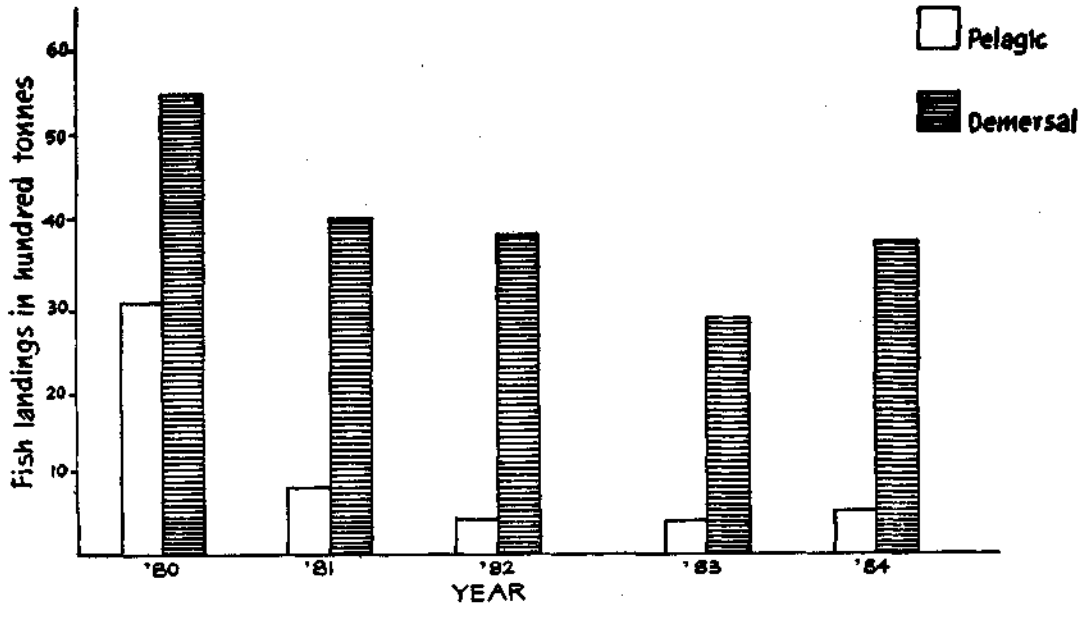

Fig.13 Annual pelagic and demersal fish landings in Paradeep fisheries harbour

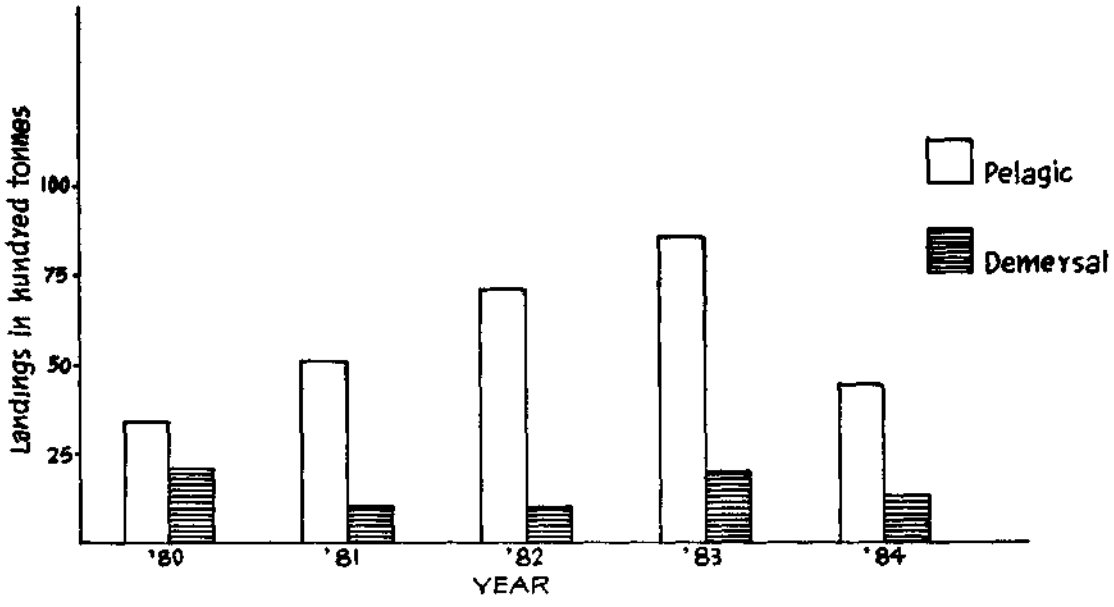

Fig. 14 Annual pelagic and demersal fish landings in Ganjam district

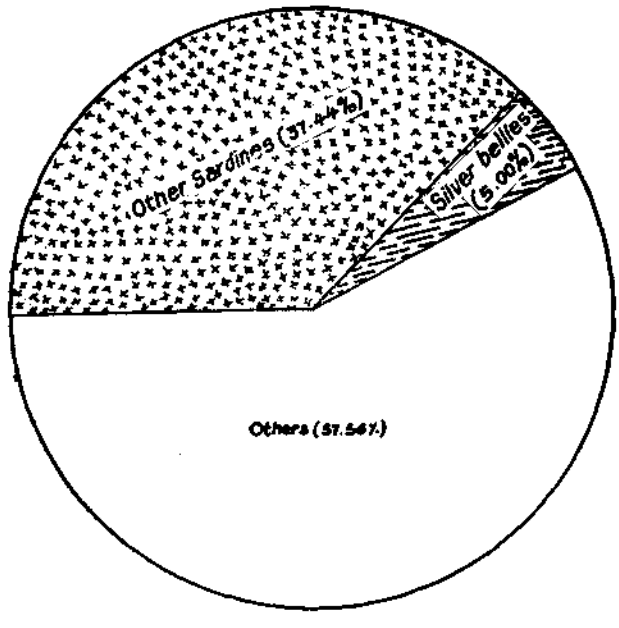

Fig. 15 Average annual contributions of major species/groups in Ganjam district during 1980-84 (in %)

APPENDIX

QUARTERWISE & SPECIESWISE MARINE FISH LANDINGS

Name of fish	1975					1976				
	I	II	III	IV	Total	I	II	III	IV	Total
1. ELASMOBRANCHS	353	139	228	376	1096	385	260	776	1553	2974
a. Sharks										
b. Skates										
c. Rays										
2. EELS						—	—	—	1	1
3. CATFISHES	1452	129	154	298	2033	657	246	507	578	1988
4. CLUPEIDS										
a. Wolf herring	65	51	96	178	390	106	48	161	202	517
b. Oil sardine										
c. Other sardines	358	262	13	319	952	931	597	2	127	1657
d. Hilsa shad	1070	460	25	3313	4868	576	89	484	4328	5477
e. Other shads	35	3	—	40	78	4	34	3	88	129
f. Anchovies										
Coilia										
Setipinna										
Stolephorus	187	70	34	88	379	104	230	1	4	339
Thrissina										
Thryssa						10	19	20	57	106
g. Other clupeids	74	188	385	190	837	150	136	235	251	772
5. BOMBAYDUCK	4	—	2	41	47	—	2	5	80	87
6. LIZARD FISHES	4	1	—	1	6	1	—	—	—	1
7. HALFBEAKS & FULLBEAKS	—	—	—	5	5	—	—	—	1	1
8. FLYING FISHES										
9. PERCHES	39	64	3	79	185	9	10	—	12	31
10. GOATFISHES	11	3	—	—	14	1	—	—	—	1
11. THREADFINS	58	13	12	56	139	41	5	52	146	244
12. CROAKERS	138	32	49	189	408	156	29	48	100	333
13. RIBBON FISHES	14	3	14	63	94	52	32	8	38	130

TABLE-1

(IN TONNES) IN ORISSA DURING 1975-'79

1977					1978					1979				
I	II	III	IV	Total	I	II	III	IV	Total	I	II	III	IV	Total
534	150	384	590	1658	345	404	593	1908	3250	868	432	831	1706	3837
					—	—	—	3	3	—	—	1	—	1
441	194	183	217	1035	191	126	232	1055	1604	438	63	66	127	694
195	61	178	318	752	182	155	254	479	1070	264	293	348	663	1568
204	119	135	769	1227	639	318	28	1427	2412	1143	351	1	963	2458
1364	131	531	932	2948	423	531	585	6198	7737	3066	557	1768	4493	9884
98	147	66	181	492	141	141	74	492	848	178	115	2	32	327
212	14	25	235	486	756	367	—	46	1169	16	—	—	486	502
31	64	13	89	197	15	7	151	—	173	87	33	88	47	255
152	58	286	282	778	108	153	585	483	1329	281	216	377	429	1303
25	33	6	22	86	4	4	126	161	295	76	20	14	87	197
5	—	—	—	5	5	—	—	—	5	50	—	—	—	50
					—	—	—	13	13	28	—	—	—	28
					—	—	—	4	4	4	—	—	—	4
48	4	1	2	55	84	—	5	46	135	20	19	1	26	66
—	—	—	1	1	1	—	—	—	1	—	—	—	1	1
149	25	52	180	406	84	64	157	799	1104	136	106	67	524	833
161	56	55	40	312	27	71	814	2786	3698	163	118	101	92	474
34	84	24	32	174	—	21	38	221	280	65	111	153	32	361

year	1975					1976				
Name of fish	I	II	III	IV	Total	I	II	III	IV	Total
14. CARANGIDS										
a. Horse mackerel										
b Scads										
c. Leather-jackets	45	20	14	59	138	34	21	48	134	237
d Other carangids	46	26	11	132	215	50	34	10	55	149
15. SILVER BELLIES	113	208	137	64	522	84	83	51	161	379
16. BIG-JAWED JUMPER	4	2	—	—	6	—	1	—	—	1
17. POMFRETS	289	169	104	1308	1870	404	418	5123	4754	10699
18. INDIAN MACKEREL	86	5	18	7	116	208	127	64	26	425
19. SEER FISHES	50	82	95	259	486	31	69	188	652	940
20. TUNNIES	10	1	—	5	16	—	6	—	78	84
21. BILL FISHES										
22. BARRACUDA	3	—	—	—	3	—	1	—	—	1
23. MULLET	5	8	12	—	25	1	4	—	—	5
24. UNICORN COD										
25. FLATFISHES										
a. Halibut										
b. Flounders										
c. Soles	—	—	—	8	8	—	—	—	6	6
26. CRUSTACEANS										
a. Penaeid prawns	122	28	107	444	701	32	27	112	517	688
b. Nonpenaeid prawns	1	—	—	59	60	—	3	—	97	100
c. Lobsters										
d. Crabs	—	1	7	—	8	—	1	21	1	23
e. Stomatopods										
27. CEPHALOPODS	1	1	—	—	2	9	18	—	—	27
28. MISCELLANEOUS	252	67	122	656	1097	78	66	119	1008	1271
TOTAL	4889	2036	1642	8237	16804	4114	2616	8038	15055	29823

TABLE – 1 contd.

1977					1978					1979				
I	II	III	IV	Total	I	II	III	IV	Total	I	II	III	IV	Total
101	49	68	168	386	122	67	199	427	815	157	103	112	339	711
30	21	52	10	113	10	18	23	18	69	187	29	70	30	316
100	99	10	24	233	25	52	103	73	253	373	123	292	309	1097
6	6	4	2	18	8	—	1	—	9	—	—	—	2	2
339	105	191	383	1018	255	319	546	4576	5696	670	524	1385	7433	10012
168	21	—	6	195	120	7	—	62	189	165	—	6	110	281
197	58	144	273	672	150	129	219	556	1054	420	270	419	1302	2411
27	1	—	9	37	34	—	—	574	608	18	—	—	12	30
3	—	—	—	3	3	—	—	—	3	2	—	—	2	4
					3	—	—	—	3	22	—	—	—	22
44	13	—	15	72	—	1	7	60	68	—	8	18	—	26
508	104	87	103	802	5	414	486	783	1688	28	41	476	242	787
1	5	2	9	17	—	—	12	—	12	32	—	—	—	32
—	—	6	—	6	—	2	2	—	4	—	4	—	—	4
					—	3	—	1	4	1	—	—	12	13
355	158	114	261	888	151	138	250	296	835	703	253	659	1164	2779
5522	1780	2617	5153	15072	3891	3512	5490	23547	36440	9661	3789	7255	20665	41370

QUARTERWISE AND SPECIESWISE MARINE FISH

	1980					1981				
	I	II	III	IV	Total	I	II	III	IV	Total
1. ELASMOBRANCHS	975	801	585	1411	3772					
a. Sharks						513	570	548	662	2293
b. Skates										
c. Rays						344	217	226	130	917
2. EELS						—	—	—	24	24
3. CATFISHES	76	40	255	1827	2198	2159	690	2355	880	6084
4. CLUPEIDS										
a. Wolf herring	351	225	275	609	1460	339	225	273	444	1281
b Oil sardine										
c. Other sardines	546	18	—	1327	1891	1582	771	1	2181	4535
d. Hilsa shad	352	486	772	3501	5091	8	321	1561	195	2085
e. Other shads	1	45	—	—	46	331	18	4	—	353
f. Anchovies										
Coilia						—	14	12	17	43
Setipinna						—	—	57	57	114
Stolephorus	244	26	—	—	270	28	23	—	35	86
Thryssa	87	35	160	51	333	17	141	144	20	322
g. Other clupeids	509	264	374	1429	2576	392	490	305	863	2050
5. BOMBAYDUCK	18	2	47	311	378	—	26	36	11	73
6. LIZARD FISHES	188	—	—	1	189	96	2	4	6	108
7. HALFBEAKS & FULLBEAKS	1	—	—	45	46	1	—	—	1	2
8. FLYING FISHES	13	—	—	4	17					
9. PERCHES	205	105	—	31	341					
a. Rock cods						1	—	—	—	1
b. Snappers						3	3	4	—	10
c. Pig-face breams										
d. Threadfin breams						—	—	—	7	7
e. Other perches						72	21	4	7	104
10. GOATFISHES	111	166	—	19	296	34	47	10	13	104
11. THREADFINS	338	244	222	322	1126	138	157	155	116	566
12. CROAKERS	990	163	177	1534	2864	477	556	590	510	2133
13. RIBBONFISHES	106	21	19	782	928	674	98	105	118	995

TABLE - 2

LANDINGS (IN TONNES) IN ORISSA DURING 1980-1984

1982					1983					1984				
I	II	III	IV	Total	I	II	III	IV	Total	I	II	III	IV	Total
616	161	797	412	1986	14	161	1046	187	1408	172	399	632	44	1247
—	—	1	3	4	5	—	4	5	14	6	14	6	7	33
252	22	27	46	347	38	24	23	21	106	143	132	88	38	401
8	1	4	70	83	3	5	—	6	14	—	1	—	9	10
1172	442	830	1551	3995	417	366	657	3089	4528	1596	757	699	3131	6183
302	135	355	349	1141	173	260	237	366	1036	177	167	128	373	845
										—	535	4	—	539
298	553	—	2261	4112	1714	220	115	3214	5263	1342	59	299	1611	3311
92	106	267	660	1125	46	75	106	194	421	32	168	1203	262	1665
1	72	67	178	318	31	40	144	38	253	9	155	17	27	208
16	2	2	6	26	317	72	42	428	859	99	34	26	422	581
65	66	55	106	292	393	64	88	753	1288	92	13	177	715	997
74	126	—	125	325	534	7	2	106	649	140	60	113	156	469
33	30	103	44	210	9	26	81	—	116	66	—	—	—	66
309	138	564	581	1592	425	191	828	1626	3070	785	26	96	1474	2381
11	1	36	133	181	9	—	37	267	313	—	18	14	271	303
71	1	2	256	330	266	—	7	16	289	109	—	9	14	132
					1	—	—	—	1	8	—	—	—	8
					9	—	—	—	9					
178	8	—	1	187	—	—	2	4	6					
26	1	—	10	37	12	—	—	8	20	4	—	1	3	8
										—	2	—	3	5
12	—	—	819	831	49	—	—	474	523	281	—	—	179	460
91	18	14	612	735	118	66	22	144	350	47	6	2	149	204
46	5	—	56	107	113	11	4	90	218	16	—	1	73	90
65	3	1	23	92	—	9	5	2	16	20	2	23	—	45
536	157	377	2643	3713	826	103	935	10902	12766	4638	375	906	10984	16903
56	31	53	303	443	411	19	83	783	996	298	75	287	575	1235

year	1980					1981				
Name of fish	I	II	III	IV	Total	I	II	III	IV	Total
14. CARANGIDS	260	201	154	559	1174					
a. Horse mackerel						13	5	15	35	68
b. Scads						88	2	—	7	97
c. Leather-jackets						163	27	5	1	196
d. Other carangids						34	35	68	13	150
15. SILVERBELLIES	408	134	48	117	707	436	184	58	55	733
16. BIG-JAWED JUMPER	35	9	16	5	65	6	42	1	—	49
17. POMFRETS	1918	1799	849	4506	9072					
a Black pomfret						382	260	1	137	780
b. Silver pomfret						735	514	998	676	2903
c. Chinese pomfret						—	1	1	—	2
18. INDIAN MACKEREL	107	3	—	155	265	673	12	13	125	823
19. SEER FISHES	405	328	185	624	1542					
a. *S. commersoni*						35	2	2	52	91
b. *S. guttatatus*						393	321	340	1370	2424
c. *S. lineolatus*						—	—	—	25	25
d. *Acanthocybium* Sp.										
20. TUNNIES	15	—	—	19	34					
a. *E. affinis*						3	—	—	102	105
b. *Auxis* spp.										
c. *K. pelamis*										
d. *T. tonggol*										
e. Other tunnies						131	—	—	14	145
21. BILL FISHES						—	—	—	1	1
22. BARRACUDAS	—	3	—	5	8	9	—	—	—	9
23. MULLETS	1	—	—	—	1					
24. UNICORN COD										
25. FLATFISHES										
a. Halibut										
b. Founders										
c. Soles	66	—	3	—	69	16	—	21	10	47
26. CRUSTACEANS										
a. Penaeid prawns	449	67	127	431	1074	256	192	150	730	1328
b. Non penaeid prawns	20	10	—	—	30	—	—	2	53	55
c. Lobsters						—	—	1	2	3
d. Crabs	40	9	—	125	174	16	99	32	—	147
e. Stomatopods	74	57	6	48	185	23	122	—	—	145
27. CEPHALOPODS	29	6	—	63	98	9	29	—	19	57
28. MISCELLANEOUS	310	206	309	230	1055	263	301	208	210	982
TOTAL	9248	5463	4583	20091	39375	10893	6538	8290	9934	35655
No of operations of fishing units ('000)	222	167	161	348	898	317	202	155	255	929

TABLE - 2 contd.

1982					1983					1984				
I	II	III	IV	Total	I	II	III	IV	Total	I	II	III	IV	Total
													20	20
181	20	9	21	231	4	39	17	136	196	26	51	113	117	307
35	9	—	12	59	204	—	—	8	212	35	—	—	1	36
—	17	67	13	97	—	5	37	11	53	22	9	57	55	143
31	18	68	85	202	38	38	111	156	343	157	77	52	148	434
252	89	137	655	1133	353	120	41	73	587	180	79	49	55	363
1	5	2	—	8	5	4	4	2	15	2	16	—	—	18
18	14	68	349	449	76	62	107	121	366	104	25	19	147	295
320	168	657	1146	2291	192	331	990	966	2479	317	258	461	984	2020
—	4	—	—	4	5	5	—	—	10					
365	15	2	238	620	719	89	3	1204	2015	309	71	—	33	413
523	21	8	155	707	33	48	3	73	157	93	8	3	117	221
557	130	295	393	1375	130	211	209	281	831	360	41	134	257	792
27	13	—	—	40						—	1	—	2	3
125	—	—	280	405	12	—	—	16	28	—	2	—	10	12
—	—	—	1	1	8	—	—	—	8	—	—	1	18	19
—	—	—	2	2	1	—	—	—	1					
—	—	—	1	1										
					5	—	—	—	5					
12	—	—	—	12	23	8	—	—	31	11	—	1	13	25
					4	—	—	—	4	1	—	—	—	1
1	—	—	—	1										
6	—	13	253	272	129	6	14	177	326	127	3	34	163	327
370	113	280	1333	2096	305	106	177	1411	1999	242	37	442	1332	2053
—	—	1	221	222	4	—	13	2	19	—	—	20	1	21
3	2	2	31	38	—	—	—	3	3	—	—	1	—	1
1	18	4	39	62	57	13	50	66	186	22	2	17	62	103
10	3	1	101	115	163	2	—	34	199	24	—	—	23	47
26	38	—	131	195	63	27	2	27	119	38	—	—	21	59
172	110	210	215	707	136	124	185	230	675	188	109	168	246	711
8369	2886	5379	16923	33557	8302	2946	6431	27720	45399	12338	3787	6303	24345	46773
233	130	182	329	874	228	137	160	308	833	215	152	139	204	710

SPECIESWISE AND GEARWISE CONTRIBUTION UNITS IN ORISSA

Name of fish	1980				1981			
	Tr	GN	NM	Total	Tr	GN	NM	Total
1. ELASMOBRANCHS	39	1953	1780	3772	104	1254	1852	3210
2. EELS					23	—	1	24
3. CATFISHES	102	1456	640	2198	366	5060	658	6084
4. CLUPEIDS	1477	5528	4662	11667	700	2696	7473	10869
5. BOMBAYDUCK	227	—	151	378	12	—	61	73
6. LIZARD FISHES	186	—	3	189	53	—	55	108
7. HALFBEAKS & FULL BEAKS	—	—	46	46	—	—	2	2
8. FLYING FISHES	—	—	17	17				
9. PERCHES	220	—	121	341	62	—	60	122
10. GOATFISHES	129	—	167	296	87	—	17	104
11. THREADFINS	54	560	512	1126	86	242	238	566
12. CROAKERS	2173	308	383	2864	1629	48	758	2133
13. RIBBONFISHES	881	8	39	928	225	—	770	995
14. CARANGIDS	419	306	449	1174	16	138	357	511
15. SILVERBELLIES	139	32	536	707	51	—	682	733
16 BIG-JAWED JUMPER	26	—	39	65	43	—	6	49
17. POMFRETS	1032	5791	2249	9072	174	2308	1203	3685
18. INDIAN MACKEREL	—	—	265	265	—	—	823	823
19. SEERFISHES	—	926	616	1542	592	1242	706	2540

(IN TONNES) OF MECHANISED AND NON MECHANISED DURING 1980-1984

1982				1983				1984			
Tr	GN	NM	Total	Tr	GN	NM	Total	Tr	GN	NM	Total
212	294	1831	2337	77	13	1438	1528	86	17	1578	1681
62	—	21	83	9	—	5	14	—	—	10	10
1222	1575	1198	3995	2449	914	1165	4528	3016	1525	1642	6183
412	1105	7624	9141	2866	514	9575	12955	2530	643	7889	11062
1	—	180	181	256	—	57	313	263	—	40	303
289	—	41	330	248	—	41	289	112	—	20	132
				—	—	1	1	—	—	8	8
				—	—	9	9				
1380	—	410	1790	630	—	269	899	677	—		677
82	—	25	107	124	—	94	218	86	—	4	90
16	40	36	92	—	4	12	16	2	—	43	45
2304	239	1170	3713	11869	116	781	12766	15411	157	1335	16903
368	—	75	443	447	20	529	996	517	36	682	1235
44	16	529	589	11	107	686	804	49	105	786	940
535	—	598	1133	269	13	305	587	13	13	337	363
—	—	8	8	—	—	15	15	—	—	18	18
175	1522	1047	2744	246	1360	1249	2855	262	1057	996	2315
—	—	620	620	2	—	2013	2015	3	—	410	413
241	608	1273	2122	11	194	783	988	4	180	832	1016

Name of fish	1980				1981			
	Tr	GN	NM	Total	Tr	GN	NM	Total
20. TUNNIES	10	—	24	34	9	—	241	250
21. BILLFISHES					—	—	1	1
22. BARRACUDAS	—	—	8	8	—	—	9	9
23. MULLETS	—	—	1	1				
24. UNICORN COD								
25. FLATFISHES								
a. Halibut								
b. Flounders								
c. Soles	61	—	8	69	46	—	1	47
26. CRUSTCEANS								
a. Penaeid prawns	843	—	231	1074	1188	—	140	1328
b. Non penaeid prawns	—	—	30	30	53	—	2	55
c. Lobsters					1	—	2	3
d. Crabs	306	—	53	359	96	—	51	147
e. Stomatopods	—				145	—	—	145
27. CEPHALOPODS	87	—	11	98	49	—	8	57
28. MISCELLANEOUS	110	236	709	1055	212	166	604	982
TOTAL	8521	17104	13750	39375	6022	13154	16479	35655
No of operations of fishing units (in '000)	134	217	547	898	55	166	708	929

TABLE 3 Contd.

1982				1983				1984			
Tr	GN	NM	Total	Tr	GN	NM	Total	Tr	GN	NM	Total
—	—	409	409	—	—	37	37	—	—	31	31
				—	—	5	5				
—	—	12	12	—	—	31	31	—	—	25	25
				—	—	4	4	—	—	1	1
—	—	1	1								
266	—	6	272	316	—	10	326	324	—	3	327
1603	—	493	2096	1626	—	373	1999	1667	—	386	2053
221	—	1	222	19	—	—	19	21	—	—	21
28	—	10	38	3	—	—	3	1	—	—	1
40	—	22	62	124	—	62	186	69	—	34	103
115	—	—	115	198	—	1	199	45	—	2	47
142	—	53	195	49	—	70	119	45	—	14	59
95	76	536	707	86	55	534	675	120	53	538	711
9853	5475	18229	33557	21935	3310	20154	45399	25323	3786	17664	46773
66	66	742	874	71	59	703	833	71	55	584	710

Tr = Trawl Net. GN = Gill Net, NM = Non-mechanised

SPECIESWISE, QUARTERWISE FISH LANDINGS OF TRAWLERS

	1980					1981				
	I	II	III	IV	Total	I	II	III	IV	Total
1. ELASMOBRANCHS	18	—	5	16	39					
a. Sharks						1	—	8	14	23
b. Skates										
c. Rays						4	—	27	46	77
2. EELS						—	—	—	23	23
3. CATFISHES	44	—	—	58	102	15	—	—	141	156
4. CLUPEIDS										
a. Wolf herring	—	—	—	44	44	—	—	—	9	9
b. Oil sardine										
c. Other sardines										
d. Hilsa shad						—	—	—	2	2
e. Other shads										
f. Anchovies										
Coilia						—	—	—	13	13
Setipinna						—	—	—	28	28
Stolephorus										
g. Other clupeids	245	24	5	1159	1433	66	225	35	108	434
5. BOMBAYDUCK	—	—	1	226	227	—	—	7	5	12
6. LIZARD FISHES	186	—	—	—	186	53	—	—	—	53
7. HALFBEAKS & FULL BEAKS										
8. FLYING FISHES										
9. PERCHES	190	—	—	30	220					
a. Rock cods										
b. Pig-face breams										
c. Threadfin breams						—	—	—	4	4
d. Other perches						56	—	—	—	56
10. GOATFISHES	105	5	—	19	129	28	47	—	12	87
11. THREADFINS	46	5	3	—	54	13	46	21	6	86
12. CROAKERS	929	44	70	1130	2173	287	413	492	435	1627
13. RIBBON FISHES	93	5	5	778	881	25	48	36	68	177
14. CARANGIDS										
a. Horse Mackerel										
b. Scads										
c. Leather-jackets										
d. Other carangids	41	—	—	378	419	13	—	—	1	14

TABLE - 4

(IN TONNES) AT PARADEEP IN ORISSA DURING 1980-1984

1982					1983					1984				
I	II	III	IV	Total	I	II	III	IV	Total	I	II	III	IV	Total
25	7	3	16	51	1	3	2	11	17	14	—	7	—	21
					—	—	—	5	5	6	—	1	7	14
12	14	4	17	47	22	9	3	16	50	24	—	16	7	47
6	1	4	28	39	3	—	—	6	9					
116	55	14	255	440	83	16	30	127	256	72	1	114	103	290
2	2	—	—	4	2	—	—	1	3	47	—	2	1	50
										—	—	37	7	44
										—	—	31	—	31
—	1	1	6	8	15	7	14	9	45	8	—	—	3	11
3	9	4	23	39	3	5	1	28	37	2	—	—	46	48
					2	—	—	—	2					
38	9	3	55	105	28	11	13	50	102	69	—	8	27	104
—	—	1	—	1	—	—	9	3	12	—	—	11	7	18
44	1	—	66	111	123	—	—	13	136	90	—	9	13	112
23	2	—	—	25										
										—	—	—	2	2
3	—	—	317	320	37	—	—	178	215	252	—	—	178	430
20	10	3	17	50	40	—	—	20	60	8	—	—	30	38
24	5	—	27	56	46	—	—	24	70	13	—	—	17	30
5	2	—	2	9						2	—	—	—	2
237	103	132	756	1228	204	33	125	526	888	473	4	397	626	1500
17	15	14	141	187	26	9	27	128	190	47	—	84	79	210
1	1	—	—	2										
										2	—	—	—	2
—	3	—	—	3									1	1
6	—	—	1	7	11	—	—	—	11	11	—	1	—	12

	1980					1981				
	I	II	III	IV	Total	I	II	III	IV	Total
15. SILVER BELLIES	139	—	—	—	139	43	—	—	6	49
16. BIG-JAWED JUMPER	22	4	—	—	26	6	37	—	—	43
17. POMFRETS	2	—	—	1030	1032					
a. Black pomfret						—	—	—	1	1
b. Silver pomfret						1	—	—	12	13
c. Chinese pomfret										
18. INDIAN MACKEREL										
19. SEER FISHES										
a. *S. commersoni*						—	—	—	—	—
b. *S. guttatus*						—	—	—	1	1
c. *S. lineolatus*						—	—	—	25	25
20. TUNNIES	10	—	—	—	10					
a. *E. affinis*						3	—	—	6	9
21. BILL FISHES										
22. BARRACUDAS										
23. MULLETS										
24. UNICORN COD										
25. FLATFISHES										
a. Soles	58	—	3	—	61	16	—	21	9	46
26. CRUSTACEANS										
a. Penaeid prawns	402	22	59	360	843	239	158	99	666	1162
b. Non-penaeid prawns						—	—	—	53	53
c. Lobsters						—	—	—	1	1
d. Crabs	40	9	—	125	174	11	85	—	—	96
e. Stomatopods	74	13	—	45	132	23	122	—	—	145
27. CEPHALOPODS	21	3	—	63	87	6	28	—	15	49
28. MISCELLANEOUS	97	11	2	—	110	26	103	14	43	186
TOTAL	2762	145	153	5461	8521	935	1312	760	1753	4760
No. of operations of fishing units (in '000)	44	2	2	86	134	7	9	5	13	34

TABLE - 4 contd.

1982					1983					1984				
I	II	III	IV	Total	I	II	III	IV	Total	I	II	III	IV	Total
15	17	—	75	107	76	6	1	3	86	8	—	2	3	13
1	1	—	—	2	—	—	1		1	1	—	2	22	25
7	2	1	29	39	8	3	9	36	56	12		10	8	30
					1	—	—	—	1					
					2	—	—	—	2	3		—	—	3
—	—	—	—	—	—	—	—	—	—	1	—	—	—	1
—	—	—	—	—	—	—	—	—	—	—	—	—	1	1
19	12	—	—	31	—	—	—	—	—	—	—	—	—	—
2	—	13	134	149	61	1	11	82	155	79	—	32	76	187
268	66	66	463	863	128	53	50	305	536	193	1	139	392	725
—	—	—	63	63	4	—	13	2	19	—	—	20	1	21
1	1	1	13	16	—	—	—	3	3	—	—	1	—	1
—	2	—	33	35	36	1	1	35	73	21	—	—	32	53
10	3	1	90	104	93	—	—	17	110	19	—	—	6	25
9	4	—	44	57	22	2	2	21	47	24	—	—	21	45
11	4	5	15	35	4	—	—	6	10	—	—	1	40	41
925	352	270	2686	4233	1081	159	312	1655	3207	1501	6	925	1756	4188
6	3	2	12	23	6	2	2	7	17	6	0	3	9	18

TABLE-6

DISTRICTWISE AND QUARTERWISE MARINE FISH LANDINGS (TONNES) IN ORISSA DURING 1980-1984

	1980					1981					1982		
Districts	I	II	III	IV	Total	I	II	III	IV	Total	I	II	III
Balasore	4887	4395	3198	11798	24278	5190	2595	6118	3941	17844	2587	671	1855
Puri	140	89	247	468	944	3262	1324	612	1742	6940	2691	444	1077
Cuttack	2762	145	153	5461	8521	935	1312	760	1753	4760	925	592	864
Ganjam	1459	824	985	2364	5632	1506	1307	800	2498	6111	2166	1179	1583
TOTAL ('00s)	92	55	46	200	393	109	65	83	99	357	84	29	54

	1982 contd.		1983					1984				
Districts	IV	Total	I	II	III	IV	Total	I	II	III	IV	Total
Balasore	4332	9445	1914	914	2449	15060	20337	6056	1051	1426	15058	23591
Puri	6373	10585	1944	529	1662	5624	9759	2932	1195	1929	5158	11214
Cuttack	3001	5382	1094	472	817	2339	4722	1800	327	1456	2736	6319
Ganjam	3217	8145	3350	1031	1503	4699	10583	1550	1214	1492	1393	5649
TOTAL ('00s)	169	336	83	30	64	277	454	123	38	63	244	468

DISTRICTWISE INFRASTRUCTURE FACILITIES IN ORISSA

TABLE - 6

	Fishermen houses		Villages having		Electrified villages	villages connected by road	Primary schools	Secondary schools	Colleges	Technical Institutions	Hospitals / dispensaries	Banks	Co-operative societies	Post & Telegraph Offices	Police stations	Community centres	Cinema theaters	Liquor shops	Landing centres with jetty	Boat building yards	Ice plants
	Kutcha	Pucca	Tap water	Well water																	
I. *Balasore District*																					
1. Balasore block	3823	34	2	32	21	16	52	9	3	—	4	1	6	15	4	4	—	6	7	—	2
2. Baliapal block	2601	1	—	44	16	19	39	2	2	—	1	—	6	8	—	3	—	—	—	—	—
3. Bhagarai block	1476	14	—	32	12	16	22	2	—	—	1	—	1	6	—	—	—	—	—	—	—
4. Basudeppuri block	1125	—	—	19	13	12	28	4	3	—	2	1	7	11	—	6	—	2	—	—	—
5. Remuna block	1168	—	—	5	6	5	10	4	—	—	—	—	2	2	—	1	—	—	—	—	—
6. Bahanaga block	1070	1	—	14	7	8	13	4	2	—	1	1	4	4	—	—	—	—	—	—	—
7. Chandabali block	313	7	—	4	1	1	4	—	—	—	—	—	2	1	—	—	—	—	1	1	—
II. *Cuttack district*																					
1. Mahakalpada block	148	—	—	4	—	4	4	1	—	—	1	—	1	1	1	—	—	—	—	—	—
2. Rajnagar block	49	—	—	4	—	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3. Kujang block	183	—	—	1	3	3	1	1	1	—	1	5	—	1	1	—	1	2	—	—	1
III. *Puri district*																					
1. Astarang block	655	325	—	16	1	1	9	5	—	—	—	—	—	—	—	—	—	—	—	—	—
2. Krishnaprasad block	438	2	—	5	3	1	5	—	—	—	—	—	1	—	—	—	—	1	—	—	—
3. Purisadar block	1700	154	—	3	3	3	4	—	—	—	2	—	1	1	1	5	—	3	—	—	2
4. Gop block	97	16	—	2	1	2	1	—	—	—	1	—	1	1	—	—	—	—	—	—	—
IV. *Ganjam district*																					
1. Chatrapur block	1346	66	—	8	—	8	3	—	—	—	1	—	2	1	—	—	—	3	—	—	—
2. Rangailunda block	1360	190	—	8	4	3	9	4	—	1	3	2	5	5	1	10	—	5	—	—	1
3. Chikiti block	651	177	—	8	1	2	5	1	—	—	—	—	5	—	—	—	—	7	—	—	—
4. Ganjam block	295	12	—	4	2	2	3	—	—	—	—	—	2	—	—	—	—	—	—	—	—

TABLE - 7

Blockwise distribution of marine fishing villages, fishermen population and their Educational and Occupational Status in Cuttack district, Orissa

	Mahakalpada Block	Rajnagar Block	Kujang Block
Fishing Villages	4	4	4
Fishermen house-holds	148	62	183
Fishermen Population : Total	858	393	1410
Adults:			
Male	262	132	492
Female	212	108	408
Children:	384	153	510
Educational Status: Total	—	27	—
Primary	—	25	—
Secondary	—	2	—
Fishermen engaged in actual fishing : Total	229	109	457
Full-time	—	—	442
Part-time	229	109	11
Occassional	—	—	4

TABLE-8

Blockwise distribution of marine fishing villages, fishermen population and their Educational and Occupational Status in Puri district, Orissa

	Astarang	Krishna-prasad	Puri Sadar	Gop.
Fishing Villages	16	6	3	2
Fishermen house-holds	1001	430	1926	115
Fishermen population : Total	6131	2375	11532	702
Adult:				
Male	1989	763	3733	248
Female	1843	604	3464	208
Children:	2299	1008	4335	246
Educational Status : Total	1543	56	214	30
Primary	930	53	170	27
Secondary	500	3	39	3
Above secondary	113	—	5	—
Fishermen engaged in actual fishing				
Total	1777	736	3147	338
Full-time	1181	653	2838	266
Part-time	306	79	186	72
Occasional	290	4	123	—

TABLE - 9

Blockwise distribution of marine fishing villages, fishermen population and their Educational and Occupational Status in Ganjam district, Orissa

	Chatrapur Block	Rangailunda Block	Chilkiti Block	Ganjam Block
Fishing villages	8	8	8	4
Fishermen house-holds	1454	1563	825	306
Fishermen Population : Total	6548	7220	4213	1244
Adults:				
Male	1986	2033	1374	379
Female	2161	2200	1297	369
Children	2401	2987	1542	496
Educational Status : Total	164	138	105	49
Primary	104	74	72	44
Secondary	52	54	26	4
Above secondary	8	10	7	1
Fishermen engaged in actual fishing:				
Total	1983	1842	1241	356
Full-time	1503	1415	482	298
Part-time	63	195	755	53
Occasional	417	232	4	5

TABLE - 10

Blockwise distribution of marine fishing villages, fishermen population and their Educational and Occupational Status in Balasore District, Orissa

	Balasore (Sadar)	Baliapal	Bhogarai	Basudepur	Remuna	Bahanaga	Chandabali
Fishing villages	33	49	32	19	16	16	4
Fishermen house-hold	3908	2705	1512	1783	1193	1071	144
Fishermen population : Total	24529	14348	9574	12139	6389	6579	960
Adults:							
Male	8454	4584	2929	4015	2058	1764	341
Female	6895	4019	2808	3464	1841	1674	262
Children:	9180	5745	3837	4660	2490	3141	357
Educational Status : Total	3187	1839	1084	768	151	544	123
Primary	2439	1663	917	572	69	351	108
Secondary	671	140	124	165	68	179	15
Above Secondary	77	36	43	31	14	14	—
Fishermen engaged in actual fishing:							
Total	6278	3484	2060	3024	1686	1671	306
Full-time	3594	1689	1726	2517	745	1170	98
Part-time	1324	1490	288	340	287	320	155
Occasional	1360	305	46	167	654	181	53

TABLE - 11

Blockwise figures of marine fishing craft and gears in Balasore district

	Balasore (sadar)	Baliapal	Bhogarai	Basu-debpur	Remuna	Baha-naga	Chanda-bali
Fishing craft:							
a) Mechanised							
Gill netters	86	2	2	16	—	—	—
b) Non-mechanised Total	651	592	466	400	172	112	39
1) Plank built boats	649	489	463	400	172	112	39
2) Dugout canoes	2	101	—	—	—	—	—
3) Catamarans	—	1	—	—	—	—	—
4) Others	—	1	3	—	—	—	—
Fishing gears :							
a) Drift/Gill nets	610	284	271	265	81	105	86
b) Boat Seines	—	—	—	132	—	—	9
c) Fixed bag nets	871	680	507	155	43	239	12
d) Hooks & Lines	84	118	4	1	—	5	—
e) Shore seines	12	1827	636	—	—	—	—
f) Traps	—	74	25	393	—	—	—
g) Scoop nets	—	—	12	1	—	1	—
h) Others	22	4282	149	73	—	—	49

TABLE-12

Blockwise figures of marine fish craft and gear in Cuttack District Orissa

	Mahakalpada Block	Rajnagar Block	Kujang Block
Fishing craft			
a. Mechanised:	—	—	—
b. Non mechanised: Total	126	55	265
1. Plank-built boats	126	55	37
2. Catamarans	—	—	228
Fishing Gear:			
a. Drift / Gill nets	10	67	348
b. Fixed bag nets	198	—	—
c. Hooks & Lines	69	—	173
d. Traps	1	22	—
e. Others	—	4	—

TABLE - 13

Blockwise figures of marine fishing craft and gear in Puri District

	Asterang	Krishnaprasad	Puri sadar	Gop
Fishing craft				
a) Mechanised	—	—	—	—
b) Non-mechanised : Total	1318	393	1504	167
1) Plank-built boats	5	17	453	—
2) Dugout canoes	76	—	—	—
3) Catamarans	1237	376	1051	167
4) Others	—	—	—	—
Fishing Gear				
a) Drift / Gill nets	763	605	1336	78
b) Boat seines	1002	30	370	65
c) Fixed bag nets	—	—	1	—
d) Hooks & Lines	—	121	10567	—
e) Shore seines	—	11	47	—
f) Others	—	—	13	—

TABLE-14

Blockwise figures of marine fishing craft and gear in Ganjam District Orissa

	Chatrapur Block	Rangailunda Block	Chikiti Block	Ganjam Block
Fishing craft				
a. Mechanised	—	—	—	—
b. Non-mechanised : Total	1543	1259	385	281
1. Plank built boats	60	86	87	12
2. Dugout canoes	7	—	—	—
3. Catamarans	1476	1173	298	269
Fishing Gear:				
a. Drift / Gill nets	2197	2243	580	498
b. Boat seines	513	441	59	36
c. Fixed bag nets	—	1	71	—
d. Hooks & Lines	1519	1612	634	358
e. Shore seines	48	112	189	11
f. Scoop nets	2	21	—	—
g. Others	55	50	157	347

DISTRICTWISE FISH LANDING CENTRES OF ORISSA*

I. BALASORE DISTRICT

1 Talsari
2 Paddapur-Krishnanagar
3 Udayapur-Sahapur
4 Kirtonia
5 Choumuke (Amchua)
6 Hanskara
7 Kankadapal
8 Kasafal North
9 Kasafal South
10 Balaramgudi
11 Mahisali
12 Khandia
13 Balichandaghat
14 Panchusisa
15 Gadeisagar
16 Kansabansa
17 Chudamani
18 Khanianala
19 Chudamani
20 Karajamal
21 Baincha
22 Karanpalli
23 Kaintkhola
24 Dhamra

II. CUTTACK DISTRICT

1 Talchua
2 Tantiapal
3 Jampoo
4 Paradeep
5 Badapadia
6 Nuliasai
7 Balipatna
8 Kajalpatia
9 Kharnasi
10 Kandarpatia
11 Ghanagalia
12 Sandhakud

III. GANJAM DISTRICT

1 Prayagi
2 Kontiogada
3 Gokurkuda
4 Bada Noagaon
5 Sana Noagaon
6 Sana Arjipally
7 Bada Arjipally
8 Bandar
9 Gopalpur-I
10 Gopalpur-II
11 Venkataraypur
12 Dighipur
13 Baxipeta
14 Golabandho
15 Markondi
16 Eksinghi
17 Ramayapatna
18 Kevity Sonapur
19 Anantaraypur
20 Patisonapur

IV. PURI DISTRICT

1 Astarang
2 Sahan-Taila-Gundalaba
3 Konark
4 Ramchandi
5 Pentakota North
6 Pentakota South
7 Puri North (Alimolasahi)
8 Puri South (Gaudaladasahi)
9 Arkhakuda
10 Kiri Bahi
11 Manikapatna
12 Sihandi

* The centres are north to south.