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Marine Small-Scale Fisheries of Orissa: A General Description

BAY OF BENGAL PROGRAMME

MARINE SMALL-SCALE FISHERIES OF ORISSA, INDIA A GENERAL DESCRIPTION

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This document attempts a brief and factual presentation of data and baseline information on the main features of the small-scale marine fisheries of Orissa, India.

It could serve as an introduction to the subject, leading to deeper studies of particular aspects; as a source of general information; or more particularly, as a background document for use in discussions on **the** planning and programming of development assistance.

The paper has been prepared by Mr. U. Tietze, Extension Training Officer of the small-scale fisheries project of the Bay of Bengal Programme, in cooperation with the Directorate of Fisheries, Orissa. It revises and updates a document issued in June 1977 by the FAO/UNDP project RAS/74/031, "Development of small-scale fisheries in South-West Asia."

The BOBP's small-scale fisheries project began in 1979 from Madras. It is executed by the FAO (Food and Agriculture Organisation of the United Nations) and funded by SIDA (Swedish International Development Authority). It covers five countries bordering the Bay of Bengal — Bangladesh; India, Malaysia, Sri Lanka and Thailand. Its main aims are to develop, demonstrate and promote appropriate technologies and methodologies to improve the conditions of small-scale fisherfolk and the supply of fish from the small-scale sector in the five countries.

The document is a working paper and has not been officially cleared by the Government concerned or the FAO.

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1. INTRODUCTION

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

It is in many respects, including fisheries, one of the least developed states in the country. This is also reflected in the scarcity of statistical data about the state.

Orissa, with a geographical area of 155,842 km^2 accounts for 4.7% of the geographical area of India. For administrative purposes, the state is divided into 13 districts of which four are coastal. The coastal districts are Balasore, Cuttack, Puri and Ganjam. These have a coastline 480 km in length, 8% of the coastline of India.

The continental shelf up to 200 m depth covers an area of 25,000 km^2 which is 4.5% of the total area of the Indian continental shelf. In the northern part of Orissa the continental shelf extends up to 120 km and in the southern part upto 40 km.

The marine fisheries sector has been showing a steady and slow expansion in terms of number of mechanized and non-mechanized boats, ice plants, freezing plants etc., and also in terms of total catch up to 1979. From 1979 onwards, however, the total catch has been more or less stagnating/declining after reaching a peak of 51,808 tons (CMFRI). The total marine catch for 1981 is estimated at 35,655 tons according to CMFRI, amounting to 2.6% of India's total marine landings and to 8.8% of the marine landings of the east coast states.

According to a census conducted by the Department of Fisheries and the Bay of Bengal Programme in 1982/83 there are 30,050 artisanal marine fishermen in Orissa who earn their living wholly or partially from artioanal marine fishing. No figures are available on the number of fishermen working on mechanized boats.

Motorization of fishing craft commenced in 1956. At present there are 729 mechanized craft in Orissa and 7156 non-mechanized craft, according to the techno-demographic census conducted by BOBP in 1983 and the departmental figures, respectively. Fifty-six per cent of the non-mechanised craft are kattumarams.

With the almost total replacement of cotton twine by synthetic twine (except in the small mesh gillnets of south Orissa), nets made on a cottage industry scale are being replaced **by** factory-made nets.

Many fishing villages are isolated and lack infrastructure facilities. The standard of housing is generally very low, a condition further aggravated by frequent cyclones.

Assuming an unsatisfied demand for fish, as well as marine resources which are unexploited or slightly exploited, the government plans to increase fish landings to 120,000 tons by the end of the 7th Five-Year Plan in 1988/89, **by** expansion of the fishing fleet as well as **by** an increase in its potential range **by** means of fleet improvement and diversification, provision of improved landing. storage, processing and transport facilities and wider marketing infrastructure.

Note: *A* 'lakh' ***is equal to 100,000 or 0.7 million.***

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2. FISHERY RESOURCES

Orissa has a moderate climate consisting of three seasons -summer from March to May, rainy season from June to September, which may extend to November, and a winter season from December to February. There are two monsoons, the active south-west monsoon during June-September and the weak north-east monsoon in November. The south-west monsoon contributes 90% of the annual rainfall, which averages about 148 cm, and the north-east monsoon 10%. Orissa's coastal area is cyclone prone, and is worst affected by cyclones and floods during the south-west monsoon. Cyclones may also occur in May in the inter-monsoonal period.

Two major currents -as elsewhere in the Bay of Bengal along the east coast of India -prevail throughout the year: a north-easterly current flows during the period January to July and a south-westerly current flows during the period August to December.

The catch per hour record provided by the Exploratory Fisheries Project (EFP) of the Government of India, using vessels of 17.5 m with the same horse power and gear from different bases, gives an indication of the abundance of demersal fish in the coastal areas of various zones upto a depth of 58 m. Compared with 76.6 kg/hr and 97.5 kg/hr for Andhra Pradesh and Tamil Nadu, respectively, the figure off the Orissa coast was 153.1 kg/hr. The figures are based on average values for five years between 1976-77 and 1980-81 and the differences are significant.

The demersal fisheries potential (exploitable fish stock) in the continental shelf of Orissa has been estimated at 100,000 to 120,000 tonnes of fish. Of the total, 30,000 tons are expected within the 10-fathoms zone, another 30,000 tons between 10 and 40 fathoms and the balance 60,000 tons between 40 and 100 fathoms.[1] These are approximate estimates but they indicate that the demersal resources are probably largely underexploited. The pelagic resources are not yet quantified, as also the resources of the deeper area of the shelf. In 1981 the EFP used larger vessels to fish in depths beyond 70 m. The catch in some areas was as high as 399.564 kg/hr which indicates a high potential.

3. FISHING FLEET

The distribution of marine craft and gear in Orissa is related to differences in the marine ecology of south and north Orissa. South Orissa, i.e., Ganjam, Puri and the southern part of Cuttack district, has a narrow continental shelf with open sandy beaches while north Orissa, i.e., central and northern Cuttack district and Balasore, is characterised by an extended continental shelf, tidal areas and extensive river deltas. The main fisheries in south Orissa are sardines, anchovies, mackerels and prawns, while hilsa and pomfret play a more important role in the north. These differences account for differences In the types of craft and gear between the north and the south.

3.1 Fishing craft

In Ganjam, Puri and partly in Cuttack district, log rafts — kattumarams and barboats -are operated from the open beach; displacement craft, e.g. navas, migrate only seasonally from Andhra Pradesh. In north Orissa displacement craft such as Salti, Dhingy, Danga, Patia, Botali, Chhoat and motorized gillnetters are operated, almost exclusively, in most cases, from creeks and rivers.

The most common craft north of Hansua in Cuttack district are the Danga and the Dhingy and Patia. Other types include the Salti, Chhoat, and the Sabado boat.

1 Indian Institute of Foreign Trade.

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Patias, Dangas and Dhingies are made of sal wood (Shores robusta), have a nearly vertical stem and stern and a full midship section. They are relatively seaworthy. Patia and Dangas are clinker built while Dhingies are carvel built. The names Patia and Danga are sometimes used synonymously. Their lengths range from 6 m to 9 m. They operate mainly from August/September to March/April, though occasional trips are made in Balasore district even in June and July if the weather is favourable.

The Salti boat,;, also made of sal wood, have more rounded bilges with extended and raised ends, the lengths ranging from 7 m to 10 m. These boats are less seaworthy, being used only in calm weather.

The Chhoat, a carvel built boat with raised stem and slightly overhanging stern, has an average length of 10.4 m. These boats are also constructed of sal wood. They are used mostly in north Balasore and are comparatively seaworthy.

On the coastline further south, i.e., south Cuttack, Puri and Ganjam districts, log raft or kattumaram operate from the beach. They are locally known as Teppa. Other boats operating in the south are the barboat and the Nava.

The kattumarams range in length from 4.2 m to 8.5 m. They are made of three or four, sometimes five logs. The two-section, four-logged Teppa are boat kattumarams and have to be handled by three to four men, whereas the smaller ones are operated by only two. The solid logs are the only source of buoyancy; wood of low density such as *Albizzia stipulata* or *Drithryna* sp. is preferred.

The barboat, locally known as Padhua, is made from mango planks *(Mangifera indica), without* frames; lengths range from 7 to 8 m. The craft is mainly used for beach seining.

Nava are plank-built boats from Andhra Pradesh operated during the fair season for fishing -mainly with driftnets up to 1200 m long.

All the craft, with the exception of the Nava, are built locally with simple tools. They have been developed over the centuries to suit local requirements and conditions.

All the traditional craft mentioned above are driven by sail, oars or paddles and their range of operation is limited to a coastal belt up to a depth of 15 to 20 fathoms. Some crafts using gillnets, in the north, and Navas using gillnets in the south, usually operate overnight, leaving for the fishing grounds in the evening and returning the next morning. The others undertake day trips only, leaving early in the morning and landing the same afternoon.

While the total number of fishing craft in Puri and Ganjam amounts to 4247, Balasore and Cuttack districts have 2992 fishing boats. The district-wise distribution of marine fishing craft according to the techno-demographic census of 1983 conducted by the Orissa Fisheries Department and the BOBP is given in Appendix 3.1.

The number of mechanized boats is increasing from south to north. While in the southernmost district only two departmental vessels are stationed, 398 motorized boats are operated in the northernmost district, mainly by private parties (see Appendix 3.1).

The mechanized fleet of Balasore district consists predominantly of gillnetters using 4.5" mesh size dirftnets for hilsa, pomfret and other species while the mechanized boats of Cuttack district are exclusively trawlers which fish for prawns.

The economics of mechanized and non-mechanized fishing boats are shown in Appendices 3.3, 3.4 and 3.5.

3.2 Fishing gear

The type of fishing gear operated reflects again the environmental conditions. In the case of gillnets, small and medium mesh sizes, aiming primarily at sardines, anchovies, mackerels, prawns are operated in the south. Medium and large mesh sizes meant mainly for hilsa and pomfret are used in the north. Apart from gillnets, the typical gears of the north, with its tidal

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areas, are set bagnets, tidal wall nets and encircling gillnets. Typical gears of the south are boat seines and lift nets besides the gillnets mentioned above.[1]

The main gears used by Patias, Dangas and Dhingies are polyamide or polyethylene pelagic driftnet; of 95 mm to 120 mm stretched mesh size, 600 to 1,000 m in length.

Driftnets similar to those used by Patias, Dangas and Dhingies and shore seines are mostly **used by the Salti boats.**

The fishing gears used **by** the Chhoats are driftnets and shore seines as well as encircling nets, the latter having an average 62 mm mesh size.

The main gears used front kattumarams are nylon bottom and surface driftnets of 55 mm to 62 mm stretched mesh size, measuring up to 400 m. Cotton boat seines and smaller meshed cotton driftnets of 20 to 40 mm stretched mesh size for sardines and anchovies are also used.

In all, 13,136 traditional fishing gears are operated in Orissa, of which 10,332 are surface or bottom driftnets. The districtwise distribution of fishing gears according to the 1983 techno-demographic census is given in Appendix 3.2.

Though them are no figures available for gears operated by mechanized boats, it can be concluded from their number that about 400 bottom board trawl nets and about 500 units of 4.5" mesh size gillnets, each unit about 2,500 m long, are in operation.

4. INFRASTRUCTURE AND SERVICE FACILITIES

The vast majority of mechanized and non-mechanized fishing craft are landed or berthed, either on open beaches, as is the case in south Orissa, or on the banks of rivers, as is the case in Balasore and Cuttack districts.

Except for a small harbour with a jetty and slipway in Dhamra and a jetty in Chandipur (of which the latter became silted soon after completion and is not in use at present), no facilities arc available at the landing centres.

The important river mouths in the Baiasore and Cuttack districts of Orissa which serve as landing centres for mechanized as well as traditional fishing craft are those of Mahanadi (Paradeep), Devi (Astarang), Dhamra (Dhamra), Gomei (Chudamani), Panchapara (Kasafal), Burhabalang (Chandipur) and Subarnarekha (Kirtania).

A list of landing centres used by mechanized boats is given in Appendix 4.1. Important landing centres used by traditional craft are Gopalpur-on-Sea, Gokharahurda, Aryapalli, Markondi and Sonapur/Pattisonapur in Ganjam district; Puri, Konark (Chandrabhaga Noliasahi) and Astrang in Puri district; Talchua, Rajnagar, Garkhyang Nolia/ Sahi/Pardeep in Cuttack district and Adhuan, Chudamani, Avana, Tulapada, Jambhirai, Krushnagar, etc., in Balasore district. There arc 63 landing sites used by traditional fishing craft.

While the major landing centres are connected by all-weather roads, many small landing centres suffer from poor communications, particularly in Balasore and Cuttack districts. In some cases the lack of an adequate and sufficient supply of drinking water is also a problem.

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1 A detailed description of technical dimensions, mode of operation etc., **of** all major gears and craft is given in BOBP/WP/24: "Traditional marine fishing craft and gear of Orissa", by P. Mohapatra.

The economics of major gears are found in "Manual-Inclusion of small-scale marine fisheries in short-term and term lending at coastal bank branches in Orissa," BOBP, Madras, 1983.

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Small workshops are available at centres regularly used by mechanized boats. A few boat building yards undertake construction and major repairs. Their locations and capacities for constructing mechanized boats are given in Appendix 4.4. All of them use wood for construction. Except for one yard (Orissa Boat Builders, Mondapada) which is government-aided, the boat-yards are private sector concerns. Traditional craft are usually constructed and repaired by local carpenters. However, some of the boat building yards also construct traditional craft to be supplied to fishermen under government schemes such as the Integrated Rural Development Programme.

In places with road access and sufficient landings of fish/prawns, there are private sector ice-making plants and freezing plants, close to the landing centres. The locations and capacities of ice-making and freezing plants are given in Appendices 4. 2 and 4.3.

There are two net-making plants in Orissa with a total capacity of 43 tonnes.

5. PRODUCTION

The total marine catch in I981 amounted to 35,655 tons, which is about 5,000 tons less than the catch in I980 and lags far behind the record catch of 51,808 tons in 1979.

Appendix 5.1 shows Orissa's marine production figures from 1976 to 1981. In the absence of catch and effort data for commcn craft/gear combinations and other more specific information, no conclusions can be drawn in regard to the causes of the fluctuating trends in the catch.

The contribution of the mechanized sector to the marine production (54%) is slightly higher than that of the non-mechanized sector (46%). Table 5.1 shows the species composition of landings as between mechanized and non-mechanized fishing craft in 1981.

Table 5.1

Species composition of landings of mechanized and non-mechanized fishing craft during 1981 (Source: CMFRI)

(tonne)

Name of fish	Mechanized			Non-mechanized	Grand total
	Trawlers	Others	Total		
Oil sardine	—			—	—
Mackerel	—	—	—	823	823
Bombay duck	12	—	I 2	61	73
Sciaenids	1629	48	1677	456	2133
Perches	62	—	62	60	122
Pomfrets	174	2308	2482	1203	3685
Tunnies	9	—	9	241	250
Penaeid prawns	1188	—	1188	140	1328
Non-penaeid prawns	53	—	53	2	55
Others	2895	10798	I3693	I3493	27186
Total	6022	13154	19176	I6479	35655

Apart from 'others', pomfrets, sciaenids and prawns contributed the largest shares, i.e. 13, 9 and 6 per cent, respectively, of the catch of mechanized craft, and pornfrets, mackerel and, sciaenids with 7, 5 and 3%, respectively, of the catch of non-mechanized craft.

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6. HANDLING AND PROCESSING

Most of the fishing boats usually undertake only one-day (or one-night) trips. If boats stay out longer, as is the case with encircling net operations in Balasore district, carrier boats transport the catch to the landing centres daily.

Mechanized craft as well as traditional hulled boats sometimes carry ice on board, to preserve valuable species such as hilsa. Kattumarams, which are log rafts and, therefore, not water tight, use seawater in a natural way for keeping the catch in a cool condition.

The catch is usually unloaded at open beaches or river banks. The Department of Fisheries, Orissa has estimated that 71% of the catch is marketed fresh, 22% dried and salted and 7% frozen.

The fish which is marketed fresh is either retailed locally by headload or cycle vendors or transported to more distant market places by cycle, lorry and railway. In the latter case the fish is packed with ice in baskets which are then covered with leaves and gunny bags.

Fish which cannot be sold due to low demand, non-availability of transport facilities or because it is not in fresh condition when landed, is dried. Depending on the species, drying without salt, dry salting or wet salting is resorted to. There are also certain species which are generally preferred by consumers in dried form, e.g. ribbon fish, white bait, silver belly and catfish. The last two species in dried form are also used as poultry feed and as fertilizer for coconut trees.

Another marine product which is usually dried is shark fins. Fish drying and curing is done all along the coastline as a cottage industry.

The species processed in freezing plants consist almost exclusively of prawns. Before being sent to the freezing plants, the prawns are deheaded and packed in ice at the landing centre.

7. DISTRIBUTION AND MARKETING

The Department of Fisheries estimates that out of the total fish production in Orissa only half is consumed in the state itself while the other half is marketed in Calcutta with its higher purchasing power and almost insatiable demand due *to* its large population and high propensity for consumption of fish on the part of the majority of its population.

As compared to the average annual *per* caput fish consumption in India which is estimated at 3 kg, Orissa's average consumption is estimated to be only one kg *per* caput. No demand-supply survey has been yet carried out in Orissa, but it can be assumed that there is an unsatisfied demand for low-cost fish protein in the state.

Exportable products such as prawns and shark fins are usually collected by agents of middlemen who buy them at pre-fixed rates and who advance loans to fishermen in order to ensure a steady supply of prawns on favourable terms. These middlemen sell the prawns to freezing plants and the shark fins to exporters at a good profit.

in the case of fish which is marketed fresh, headloa,d or cycle retailers mainly market cheap varieties of fish locally, selling them from door to door or in village markets and small towns.

Agents of wholesale dealers or bigger retail traders buy fish and send it by cycle rickshaw, lorry and train'to bigger wholesale markets (e.g. Cuttack, Berhampur), retail markets, or directly to Calcutta.

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In south Orissa, particularly in areas where there is good road communication, fish is sold usually in the form of a small auction. Immediately on arrival of a boat, interested buyers gather and negotiations start. The wife of the boat owner/operator usually plays an important role in the transaction. Fisherwomen, too, frequently retail fish.

In north Orissa, women do not play an active role in selling or retailing fish.

Particularly in villages with poor road communication, in temporary camps where fishermen stay away from their homes and families for the duration of the fishing season, or in the case of encircling gillnet operations where fishermen stay for weeks out in the seas, fish is bought at low pre-fixed rates by middlemen.

Operators of curing/drying yards sometimes depend for marketing on middlemen, who advance money to buy fish, salt, etc., and later on, buy the dried product at unfavourable pre-fixed rates.

8. EXPORT AND IMPORT

Frozen prawns are exclusively exported to Japan. Prawn exports have remained more or less constant since 1978. In 1982/83 they were of the order of 2300 tonne valued at Rs. 177 million. Appendix 8.1 shows the exports from 1978/79 to 1982/83. In 1981, Orissa contributed 3.64% of India's marine product exports showing an increase of 0.7% as compared to 1980. With regard to realization per unit[1] Paradeep harbour occupied the fourth position in 1980 and the fifth position in 1981.

Apart from the estimate that half of the marine fish production of Orissa is sold in Calcutta and the fact that part of the dried fish sold in the tribal districts of Orissa is imported from Tamil Nadu and Andhra Pradesh, no information is available about quantity, value and type of marine products imported from or exported to other Indian states.

9. COASTAL AQUACULTURE

About 16.500.00 ha of brackishwaters have been surveyed out of which 14,000.00 ha have been found suitable for brackishwater prawn and fish culture (details are given in Appnedix 9.1). At present 240.00 ha are under prawn culture. Of the area with potential for brackishwater culture only 6.5% is private land, the balance being owned by the government. About a third of the potential area is plain land which requires comparatively little investment for development while the other two-thirds is swampy, uneven land with mangrove forests located in the inter-tidal zones, which would require higher investment for development.

Seeds of *Penaeus monodon* and *Penaeus indicus* are available in Orissa throughout the year. The peak periods are from June to July and from December to January. It is estimated that about 130 million prawn seeds are available annually from natural resources. A hatchery which is still in an experimental stage has been established by the Department of Fisheries at Paradeep.

Prawn culture in ponds is being presently carried ovt by some private operators in a traditional way. Ponds are cleaned and stocked with fry and feed is given but there is no regular exchange of water. No production figures are available for the ponds.

Recently, cage culture of prawns has been taken up by the Fisheries Department in Chilka Lake and pond culture with regular exchange of water has been taken up by private operators in Balasore and Ganjam districts within the framework of IRDP and DRI schemes, prepared by the Fisheries Department through its brackishwater development agencies. The economics of

1 Value per quantity of exported marine products (Rs. per ton).

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the schemes are given in Appendices 9.2 and 9.3. The first scheme is meant for flat land while the second scheme is meant for uneven, swampy land covered with mangrove in respect of which more money has to be invested for site clearing and for earthworks.

Government land which is suitable for prawn culture has been reserved with the revenue authorities so that it cannot be leased for any other purpose except prawn culture. It is planned to lease out the land to entrepreneurs for a period of 15 years.

The fisheries department has set up brackishwater development agencies in the coastal districts, to extend culture technology. The main emphasis is on training and motivating landless labourers small and marginal farmers who are to be financed under ERRP[1], IRDP[2] or DRI[3] schemes. To a smaller extent, the agencies also intend to involve bigger farmers who are able to mobilise bank finance on their own.

10. SOCIO-ECONOMICS

According to a census conducted by the Fisheries Depattmenr and BOBP in 1982/83 the total number of artisanal marine fisherfolk households in Orissa state is 16,886. District-wise analysis of the fishermen families shows that the largest number of fisherfolk families live in Balasore district (55%), the second largest in Ganjam district (24%), followed by Puri (11%) and Cuttack districts (10%). Appendix 10.1 shows the district-wise distribution of fisherfolk population in Orissa. Appendix 10.2 shows the population density.

In the two southern districts of Ganjam and Puri as well as in the southern part of Cuttack district, the marine fisherfolk are mainly Telugu for whom marine fishing is the traditional caste occupation. In the northern part of Cuttack district and in Balasore district are found Oriya and Bengali fisherfolk who belong to a variety of castes, many of which are traditionally non-fisherfolk castes.

In the southern districts, a particular caste generally dominates a fishing hamlet e.g. Jalari and Vodabalija. In the northern districts these conditions do not prevail as various non-traditional fishetfolk are also involved in marine fishing, and fishetfolk settlements are frequently part of larger agricultural villages.

In the north, traditional fisherfolk castes (both marine and estuarine) are Kaibartta and Gokha while members of such castes as Tanti Kumar, Barik, Radhi, Mahesh, Gauda, Teli, Khandayat and Rajbhansi with traditional caste occupations such as agriculturist, blacksmith, barber, milkman, etc., are also involved in fishing.

Caste panchayats govern both the social and the economic aspects of life in fishing villages Fisherfolk villages in the south are governed by a caste panchayat because a village consists usually of members of only one caste.

These caste panchayats are traditional associations in which membership is hereditary. The number of members varies from 6 to 15. It supervises caste behaviour through social control on the basis of the caste norms and customs. Breaches of communal laws, marriage disputes and family problems and other intra-village social problems are brought to the caste panchayat for settlement. The caste panchayat also adjudicates on the division of property, collects money for festivals, settles disputes between net owners and labourers and also has the right to ban fishing on particular occasions.

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1 ERRP - Economic Rehabilitation of Rural Poor

2 IRDP — Integrated Rural Development Programme

3 DRI — Differential Rates of Interest

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In the northern districts like Balasore, where several castes in a village participate in fishing, social activities of each caste are controlled by a caste association while economic activities are controlled by another informal association -the village panchayat.

Apart from these informal institutions there is the gram panchayat, a democratic institution at the block level. It comprises elected representatives from different villages which are divided into wards. It can provide infrastructure facilities, loans, etc.

While leadership in caste panchayats is hereditary, influential and well-to-do or educated members of caste panchayats try to obtain leadership of gram panchayats and cooperative societies. This sometimes brings about an overlap of the functions of traditional, informal and formal associations and also leads to friction and conflict.

In both the north and the south, the fisherfolk are divided into different economic groups based on the ownership of fishing assets-those who own several nets and boats (big owners), those who own one boat and one or two nets and those without any net or boat In the southern districts most households possess either nets or boats. In the northern districts the ownership pattern differs with particular castes having boats and others possessing nets and supplying labour. Table 10.2 is based on the BOBP techno-demographic census of 1983 and shows the ownership patterns with regard to craft and gear for the four coastal districts.

Table 10.1

Districtwise distribution of assets

District	Ganjam	Puri	Cuttack	Balasore
{a) ***Ownership pattern with regard to boats:***				
Percentage of households with no boat	37%	54%	49%	81%
Percentage of households with one boat/boat share	36%	26%	36%	17%
Percentage of households with two and more boats	24%	20%	15%	1%
Total	97%	100%	100%	99%
(b) ***Ownership pattern with regard to gear:***				
Percentage of households with no gear	37%	52%	35%	18%
Percentage of households with one gear/gear share	16%	9%	43%	60%
Percentage of households with **two** gears/gear shares	10%	9%	4%	17%
Percentage of households with three and more gear shares	35%	29%	18%	4%
Total	98%	99%	100%	99%

In the two southern districts the percentage of those who do not own any boat roughly equals the percentage of those who do not own any net. This pattern suggests that on the one hand there is a group of labourers who do not own any assets while on the other hand **boats as well** as nets are owned by the same households.

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The figures for Balasore district look completely different. Even though 81% own one or several **nets** or pieces of net, only 17% of the households own a boat and one per cent, two or more boats. Many of the boats are owned by non-fisherfolk. The ownership pattern with regard to nets shows **a** widespread ownership of small assets such as one net or net piece/share. The reason for this phenomenon is that in Balasore a crew member has to contribute a net piece in order to get a share of the catch. If he cannot provide a net piece he gets a fixed wage per fishing day which is much more unfavourable than a share.

The system in Ganjam and **Puri** is completely different because there are separate boat, net and labour shares. This is clearly reflected in the prevailing ownership pattern.

The larger portion of non-owning labourers in Puri district could be due to operational aspects, because larger kattumarams are operated there which require a bigger crew.

Cuttack district shows a pattern which is similar to Puri and Ganjam.

While the **men** are involved in fishing, the **women** in the southern districts are involved in marketing of fish, especially elderly women. Some also make nets. In north Orissa a few poor women are employed by commercial firms for net making.

In the **south, male children** are inducted into fishing and net making at the age of 6 to 8 years, whereas, in the north, initiation into fishing takes place only at 15 years. Female children in the south learn drying and selling of fish while girls in the north do not.

Indebtedness is a general phenomenon among fisherfolk. The fisherfolk incur debts at two levels: debts connected with fishing and debts connected with social expenditures and consumption. Loans related to fishing are taken to buy boats, nets and accessories or for repairing these as well as to give advances to labourers. Marketing debts are incurred by small hawkers who procure fish on credit and return the credit after disposing off the fish. This kind **of** credit can be obtained through auctioners of fish or through wholesalers who distribute fish to hawkers on credit, **In** addition to these debts, debts are incurred for important social occasions like festivals, weddings, funerals, for medical expenses, for house construction and for consumption, particularly during off season.

A socio-cultural survey conducted by BOBP in 1982/83 in four villages in south Orissa and in six villages in north Orissa analysed, ***inter*** alia, the fisherfolks' perception of the future of their trade as well as their perception of nature. The data were separately analysed for south and north.

In south Orissa the largest group (43%) held the view that the present situation with regard to catch, prices, etc., will deteriorate. The second largest group (31%) expressed the view that the present situation will continue or even improve, while 19% were indifferent. However, there were wide differences between different economic strata. Among owners of several boats and nets the optimistic group dominated, among labourers there was almost a balance and among owners of one boat and/or one net, pessimistic answers prevailed.

Table 10.2

Perception of future of trade vs. economic status in south Orissa

Economic stratum	Cognitive pattern	Optimistic/ present situation will continue	Pessi- mistic	Indifferent	No answer	Total
Labourers' group		10 (36%)	12 (43%)	6 (21%)	—	28 (100%)
One boat and one net owners' group		18 (134%)	5 (60%)	3 (17%)	(11%)	30 (100%)
Several boats and several net owners' group		13 (46%)	3 (257%)	(185%)	(11%)	28 (100%)
Total		(3%)	(4337%)	16 (19%)	6 (7%)	86 (100%)

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The reason for the differences between the economic strata might be that big owners while employing a substantial part of the labourers, operate a diversified se? of fishing craft and gear, and are more flexible in exploiting the marine resources compared to an owner of only one particular type of craft and gear who might be badly affected already by the failure of a fishing season for one particular species.

In north Orissa the largest group among the fisherfolk interviewed also held a pessimistic view. Another notable aspect was that those for whom fishing was a traditional caste occupation **held** a clearer view towards the future of their trade than non-traditional fisherfolk, from whom a large number of indifferent responses were received.

Table 10.3

Perception of future of trade vs. traditional caste occupation in north Orissa

	Traditional fisherfolk (n =71)		Non-traditional fisherfolk (n=55)	
1. Optimistic: (hopeful, bright, hopes for children)	25	35%	6	11%
2. Pessimistic (not bright at all, fish is decreasing, not bright for children)	40	**56%**	**17**	31%
3. Indifferent	6	9%	32	58%
Total	71	100%	69	**100%**

The pessimistic attitude of the fisherfolk may be a reflection of the stagnation/decline of marine resources accessible to artisanal fisherfolk due to increase in numbers of the latter and improved technology competition from mechanized fishing boats.

According to the same survey, perceptions of nature (reasons for good and poor catch, changes in weather, etc.) are strongly influenced by superstitions and religious beliefs such as performance/ non-performance of rituals, etc.

According to the BOBP techno-demographic census the following situation prevails in the four coastal districts in regard to village infrastructure.

In Ganjam district, a general feature common to the entire district is the widespread absence of clinics, primary health centres, hospitals, community health workers or any other modern health facilities within a reasonable distance from the fishing villages.

Other common features are the widespread lack of electricity and the lack of functioning tube wells, so that drinking water is usuallytaken from open wells which are exposed to contamination.

Primary schools are generally within the reach of traditional fishing villages but only a few secondary schools are situated within reach of fishing villages.

With the exception of some smaller settlements within the municipal area of Puri town, infrastructural facilities such as tube wells or other supply systems to guarantee clean, non-saline drinking water supply throughout the whole year, secondary schools, primary health centres or clinics to provide basic medical care, motorable roads as well as hygienic houses and electricity are lacking in the majority of the traditional fishing villages in Puri district.

Problems in Cuttack district are the lack of communication, the lack of health facilities, the lack of electricity and to a certain extent the lack of secondary schools.

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In Balasore district the lack of modern health facilities within a reachable distance from marine fishing villages seems to be the major problem. At present primary health centres are the only significant institutions; their number is, however, far too small and locations too far away to play an effective role with regard to preventive and curative health care in fishing villages. Lack of motorable roads providing access to fishing villages is another problem.

A considerable number of marine fishing villages do not havs access to primary schools and secondary education is rarely available for children from marine fishing villages. Drinking water supply seems on the whole satisfactory, although there are still a few villages which obtain their drinking water from ponds and rivers. Housing conditions are better in Balasore district than in the other district; of Orissa.

11. FISHERIES ADMINISTRATION AND INSTITUTIONS

11.1 Fisheries administration

At the state level a cabinet minister is responsible for fisheries. He is assisted by a Secretary to Government who is the administrative head of the Department of Forestry and Fisheries. The administrative set-up of fisheries at national and state levels is shown in Appendix 11.1.

The Directorate of Fisheries is responsible for the development of fisheries in the state. It is headed by the Director of Fisheries and is located in Cuttack. The organizational chart of the directorate is shown in Appendix 11.2.

At the headquarters, an Additional Director, two Joint Directors, a Senior Research Officer (assisted by a Research Officer and Superintendent of Fisheries), three Deputy Directors (plan, marketing, extension services) as well as an Executive Engineer (assisted by two assistant engineers) are posted. At the administrative level there are a Deputy Registrar of Cooperative Societies and his assistant, two Accounts Officers (budget and audit) an Establishment Officer, Assistant Legal Officer, Superintendents, three Assistant Directors of Fisheries, Store Officer, Statistical Officer, Project Officers and Personal Assistants to the Director of Fisheries.

The regional set-up in the field comprises three different sectors : inland, marine and brackish-water fisheries.

On the inland side, a Deputy Director each is in charge of the northern, central and southern zones. The Deputy Director of the northern zone is posted in Sambalpur. He is assisted by **two** superintendents of fisheries. Under him five regional assistant directors of fisheries are posted who are again assisted by extension officers, fisheries demonstrators and other staff. There are also three chief executive officers of Fish Farmer Development Agencies, an Assistant Engineer and an Assistant Registrar of Cooperative Societies. A similar set-up is found in the central zone (Cuttack) and in the southern zone (Berhampur). In regard **to** marine fisheries, a Deputy Director is in charge of the northern part (Balasore District), while another Deputy Director is in charge **of the** three southern districts (Cuttack, Puri, Ganjam). The Deputy Director, Marine/North is assisted by an Assistant Director and three Project Officers whose duties are concerned with cooperative societies and operating mechanized fishing vessels. The Deputy Director, Marine/ South is assisted by two Assistant Directors (one for Ganjam district, one for Cuttack district) and one Project Officer. In order to develop artisanal marine fisheries, 15 Extension Centres manned by one Extension Officer, one Fisheries Demonstrator and one Assistant each have been established, out of which six are situated in Balasore District and nine in the southern zone. Their **locations are** shown in **Appendix 11.3.**

The brackishwater division consists of two Brackishwater Development Agencies, one in Puri district and the other in Balasore district with a chief executive officer in the rank of an Assistant Director **in** charge of each. At the headquarters level, an **Assistant Director of Fisheries is posted** under the Deputy Director, Brackishwater, who is in overall charge **of brackishwater development.**

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The total plan expenditure in 1982/83 under the 6th Five-Year Plan was Rs. 17.991 million, which does not include non-plan expenditure and central government contributions.

11.2 Research and training institutes

There are five research and training institutes in Orissa. They are iisted in Appendix 11.4. Three are sponsored by the Indian Council of Agricultural Research, one by the Directorate of Fisheries and one by the FAO Regional Network of Aquaculture Centres in Asia. One institute works in the field of marine fisheries, one in the field of brackishwater culture and three in the field of freshwater fish culture.

12. INDUSTRY ORGANIZATIONS

12.1 Fisheries corporations

The Orissa Fisheries Development Corporation, after having been non-operational for many years, has been closed down by the Government. A new agency. the Orissa Maritime and Chilka Area Development Corporation has been set up.

At present the Corporation is running a freezing plant and a diesel outlet at Paradeep. For the future, it plans to take up offshore fishing and brackishwater aquaculture.

12.2 Fisheries cooperatives

Twenty-nine primary fishermen cooperative societies are functioning *out* of which the vast majority is located in and around the Chilka lake. The societies for marine fisherfolk have mainly served the purpose of introducing mechanized fishing boats to traditional fishermen. Appendix 12.1 gives details about these societies.

The role of primary cooperative societies has on the whole, so far, been limited to serving as a channel for loans and subsidies to fisherfolk. The subsidy provided to members of cooperative societies by cooperative banks is 33% of the capital investment.

13. GOVERNMENT POLICY AND DEVELOPMENT PLANS

In order to deveiop marine fishing, the present 6th Five-Year Plan emphasizes the construction of harbour facilities, jetties, communication and introduction of more mechanized trawlers and gillnetters through, existing cooperative societies, About Rs 18.2 m and Rs. 5.4 m, respectively, are the agreed plan outlays. Another Rs. 450,000 have been allocated for assistance to public sector ice plants and cold storage.

Appendices 13.1 and 13.2 give details of the outlay and expenditure under the Sixth Five-Year Plan.

Resides the promotion of mechanized fishing through cooperatives and development of landing sites, provision has also been made for artisanal marine fisheries. About Rs. 1.7 m has been already spent or is proposed to be spent for extension services to artisanal marine fisherfolk until the end of the 6th plan period. Rs. 1.3 m is provided for further expansion of primary fisheries cooperative societies and another Rs. 0.5 m for financial assistance to traditional fishermen.

The marine extension service implements central government schemes such as ERRP, DRI and IRDP for marine fisherfolk under the categories of landless labourers and small and marginal farmers, to supply them with fishing equipment, Other central government fisheries schemes such as provision of landing platforms to traditional fishing villages and life insurance for fisher-folk are implemented in addition to state government schemes for social welfare/cyclone reiief,

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etc. In cooperation with BOBP, UNICEF, the Education Department and nationalised banks, extension programmes have been taken up in the fields of fisheries credit, non-formal primary education, fishing craft and gear.

The 7th Five-Year Plan aims at raising the marine fish production to 120,000 tons by introducing 20 deep sea trawlers (23 m) and 240 off-shore fishing vessels (15 m) in order to explore virgin fishing grounds further off-shore.

Details of the proposed capital outlay for the 7th Plan are given in Appendix 13.3.

In regard to the fishing fleet, it is not proposed to introduce any more vessels of the same type as the existing mechanized gillnetters and trawlers. Instead, the motorization of 200 displacement type country boats and the introduction of 200 mechanized beach landing crafts from 27 marine centres is planned.

The construction of three new fishing harbours (Paradeep, Astrang, Gopalpur-on-Sea) and six new jetties (Krushnagar, Kasafal, Chudamani, Adhuan in Balasore district, and Rajnagar, Talchua in Cuttack district) and 15 fish landing platforms at landing centres of non-mechanized boats are proposed.

Approach roads to fish landing centres and villages, constructing 10 additional public sector freezing plants with 50 tonne freezing capacity and 1000 tonne frozen storage capacity, creating additional private sector ice-making (50 tonne) and cold storage capacity (100 tonne), a 20-tonne fish meal plant and three two-tonne capacity dry fish plants for the public sector, are the other infrastructural facilities planned.

Assistance to fisherfolk in the form of extension service, credit facilities, housing, insurance and expanded training and the intensification of fisheries research and conservation/surveillance are other important components proposed for the Seventh Five-Year Plan.

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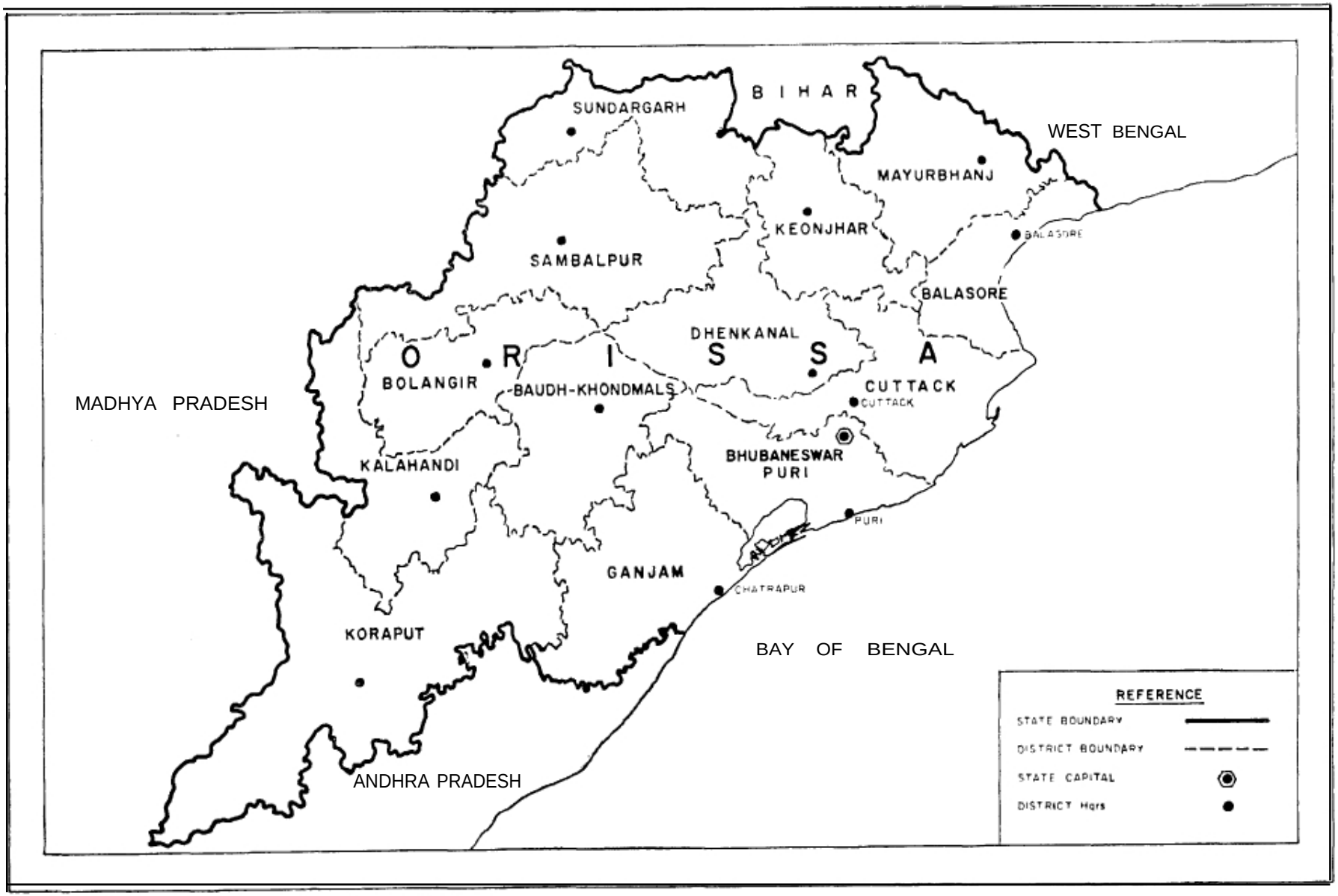
Appendix 1.1: ADMINISTRATIVE MAP OF ORISSA



Appendix 1.2

STATE DATA

			India*
1. Size:	Area	155,842 km^2	(4.7%)
	Districts	13	
	Coastline	480 km	(8%)
	Continental shelf	25,000 km^2	(6%)
2. *Population.*	Total	26.3 million	(3.84%)
	Urban	11.8%	N A
	Rural	88.2%	N A
	Density per km^2	169	221
	Growth rate (1981)	19.72%	24.75%
	Birth rate (1979) per thousand	33	33.7
	Rural	N A	33.6
	Urban	N A	35.3
	Death rate per thousand (1978)	14	27.6
	Rural	N A	13.9
	Urban	N A	8.2
	Infant mortality per thousand (1980) :	143	114
	Rural	150	124
	Urban	62	65
	Life expectancy		
	Male	N A	50.5 (1982)
	Female	N A	49.0
3. Education:	Literacy rate (1981)		
	Total	34.12%	36.17%
	Males	46.90%	46.74%
	Females	21.11%	24.88%

Number of scholars in primary, secondary and high schools (1978-79).

Sex	At primary school level	At secondary school level	At high school level
Males	1,611,396	347,158	195,592
Females	1,000,602	153,888	68,492
Total . .	2,611,998	501,046	264,084

4. *Health:*	Population perdoctor (allopathic)	N A
	Population per hospital bed	N A
5. Nutrition:	Caloric intake as % of requirement (21,000 Cal/day)	N A
	Per capita protein intake (60 g/day)	N A

* Figures in this column give either state share (%) of all-India, or figures for India as a whole.

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6. Employment:

Employment by different categories as % of total population

Category	Percentage of total population
1. Cultivators	15.43
2. Agricultural labourers	9.08
3. Workers in household industry	1.13
4. Other services	7.18
Total main workers	32.82

7. Net (State) Product (1978/79)

NNP at constant 1970/71 prices (Rs. million)	443,280
NNP at current (1980-81) prices (Rs. million)	104,210
NNP per capita at constant 1970/71 price (Rs.)	501.33

8. Trade:

Exports : Products exported from the State of Orissa to other States — Lime and lime-stone, iron and steel bars, manganese ore, timber, cement, hides and rice. Minerals, iron and chrome are exported to other countries.

Imports: Products imported to the State of Orissa -coal and coke, machinery, oil, kerosene, wheat, sugar and textiles. Petroleum products are imported from other countries.

9. General Consumer Price Index number for agricultural labourers.

(Base year 1960-61 =100)

	1975-76	1976-77	1977-78	1978-79
Orissa	433	379	388	384
All-India	345	324	349	340

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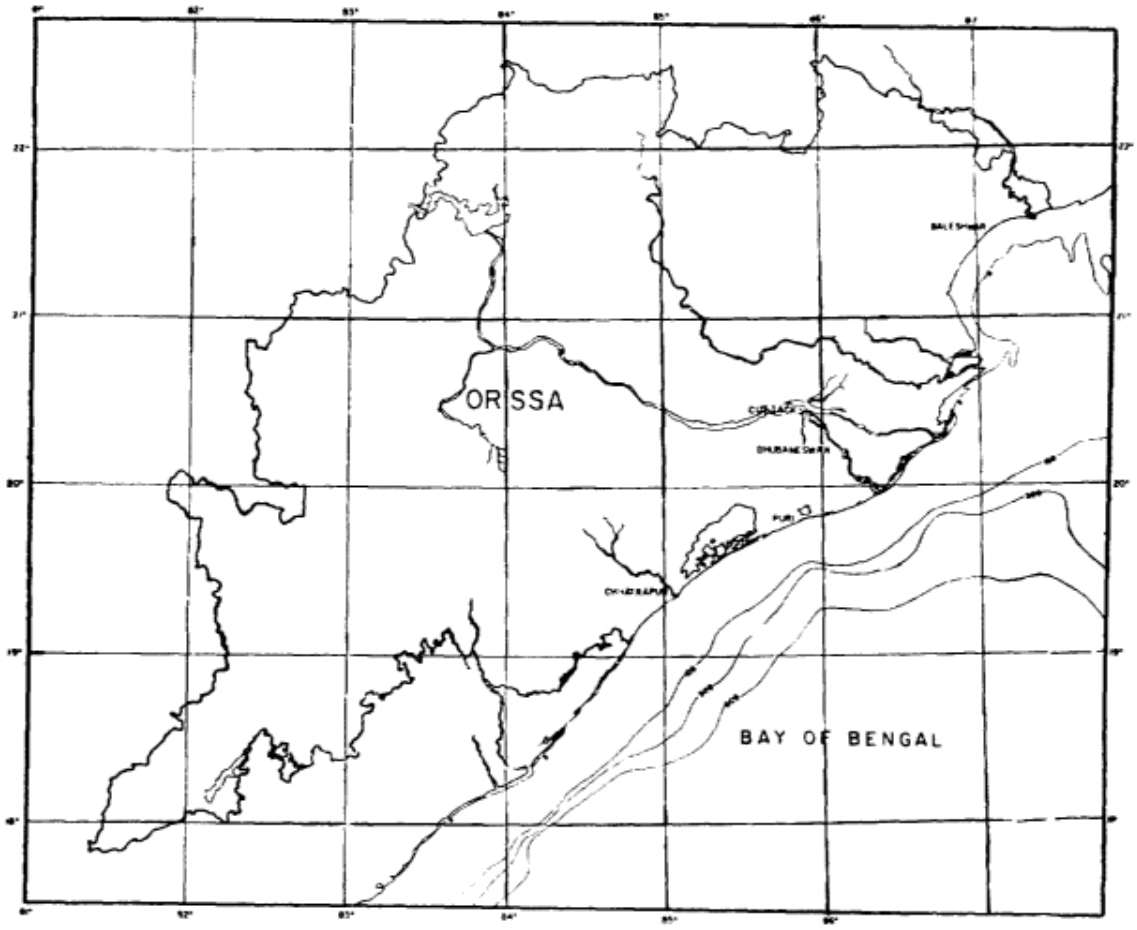
Appendix 2.1

CONFIGURATION OF CONTINENTAL SHELF OFF ORISSA



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Appendix 3.1

DISTRICTWISE DISTRIBUTION OF MARINE FISHING CRAFT 1983

Type of craft	Districts				
	Ganjam	Puri	Cuttack	Balasore	Total
(a) ***Mechanized:***					
Trawlers	2	70	203	120	395
Gillnetters	—	—	—	278	27%
Total	2	70	203	398	673
(b) ***Non-mechanized:***					
Kattumaram	272%	1108	141		3977
Bar boat	231	42	23		296
Salti				87	87
Dhingy/Danga			862	757	1619
Patia/Botali				787	787
Chhoat			5	154	159
Nava		138	93		231
Total	2959	1288	1134	1795	7156

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Appendix 3.2

DISTRICTWISE DISTRIBUTION OF ARTISANAL MARINE FISHING GEAR USED BY NON-MECHANIZED CRAFT, 1983

Type of gear[1]	Districts				
	Ganjam	Puri	Cuttack	Balasore	Total
Small mesh gillnets (2-4 cm) : Katlala, Kavala, Kokuli, etc. (in operational units)	2168	294	74		2536
Medium mesh gillnets (5-6 cm) : Jagawala, Kilumala, Nyallala, Behendi etc. (in operational units)	2186	1041	466	1159	4852
Large mesh gillnets (10 cm) : Phasi, Pedsillivala			7	2854	2861
Very large mesh gillnets (15-20 cm) : Nakuda, Bhekti (in operational units)			63	10	73
Total no. of drift/bottom gillnets (in operational units)	4354	1335	610	4023	10322
Wallnets : Malo, Bedha				424	424
Setbag nets : Bohundi, Dhai				705	705
Beachseines, shoreseines : Bado, Sarini, etc.	235	67	39	291	632
Encircling gillnets: Jangap, Khia badia			35	120	155
Boatseines : Irgali	580	190	26		796
Liftnets : Marala	102				102
Total no. of gears (in operational units)	5271	1592	710	5563	13136

[1]The technical dimensions of the fishing gear mentioned in this table are described by P. Mohapatra in BOBP/WP/24, "Traditional Craft and Gear of Orissa."

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Appendix 3.3

ECONOMICS OF 32' WOODEN MECHANISED FISHING BOATS (TRAWLER-CUM-GILLNETTER)

	RS.
1. CAPITAL COST	
A. ***Boat:***	
Cost of hull complete with mast, boom, gallows, made of seasoned Ainoo wood, (C.I.F.T.) design including engine installation and taxes	70,000
Cost of 60-65 B.H.P. water cooled marine diesel engine with 3 : 1 gear complete with accessories including taxes and delivery charges ..	80,000
Cost of twin drum trawl winch with power take off clutch galvanised steel wire rope 400 m Rs. 5000+Rs. 4000 + Rs. 2400	***11,400***
	161,400
B. ***Fishing Gears and Equipment:***	
Cost of trawl net complete with handling and framing with sinkers chain floats at the rate of Rs. 2,500 each net for 2 sets	5,000
Cost of a 3,000 ft. gillnet	20,000
Otter bsard, one pair Rs. 900	900
Navigational/life saving and fire fighting equipment	4,720
Boat equipment such as water drum, G.I. bucket, cooker, utensils, torchlight, lantern, first aid box, monofilament rope, etc. ..	4,980
	35,600
C. Working Capital:	
Port dues, insurance and initial cost of fuel etc.	2,000
Total Capital Cost (A+B+C) (Rs. 161,400+Rs. 35,600+Rs. 2,000)	199,000
2. OPERATIONAL EXPENDITURE PER BOAT/YEAR	
Fuel, lubricants for 180 days fishing by trawl net at Rs. 100 per day ..	**18,000**
Wages of 2 skilled and unskilled labourers and remuneration for the owner (ILD, IMF, I-Khalasi, 2-deck)	24,000
Port dues, detention and registration charges at Rs. 200 per month for six months	1,200
	43,200
Insurance at 2.5% of the cost of boat and engine	3,900
Misc. expenditure for loading, unloading, cost of basket, ice, etc.	2,000
Maintenance of boat, engine and nets from second year and onwards (L.S.)	20,000
Total . .	69,100
3. ANNUAL INCOME	
Fishing landing in 100 days=35 M.T. at Rs. 3,000 per tonne (30 M.T. from trawling and 5 M.T. from gillnetting)	105,000
4. GROSS SURPLUS	105,000
	(-) ***69,100***
	35,900

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Appendix 3.4

ECONOMICS OF A NON-MOTORIZED DISPLACEMENT BOAT (DANGA/PATIA)

Specifications	: 30' x 7' x 6', clinker built, salwood.
Life span	: 10 years
Period and area of operation	: All year round, except when the sea is too rough in May/June or July, operated upto 20 km.
Mode of operation/ sharing system	: Used in combination with various gillnets and together with other boats, in combination with encircling nets, wage labour or sharing system where crew members contribute net pieces.

A. CAPITAL COST

	Rs.
Requirement of material :	
— Total wood : 75 c.ft. at Rs. 60 per c.ft. size of planks range from 4" to 1 ft. Likewise 13 planks in each size for chine construction. Further 5 planks for each side for top construction. Total (13 x2)+(5x2)= 36 planks	4,500.00
— Nails (four face) 60 kg at Rs. 8/kg	480.00
— Cotton for caulking at Rs. 15/kg for 6 kg	90.00
— Coal for preservation (1 tin contains 15 kg) at Rs. 80/tin-3	240.00
— Oil for cleaning at Rs. S/kg -total 5 kg	30.00
— Sail cloth 18 ft. x 20 ft.	400.00
— Tarpaulin	400.00
— Iron for anchor, at Rs. 10/kg, 15 kg	150.00
— Nylon rope for anchor, 15 mm; 10 m	110.00
Total expenditure for material	6,400.00
— Making charge of the boat	1 ,000.00
— Miscellaneous expenditure	600.00
Total cost	8,000.00

B. ANNUAL RECURRENT EXPENSES

— Wages for 3 labourers at Rs. 10 per day for 210 fishing days (in addition to labour of owner)	6,300.00
— Repair of boat and sail	800.00
— Hire-charges for nets for 10 months at Rs. 250 per month	2,500.00
Total expenses	9,600.00

C. ANNUAL INCOME AND SURPLUS

— Gross earnings from sales of fish at Rs. 5 per kg, 30 kg per fishing day and 210 fishing days	31,500.00
— Annual recurrent expenses	— 9,600.00
Gross surplus	21,900.00
— Annual depreciation	— 800.00
— Net surplus, divided into	21 ,100.00
Return on labour of applicant (boat owner)	2.100.00
Return on capital	19,000.00

D. ECONOMIC FEASIBILITY (estimated)

-Annual rate of return on investment	238%
— Net value added per Rs. of investment in Rs.	3.43

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Appendix 3.5

ECONOMICS OF A LOG RAFT (Kattumaram)

Specifications	: Log raft, four logs, wood : ***Albizzia stipulata*** Dim. 8.3 m x 1.5 m x 0.5 m, sail triangular 7.5 m x 6.25 m.
Life span	: 5 years
Period and area of operation	: All year round up to 10 km off-shore.
Mode of operation/ sharing system :	: Operated with various types of gillnets, also, with boat seines, hook and line, liftnets. Operated on share basis. In the case of gillnets: 8 shares. 5 shares go to the 3-4 labourers (including owner) 2 shares to the boat and 1 share to the net.

	RS.
A. CAPITAL COST	
— Cost of wood	3,500.00
— Making charges	700.00
— Sail and accessories	800.00
Total cost	5,000.00
B. RECURRENT EXPENDITURE	
— Repair	300.00
C. ANNUAL INCOME AND SURPLUS	
— Earnings : (Out of 8 shares into which the total catch is divided, the owner will get 2 shares for the boat. Furthermore he will get one third out of the 5/8 share for the three crew members if he works as a labourer, i.e., in total his earnings will be $\frac{3.67}{8}$ of the total sales proceeds)	
-Total sales proceeds	
Average catch of prawns during peak period at 5 kg/day for 45 days at Rs. 60/kg	13,500.06
Average catch of other fish for the period of 215 days at 20 kg/day at Rs. 3/kg	12,900.00
Gross earnings	26400.00
— Owner's share (gross earnings) divided into	12.100.00
Boat share	6,600.00
Labourers' share	5,500.00
— Gross earnings	12,100.00
— Annual recurrent costs	— 300.00
— Gross surplus	11.800.00
— Depreciation, annual	— 1,000.00
— Net surplus divided into	10,800.00
Return on labour of owner	5,500.00
Return on investment	5.300.00
D. ECONOMIC FEASIBILITY:	
— Rate of return on investment	106%
— Net value added per unit of investment in Rs.	4.36

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Appendix 4.1

LANDING CENTRES USED BY MECHANIZED BOATS

No	Name/location of landing site	Number and type of vessels	Ownership	Availability of shore facilities such as jetty, slipway
1.	Talsari,Kirtania Balasore district	61 trawlers 2 gillnetters	Cooperative : 23 trawlers & 2 gillnetters Private : 38 trawlers	No
2.	Chudamani, Balasore district	42 gillnetters	All private	No
3.	Kasafal, Balasore district	100 gillnetters	All private	No
4.	Bidaipur, Balasore district	2 gillnetters	All private	No
5.	Chandinipal, Balasore district	7 gillnetters	All private	No
6.	Chandipur, Balasore district	125 gillnetters 40 trawlers	Fish. Dept : 5 gillnetters Coop : 40 gillnetters Private : 80 gillnetters 40 trawlers	Jetty
7.	Dhanara, Balasore district	19 trawlers	Coop: 16 Fisheries Dept: 3	Jetty Slipway
8.	Talchua, Cuttack district	18 trawlers	All private	No
9.	Paradeep, Cuttack district	185 trawlers	Private : 181 Fish. Dept.: 4	No
10.	Astrang, Puri district	70 trawlers	Private : 50 Cooperative : 20	No
11.	Rushikuliya, Ganjam district	2 trawlers	Fisheries Dept.	No

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Appendix 4.2

ICE PLANTS AND COLD STORAGES

District	Ice Plant/Cold Storage	Location	Installed capacity (MT)	Utilized capacity (MT)	Private/ public sector
1	2	3	4	5	6
Ganjam district	***1.*** M/s Balaram Sahoo and Harimohan Sahoo Jena St., Berhampur	Berhampur	5	2	Private
	2. M/s Hind Ice 8 Cold Storage, Gosani Nunagain Berhampur-5	Berhampur	20	8	-do-
	3. M/s Tirupati Ice Factory Keshpur Junction Khallikote Railway Station	Keshpur	10	8	-do-
	4. M/s Kalyana Srinivas Ice Factory At/PO : Parvatipuram Gopalpur-on-sea	Parvatipuram	6	0.5	-do-
Puri district	5. M/s Chilka Lake Ice Factory, Banapur Road Balugaon	Balugaon	22	15	-do-
	6. M/s Bhima Ice Factory Kalupadaghat	Kalupadaghat	15	13	-do-
	7. Govt. Ice Factory Chilka Road, Balugaon	Balugaon	5.5	4.5	Public
	8. M/s Puri Ice Factory Puri	Puri	6	4	Private
	9. M/s Narala Cold Storage & Ice Plant Bhubaneswar	Bhubaneswar	12	8.9	-do-
	10. M/s Laxmisagar Govt. Ice Plant-cum-Cold Storage	Laxmisagar	2	1	Public
	1 I. M/s Jayadurga Ice Et Cold Storage, Jatni	Jatni	3	1	Private
	12. M/s Jayabala Ice Factory, Panasupada, Puri	Puri	20	12	-do-
	13. M/s Orissa Marine Products, Uttarayan Colony Balugaon	Balugaon	6	4	-do-

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District	Ice Plant/Cold Storage	Location	Installed capacity (MT)	Utilized capacity (MT)	Private/ public sector
1	2	3	4	5	6
	14. M/s Jaihind Ice Factory Balugaon	Balugaon	6	1	Private
	15. M/s Nilachala Ice Factory Chakratirtha Road, Puri	Puri	20	12	-do-
	16. M/s Jaihind Ice Factory Chakratirtha Road, Puri	Puri	20	12	- d o -
	17. M/s Puri Marine Products Gopinathpur, Puri	Puri	30	24	- d o -
	18. M/s Bijaya Marine Products, Atharanalapatna Puri	Puri	6	3	-do-
	19. M/s Utkal Marine Gokhara Radangh, Puri	Puri	8	6	- d o -
	20. M/s Jayabala Ice Factory Astaranga	Astaranga	6	5	- d o -
	21. M/s George Maijo Export Pvt. Ltd. Chilka Road, Balugaon	Balugaon	30	15	-do-
	22. M/s Sealords & Seafood Panasapada, Puri	Panasapada	5	4	-do-
	23. M/s. D. K. Marine Products, Puri	Puri	20	10	-do-
	24. M/s Laglace Ice Factory Puri	Puri	6	5	-do-
	25. M/s Jayadurga Ice Factory, Mansinghpur	Mansinghpur Sorana	6	5	-do-
	26. M/s. Sonata Ice Factory Hatabaradihi	Hatabaradihi	6	5	-do-
Cuttack district	27. M/s Bhima Ice Factory Cuttack	Cuttack	50	40	-do-
	28. M/s Satyasai Ice Factory, Paradeep	Paradeep	14	13	-do-
	29. M/s Hemakund Ice Factory, Paradeep	-do-	30	20	-do-
	30. M/s C. I. Foods Ltd. Paradeep	-do-	20	10	-do-
	31. M/s Suryodyog Pvt. Ltd. I.E. Paradeep	-do-	10	6	-do-
	32. M/s Golden Dragon Pvt. Ltd., I.E. Paradeep	-do-	15	10	-do-
	33. M/s Santosh Ice Factory & Cold Storage	Raghunathpur	6	5	-do-

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District	Ice Plant/Cold Storage	Location	Installed capacity (MT)	Utilized capacity (MT)	Private/ public sector
1	2	3	4	5	6
	34. M/s Sardar Brothers Kujanga	Kujanga	25	20	Private
	35. M/s Shakti Ice Factory Nishintakaili	Nischintakaili	3	Nil	-do-
	36. Govt. Ice Plant Majhidiha	Majhidiba	3	Nil	Public
	37. Govt. Flake Ice Plant Paradeep	Paradeep	1	0.5	-do-
Balasore district	38. Draupadi ice Factory Bhadrak	Bhadrak	5	3	Private
	39. M/s Konark Ice Factory Adhuan	Adhuan	6	1	- d o -
	40. M/s Konark Ice Factory Basudevpur	Basudevpur	3	1	- d o -
	41. M/s Pratap Ice Factory Chudamani	Chudamani	6	5.8	-do-
	42. ***Govt.*** Ice Factory Chandbali	Chandbali	2	1	Public
	43. M/s Ayodhya Ice Factory Chandbali	-do-	6	5	Private
	44. M/s Bivaja Ice Factory Dhamara	Dhamara	9	8	- d o -
	45. M/s Lingaraj Ice Factory Soro	Soro	16	12	- d o -
	46. M/s Balasore Ice Factory Akatapur, Balasore	Akatapur	13	6	-do-
	47. M/s Kalinga Ice and Cold Storage, O.T. Road Balasore	Balasore	25	15	-do-
	48. M/s Shree Mahaveer Ice Plant & Cold Storage Sunhal, Balasore	-do-	10	6	- d o -
	49. M/s Mahalaxmi Ice Factory, Aktapur, Balasore	Aktapur	7	6	- d o -
	50. Govt. Ice Factory Chandipur	Balaramgudi	5	2	Public
	51. M/s Orient Ice Factory Balaramgudi	-do-	10	9	Private
	52. M/s Parabati Ice Plant Haldipada Bazaar, Balasore	Balasore	5	4	-do-

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Appendix 4.3

FREEZING PLANTS

Name of the Unit	Location	Freezing capacity (tonne/ day)	Frozen Storage capacity (tonne)	Private/ Public
1	2	3	4	5
1. M/s Puri Marine Products Vinchan Nagar, Puri	Gopinathpur Puri	15	400	Private
2. M/s D. K. Marine Products Kamitipatna, Puri	Puri	2.5	75	-do-
3. M/s Vijay Marine Products Atharanalapatna Gopinathpur Sason, Puri	Gopinathpur Puri	7.5	100	- d o -
4. M/s P & S Pvt. Limited Matimandap Sahi, Puri	Gokhara PO Brahmagiri	2.5	50	- d o -
5. M/s Orissa C.I. Foods Madhupatna, Cuttack	Weder Works Road, Puri	2	50	- d o -
6. M/s Sealands Seafoods Chakrartha Road, Puri	Panasapada Puri	2.5	50	- d o -
7. M/s C. I. Foods Madhupatna, Cuttack	Pathara Belugaon	4	100	- d o -
8. M/s C. I. Foods Pvt. Ltd. I.E. Cuttack	Bhutamundei Paradeep	8	400	- d o -
9. M/s Golden Dragons Sea Foods Factory Pvt. Ltd. I.E. Paradeep Garh	Paradeep	5	100	- d o -
10. M/s Surya Udyog Pvt. Ltd. 313 Kharavela Nagar Bhubaneswar	Paradeep Garh	2.5	100	- d o -
11. M/s Orissa Marine Industries Pvt. Limited 25, Udyan Marg, Bhubaneswar	Balugaon	2.5	50	-do-

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Appendix 4.4

BOATBUILDING YARDS

No.	Name	Location	Capacity No. of Boats/ per year
1.	M/s Marine Engg. Works	Atharbanki P.O. Paradeep Cuttack Dist.	50
2.	M/s Mahanadi Engg. Works	Ranital, Cuttack	25
3.	M/s Kalinga Docking & Engg. Works	Jobra, Cuttack Dist.	25
4.	M/s K. J. Javior & Sons Boat Builders & Enterpriser	Keshpur, Bidyadharpur Cuttack Dist.	25
5.	M/s Agean Boat Builders	14-C Kalpana area	30
6.	M/s Orissa Boat Builders	BBSR-4, Mandapada P.O. Dauladabad (via) Chowdwar, Cuttack Dist.	20
7.	M/s East Coast Engg. Works	Bidyadharpur Cuttack Dist	25
8.	M/s Orissa Docking & Engg. Works	Choumukh, Paradeep Cuttack Dist.	45
9.	M/s Vessels India	Atharbanki, Paradeep Cuttack Dist.	25

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Appendix 5.1

COMPOSITION OF MARINE FISH LANDINGS IN ORISSA DURING 1976 TO 1981 (tonne)1

Sl.No.	Name of Fish	1976	1977	1978	1979	1980	1981
1.	Elasmobranchs	2,974	1,658	3,386	4,331	3,772	3,210
2.	Eels	1		3	2	—	24
3.	Catfishes	1,988	1,035	1,794	1,308	2,198	6,084
4.	*Chirocentrus*	517	752	1,073	1,644	1,460	1,281
5a.	Oil sardine	—	—	—	—	—	—
b.	Lesser sardines	1,657	1,227	2,514	2,687	1,891	4,535
c.	*H/lsa ilisha*	5,477	2,948	7,737	9,969	5,091	2,085
d.	*Other H/lsa*	129	192	848	359	46	353
e.	*Anchoviella*	339	486	1,169	505	270	86
f.	*Thrissocles*	106	197	175	295	333	322
g.	Other clupeoids..	772	778	1,330	1,431	2,576	2,093
6a.	*Harpodonnehereus*	87	86	314	449	378	73
b.	*Saurida&Saurus*	1	5	5	50	189	108
7.	*Hemirhamphus&Belone*	1	—	13	28	46	2
8.	Flying fish	—	—	4	4	17	—
9.	Perches	31	55	173	151	341	124
10.	Red mullets	1	1	2	2	296	102
11.	Polynemids	244	406	1,287	1,491	1,126	566
12.	Sciaenids	333	312	5,198	5,351	2,864	2,133
13.	Ribbon fish	130	174	336	616	928	995
14a.	*Caranx*	147	103	68	326	607	165
b.	*Chorinemus*	237	386	815	716	567	196
c.	*Trachynotus*		—	—	—	—	
d.	Othercarangids..	—	—	—	—		
e.	*Coryphaena*	2	1	—	1	—	
f.	*Elacate*	—	9	3	1	—	
15a.	*Leiognathus*	378	233	256	1,108	704	
b.	*Gazza*	1	—	—	—	3	
16.	*Lactarius*	1	18	12	5	65	49
17.	Pomfrets	10,699	1,018	5,714	10,109	9,072	3,685
18.	Mackerel	425	195	196	306	265	823
19.	Seer fish	940	672	1,059	2,444	1,542	2,540
20.	Tunnies	84	37	609	31	34	250
21.	*Sphyraena*	1	3	4	5	8	9
22.	Mugil	5	—	3	22	1	—
23.	*Bregmaceros*	—	—	—	—	—	
24.	Soles	6	72	103	125	69	47
25a.	Penaeid prawns	688	802	2,599	2,983	1,074	1,328
b.	Non penaeid prawns	TOO	17	12	34	30	55
c.	Lobsters	—	—	—	—	—	3
d.	Other crustaceans	23	6	4	6	359	292
26.	Cephalopods	27	—	4	14	98	57
27.	Miscellaneous	1,271	888	848	2,899	1,055	1,097
	Total	29,823	15,072	39,670	51,808	39,375	35,655

'Source: Central Marine Fisheries Research Institute.

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Appendix 8.1

EXPORT OF FROZEN SHRIMPS TO JAPAN

Year	Quantity exported (tonne)	Value (Rs. million)
1978-79	2179.15	127.9
1979-80	2379.53	120.5
1980-81	2407.00	114.0
1981-82	2840.46	159.8
1982-83	2357.13	177.3

Appendix 9.1

POTENTIAL AREA FOR BRACKISHWATER FISH CULTURE

(in ha)

Sl. No.	Name of the centre	Grand total area surveyed			Grand total area found suitable		
		Govt.	Pvt.	Total	Govt.	Pvt.	Total
1.	Kirtania	635.59	50.34	685.93	344.75	65.73	410.48
2.	Chandipur	293.47	98.40	391.87	807.28	58.13	865.41
3.	Adhuan	796.11	216.19	1012.31	658.03	117.68	775.71
4.	Dhamara	473.91	152.21	626.12	443.05	354.64	797.69
5.	Rajnagar	2198.99	82.25	2281.24	1959.47	82.25	2041.72
6.	Paradeep	3720.74	327.66	4048.40	2952.38	327.66	3280.04
7.	Arakhakuda	4306.84	52.77	4359.61	3800.59	52.77	3853.36
8.	Astaranga	486.44	10.05	496.49	336.84	9.78	346.62
9.	Damodarpur	1313.19	11.77	1324.96	1288.35	11.77	1300.12
10.	Sonapur	811.71	22.79	834.50	725.65	22.79	748.44
	Total	15036.99	1024.43	16061.43	13316.39	1103.20	14.419.59

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Appendix 9.2

UNIT COST OF THE SCHEME (HIGH-COST TECHNOLOGY) FOR BRACKISHWATER FISHERIES DEVELOPMENT

(Area Development Programme/Other Category Farmers and Big Entrepreneurs through Bank Finance) — Prepared by Brackishwater Fisheries Development Agency
Land area : 1.25 ha ; Water area : 1.00 ha (for two beneficiaries)

A. CAPITAL INVESTMENT	RS.
1. Reclamation of brackishwater farm site development and fencing	1 o,ooo.oo
2. Construction of ponds (earthwork & creation of bunds)	1 o,ooo.oo
3. Sluice gate Et feeder channels	11 ,ooo.oo
4. Construction of main channel for inlet Et outlet of tidal water	12,000.00
5. Construction of sheds for watchman	6,450.00
6. Lease Value	550.00
Total	50,000.00

B. OPERATING COST	
1 First Crop:	
(a) Super phosphate @ 250 kg/ha @ Rs. 1.50	375.00
(b) Raw cow dung @ 6250 kg/ha @ Rs. 50/tori	315.00
(c) Lime 250 kg/ha @ Rs. 1.00/kg	250.00
(d) Labour charges 8 transport (lump sum)	250.00
(e) Stocking of prawn & mullet seed (25 mm) 25000/ha @ Rs. 50/ thousand	1,250.00
(f) Feeding fish meal, shrimp powder and groundnut oil cake at 1 : 1 : 1 ratio *ingredient* Total 1,725 kg of seed or 575 kg of each feed ingredient @ Rs. 1.25 per kg	2,156.00
2. *Second Crop:*	
(a) Fertilisation	**Not** necessary
(b) Stocking of prawn & mullet seed at the same rate	1,250.00
(c) Feed at the same rate	2,156.00
	8,002.00
	or say 8,000.00

INCOME	
A. *First Crop:*	
1. Exportable prawn @ 250 kg per ha@ **Rs.** 50/per kg	12,500.00
B. *Second Crop:*	
2. Exportable prawn @ 250 kg per ha @ Rs. 50/per kg	12,500.00
	25,000.00

Gross Income:	
Sale value of prawn from **two** crops	25,000.00
Operation cost for two crops	— 8,000.00
Gross Annual Income	17.000.00

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Appendix 9.3

UNIT COST OF THE SCHEME FOR BRACKISHWATER FISHERIES DEVELOPMENT

(E.R.R.P. Programme/Bank Finance under I.R.D.)
Prepared by Brackishwater Fisheries Development Agency
Land area 1.25 ha — Water area 1 .OO ha (for beneficiaries)

	Rs.
A. CAPITAL INVESTMENT	
1. Earthwork for construction of tank in plain land including hume pipe provision	19.450.00
2. Lease value for 1.25 ha of land	550.00
	20,000.00
8. OPERATIONAL COST	
1. *First Crop:*	
(a) Super phosphate @ 250 kg/ha @ Rs. 1.50/kg.	375.00
(b) Raw Cow dung @ 6250 kg/ha @ Rs. 50/tori	315.00
(c) Lime 250 kg/ha @ Rs. 1.00/kg	250.00
(d) Labour charges Et transport (lump sum)	250.00
(e) Stocking of prawn & mullet seed (25 mm) 25,000/ha @ Rs. 50/ thousand	1,250.00
(f) Feeding fish meal, shrimp powder and ground nut oil cake at 1 : 1 : 1 ratio	
Ingredient	
Total 1,725 kg of feed or 575 kg of each feed ingredient @ Rs. 1.25/kg	2,156.00
2. *Second Crop:*	
(a) Fertilisation	Not necessary
(b) Stocking of prawn & mullet seed at the same rate	1,250.00
(c) Feed at the same rate	2,156.00
	8,002.00
	or say 8,000.00
INCOME	
A. *First Crop:*	
1. Exportable prawn @ 250 kg per ha @ Rs. 50 per kg	12,500.00
B. Second Crop:	
2. Exportable prawn @ 250 kg per ha @ Rs. 50 per kg	12,500.00
	25,000.00
Gross ***income:***	
Sale value of prawn from two crops	25,000.00
Operation cost for two crops	— 8,000.00
Gross Annual income	17,000.00

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Appendix 10.1

DISTRICTWISE DISTRIBUTION OF FISHERFOLK POPULATION IN ORISSA

District	Ganjam	Puri	Cuttack	Balasore
1. Number of marine fishing villages	29	16	7	184
2. Number of marine fisherfolk households-major time & minor time				
(a) No. of households	4132	1808	1686	9260
Average no. of fisherfolk households per village	142.5	113	240.9	50.3
(b) Average size of household	5.4	6.9	6.1	6.2
(c) No. of major time fishing households	3831 (93%)	1602 (88%)	1460 (87%)	7527 (81%)
Average no. of major time fishing households per village	132.1	101.1	208.6	40.9
(d) No. of minor time fishing households	177 (4%)	181 (10%)	178 (11%)	1657 (18%)
Average no. of minor time fishing households per village	6.1	11.3	25.4	9
(e) No. of single old people households	124 (3%)	25 (2%)	48 (2%)	76 (1%)
Average no. per village	4.3	1.4	6.9	0.5
3. Number of active fishermen	5880	3800	3202	17168

Appendix 10.2

POPULATION DENSITY

District	% of coastline	% of fisherfolk households	% of active fishermen
Balasore	27% (130 km)	55	57
Cuttack	28% (135 km)	10	11
Puri	32% (155 km)	11	13
Ganjam	13%(60km)	24	20

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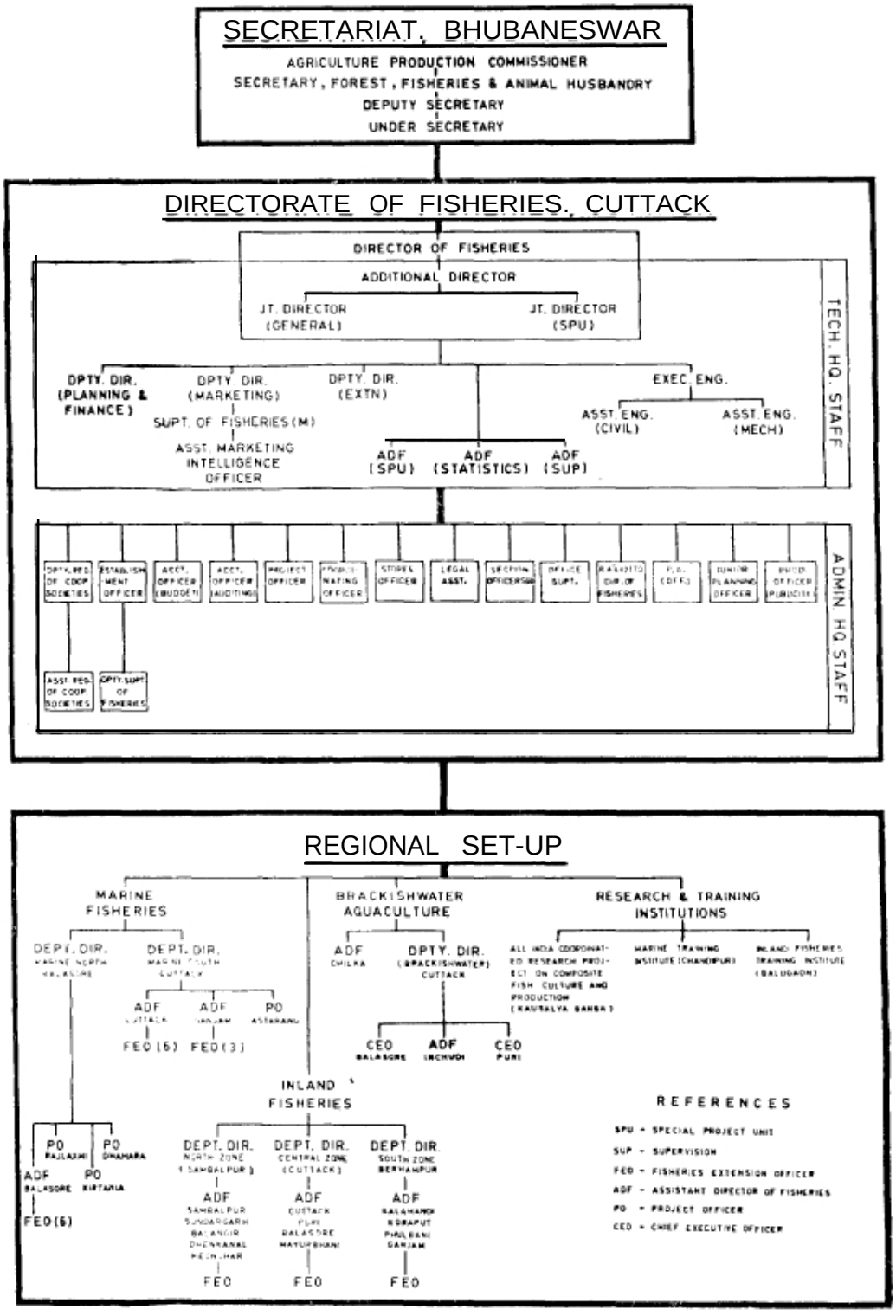
Appendix 11.2 ORGANIZATIONAL CHART OF THE DEPARTMENT OF FISHERIES ORISSA



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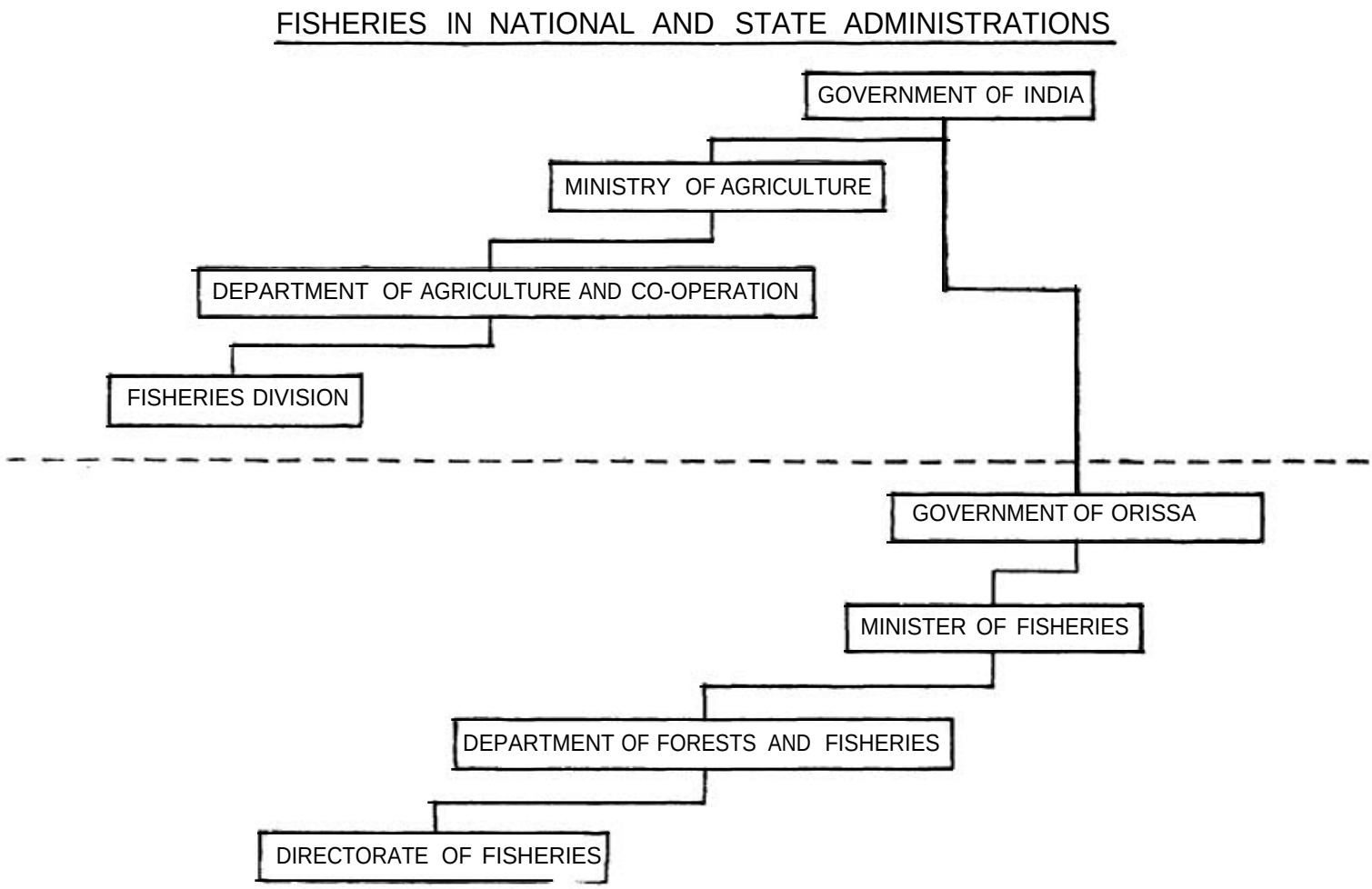
Appendix 11.1: FISHERIES IN NATIONAL AND STATE ADMINISTRATIONS



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Appendix 11.3

LOCATION OF MARINE FISHERIES EXTENSION CENTRES

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Appendix 11.4

FISHERIES RESEARCH AND TRAINING INSTITUTES IN ORISSA

Name	Sponsoring institution	Location	Field/type of research/ training	Date of establish-ment
1. All-India Coordinated Research Project on Brackishwater Fish Farming at Keshpur	Indian Council of Agricultural Research	Keshpur, Ganjam	Research on brackishwater prawn culture	1977-78
2. All-India Coordinated Research Project on Composite Fish Culture & Production at Kausalya Ganga	-do-	Kausalya Ganga	Research to develop formulation of species combination	1976-77
3. Marine Training Institute at Chandipur	Dept. of Fisheries Orissa	Chandipur, Balasore	Training on deckhand & launch driving	
4. Inland Fisheries Training Institute at Balugaon	-do-	Balugaon, Puri	Fish culture	1980-81
5. Regional Lead Centre/Aquaculture Research and Training Centre (ARTC)	FAO Regional network of Aquaculture Centres in Asia (NACA)	Dhauli, Bhubaneswar	Monoculture and polyculture of carps in ponds, undrainable ponds, reservoirs	1977

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Appendix 12.1

PRIMARY FISHERMEN COOPERATIVE SOCIETIES

Sl. No.	Name of the P.F.C.S.	Location	Date of establish-ment	No. of members	Amount disbursed	
					Loan	Subsidy
1	2	3	4	5	6	7
1.	Gangadevi M.P.F.C.S.	At: Nuagah PO : Astaranga Dist. : Puri	2-8-77	671	3,350,000	1 ,1 77,000
2 .	Maa-Dhamarai M.P.F.C.S.	At/PO: Dhamara Dist. : Balasore	1-9-77	260	3,145,000	1,159,000
3.	Kirtania M.P.F.C.S.	At/PO : Chandaneswar Dist. : Balasore	19-2-74	392	1,949,277	1,169,650
4.	Rajlaxmi M.P.F.C.S.	At: Chandipur PO Dist. : Balasore	21-2-72	280	3,551,640	1,51 4,300
5.	Baliapal Panchayat	At/PO : Baliapal Dist. : Balasore	8-12-64	701	85,173	35,560 subsidy 5,000 managerial subsidy
Societies in and around Chilka Lake						
6.	Uttar Chilka P.F.C.S	At/PO: Sorana Dist. : Puri	17-6-63	922	524,900 225,650 750,550	
7.	Satapada P.F.C.S.	At/PO: Balugaon Dist. : Puri	6-1-61	254	**463,900** 157,000 620,900	
8.	Sorana Chilka P.F.C.S.	At/PO: Sorana Dist. : Puri	17-6-63	737	987,000	326,927
9.	Utkala Kamala P.F.C.S.	At/PO: Balugaon Dist. : Puri	23-3-78	33	100,000	50,000
10.	Taradevi P.F.C.S.	At/PO: Kumandalpatra Dist. : Puri	11-11-71	84	160,000	80,000
11.	Badabahaniasahi P.F.C.S.	At: Balipalapur PO: Bhusandpur Dist. : Puri	4-I -78	282	300,000	150,000
12.	Padmadevi P.F.C.S.	At: Jagannathpur PO : Bhusandpur Dist. : Puri	26-7-78	94	100,000 392,000 **492,000**	50,000

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Sl. No.	Name of the P.F.C.S.	Location	Date of establish-ment	No. of members	Amount disbursed	
					Loan	Subsidy
1	2	3	4	5	6	7
13.	Kalupada P.F.C.S	At : Kalupada PO : Jaripada Dist. : Puri	18-8-59	66	148,000	
14.	Jagulai P.F.C.S.	At: Kalupada PO : Jaripada Dist. : Puri	18-8-59	100	157,500	59,500
15.	Ambika P.F.C.S.	At/PO : Balugaon Dist. : Puri	18-8-59	429	157,000	
16.	Laxmi P.F.C.S.	At/PO : Nairi Dist. : Puri	25-8-59	189	292,200	
17.	Jagamaya P.F.C.S.	At: Karimpur PO : Brahmagiri Dist. : Puri	18-8-59	187	444,500	222,000
18.	Bagdevi P.F.C.S.	At : Siariagola PO : Panispada Dist. : Puri	9-2-70	99	266,000	133,000
19.	Gangadevi P.F.C.S.	At/PO : Pathara Dist. : Ganjam	21-5-58	241	125,000 375,000 500,000	187,500
20.	Pathara P.F.C.S.	At/PO : Pathara Dist. : Ganjam	28-8-63	505	110,500 441,500 552,000	220,750
21.	Rambha P.F.C.S.	At/PO : Rambha Dist. : Ganjam	31-7-59	358	339,600 876,000 1,21 5,000	438,000
22.	Gajapatinagar P.F.C.S.	At/PO: Gajapatinagar Dist. : Ganjam	31-7-59	318	561,000 480,000 1,041,000	240,000
23.	Chandi P.F.C.S.	At/PO: Balugaon Dist. : Puri	17-6-63	231	364,000	182,000
24.	Bhagabati P.F.C.S.	At/PO : Sorana Dist. : Puri	24-6-63	419	367,500	
25.	Nairi P.F.C.S.	At/PO : Nairi Dist. : Puri	17-6-63	446	490,000	245,000
26.	Mangala P.F.C.S.	At: Barakudi PO : Bhubanpur Dist. : Puri	18-4-60	189	350,000	175,000
27.	Gopinathpur P.F.C.S	At: Gopinathpur PO: Parasapada Dist. : Puri	25-8-59	234	248,000	124,000
28.	Jenamani P.F.C.S.	At/PO : Barkul Dist. : Puri	30-1-76	51	117,500	
29.	Baradi P.F.C.S.	At/PO : Baradi Dist. : Puri	17-6-63	361	652,800	326,400

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Appendix 13.1

SIXTH FIVE-YEAR PLAN

Outlay and Expenditure

(Rs. in lakhs)

Name of the Scheme/Project	Sixth Five Year Plan 1980-85 agreed outlay	1980-81 Actual expenditure	1981-82 Actual expenditure	1982-83 Actual expenditure	1983-84		1984-85	
					Approved outlay	Anticipated expenditure	Proposed outlay	Of which capital contents
1	2	3	4	5	6	7	8	9
FISHERIES								
Direction & Administration								
I. Administration at headquarters	16.00	2.55	2.63	4.75	5.70	5.70	5.83	—
2. Administration at Zonal and District level . .	40.00	7.62	6.72	6.46	8.31	8.31	11.46	
3. Construction of Office and Staff Quarters . .	1.30	1.30	0.13	1.06	0.69	0.69	3.01	3.01
Total . .	57.39	11.47	9.48	12.27	14.70	14.70	20.30	3.01
EXTENSION								
4. (a) Fisheries extension programme	135.00	24.76	23.02	30.58	32.46	32.46	38.38	—
(b) Extension service to traditional Marine fishermen	—	—	2.27	2.73	3.20	3.20	5.12	—
5. Fisheries publicity and fair . . .	14.00	2.42	4.87	2.48	2.71	2.71	3.50	—
Total . .	149.00	27.18	30.16	35.79	38.37	38.37	47.00	—
FISH FARM								
6. Improvement to K. Gang fish farm	***10.00***	7.81	—		—	—	—	—
7. Remodelling of fish farm	30.00	15.37	8.53	6.80	7.05	7.08	6.76	6.76
8. Establishment of brackishwater fish farms at Inchudi	17.00	—	—	4.30	6.37	6.37	3.40	2.00
9. Assistance to brackishwater fish farm . .	2.00		—	—	—	—	—	—
10. Development of Keshpur Fish Farm . . .	10.00	2.41	0.89	—	1.07	1.07	0.40	0.40
I I. Brackishwater Fisheries Development Agency . .	—	—	—	—	11.67	11.67	11.84	4.00
Total . .	69.00	25.59	9.42	11.10	26.19	26.19	22.40	14.16

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HATCHERIES								
12. Establishment of riverine spawn collection centre	5.00	0.99	1.02	1 .oo	0.50	0.25	0.25	—
13. Production of quality spawn by adopting induced breeding technique	21 .oo	3.88	7.32	7.64	5.61	5.61	5.05	0.52
14. Prawn hatchery and prawn farming ..	—	—	—	2.00	—	—		—
Total . .	26.00	4.87	8.34	10.64	6.1 1	6.1 1	5.30	0.52
RESEARCH								
15. Applied Research Organisation . . .,	5.49	0.88	1.02	0.93	1.03	1.03	1.57	—
16. All-India Coordinated Research Project on Composite Culture of Indian Exotic Fishes ..	5.03	0.99	1.04	1.16	1.08	1.08	1:16	—
17. Survey of brackishwater fish farming in Orissa coast	29.60	5.45	6.09	1.13	3.53	3.53	6.53	2.70
18. Survey and investigation of fisheries resources	15.00	2.86	1.94	3.20	3.00	3.00	5.75	—
19. Pilot survey of inland fish catch . ..	—	—	—	—	—	—	1.00	—
Total . .	55.00	10.13	10.09	12.42	8.64	8.64	16.01	2.70
EDUCATION & TRAINING								
20. Training in fisheries	61 .00	14.22	11.45	7.46	9.45	9.45	9.27	3.00
(A) Grant to O.U.A.T. .. .' ..	—	—	1.50	6.50	3.60	3.60	3.60	—
Total . .	61 .OO	14.22	12.95	13.96	13.05	13.05	12.87	3.00

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INLAND FISHERIES								
21. Development of Inland pisciculture under Fish Farmer's Development Agency	229.00	14.00	63.17	33.20	36.50	36.50	46.13	—
22. Construction of approach road to IDA assisted hatchery	0.10	0.10	-	1.53	4.75	4.75	3.00	3.00
23. Share capital to Inland Fish Seed Development Corporation	20.00	10.00	1.00	10.00	7.00	7.00	7.00	—
24. Demonstration of Intensive fish production ..	20.00	3.91	3.82	—	—	—	—	—
25. Development of reservoir fisheries	15.00	2.68	2.26	3.82	3.22	3.22	3.88	0.65
26. Assistance to traditional Inland fishermen and pisciculturist	5.00	0.56	0.92	1.40	1.40	1.40	1.00	—
27. Development of Ansupa Lake	1.00	—	—	—	—	—	—	—
28. Grant to Orissa Fisheries Development Corporation	—	—	0.70	1.00	1.00	1.00	—	—
Total , .	290.10	31.25	71.87	50.95	53.87	53.87	61 .01	3.65
FISHING HARBOUR AND LANDING FACILITIES								
29. Construction of Dhamara Fishing Harbour Project including road communication	7.00	7.00	—	—	—	—	—	—
30. Construction of fishing jetty and slipway at Chandipur ..	2.40	2.40	—	—	—	—	—	—
31. Small landing and berthing facilities (Kasafal] Rambha, Satpada and Chudamani)	10.00	1.37	—	5.02	2.08	2.08	1.00	1 .00
32. Construction of Astarang Fishing Harbour ..	70.00	—	—	0.01	1 .oo	1.00	1.00	1.00
33. Infrastructure facilities to coastal fishing villages	9.00	1.00	3.27	4.38	2.24	2.24	2.45	—
33. (a) Road, community building, water supply to Balitutha Kasafal, Purnabandha, Kankadia, Chudamani and Satpada	28.20	5.76	0.60	6.92	5.00	5.00	1.29	1.29
(b) Road to Astarang Fishing Harbour ::	18.00	6.80	3.44	3.00	4.80	4.80	4.00	4.00
34. Provision of office and staff quarter at Astarang fishing harbour	3.00	0.01	—	—	—	—	—	—
35. Provision of office and staff quarter at Dhamara Fishing Harbour	10.00	—	—	2.00	3.00	3.00	3.63	3.63
36. State share for implementation of NORAD ::	25.00	—	—	2.01	2.23	2.23	3.28	—
37. Maintenance of jetties and platforms ..	—	—	—	0.30	0.01	0.01	0.06	0.06
Total . .	182.60	24.42	7.31	23.64	20.36	20.36	16.71	10.98

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INSHORE FISHERIES								
38. Assistance to the traditional marine fishermen	5.00	0.67	1.00	0.60	1.00	1.00	1.00	—
Total . .	5.00	0.67	1.00	0.60	1.00	1.00	1.00	—
PROCESSING, PRESERVATION AND MARKETING								
39. Expansion of fisheries cooperatives . .	13.00	2.30	2.65	3.06	3.57	3.57	3.86	—
40. Development of ice plant and cold storage . .	4.75	0.78	0.46	1.50	1.00	1.00	1.00	—
Total . .	17.75	3.08	3.10	4.56	4.57	4.57	4.86	—
MECHANIZATION AND IMPROVEMENT OF FISHING CRAFT								
41. Development of marine fisheries in Balasore district under ARDC at Kirtania . .	3.85	0.62	0.72	0.78	0.84	0.84	0.91	—
42. Fishing by mechanized boats by Rajalaxmi FCS under ARDC	3.65	0.52	0.55	0.74	0.71	0.71	0.73	
43. Development of marine fisheries at Astarang under ARDC	22.70	11.37	0.72	0.60	0.60	0.60	0.70	–
44. Development of marine fishing at Dhamara through MAA-Dhamalai FCS under ARDC . .	81.00	10.84	0.56	0.73	0.76	0.76	0.65	—
45. Margin money for acquisition of mechanized boats by private entrepreneurs	1.00	—	—	—	—	—	—	—
46. State share for ARDC Scheme	5.05	1.61	0.29	1.13	—	—	—	—
47. Assistance to cooperative (ARDC) ,, . .	—	—	—	—	1.00	1.00	1.00	—
Total . .	54.25	24.96	2.84	3.98	3.91	3.91	3.99	- -

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OTHERS								
48. Renovation of Palur canal	17.00	—	—	—	7.00	7.00	7.00	7.00
49. Fisheries scheme with N.C.D.C. assistance ..	4.00	—	—	—	1.63	1.63	3.07	—
50. Scheme for accident	—	—	—	—	0.60	0.60	0.35	—
51. Deepening of Magarmukh area in Chilka lake	—	—	—	—	—	—	3.13	3.13
Total ..	21.00	—	—	—	923	9.23	13.55	10.13
Grand Total ..	988.00	177.89	166.56	179.91	200.00	200.00	225.00	45.38
Orissa Maritime Chilka Area Development Corporation	12.00	—	—	—	—	—	—	—
Economic Rehabilitation of Rural Poor	—	22.61	—	—	—	—	—	—
Total ..	1000.00	200.50	166.56	179.91	200.00	200.00	225.00	45.38

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Appendix 13.2

SUMMARY: DRAFT ANNUAL PLANS DURING VI PLAN, 1980-85
Outlay and Expenditure on Development

(Rs. in lakhs)

Head/Sub-head of Development	Code No.	Sixth Five-Year Plan 1980-85 agreed outlay	1980-81 Actual expenditure	1981-82 Actual expenditure	1982-83 Actual expenditure	1983-84		1984-85	
						Approved outlay	Anticipated expenditure	Proposed outlay	Of which Capital contents
1	2	3	4	5	6	7	8	9	10
FISHERIES									
1. Direction and administration ..	108	57.30	11.47	**9.48**	12.27	14.70	14.70	28.30	3.01
2. Extension		149.00	27.18	30.16	35.79	38.37	38.37	47.00	—
3. Fish farm		69.00	25.59	9.42	11.10	26.19	26.19	22.40	14.16
4. Hatcheries		26.00	4.87	8.34	10.64	6.11	6.11	5.30	0.52
5. Research		55.00	10.18	10.09	12.42	8.64	8.64	16.81	2.70
6. Education and training		61 .00	14.22	12.95	13.96	13.05	13.05	12.87	3.00
7. Inland fisheries		290.10	31.25	71.87	50.95	53.87	53.87	61 .01	3.65
8. Fishing harbour and landing facilities..		182.60	24.42	7.31	23.64	20.36	20.36	10.71	10.98
9. In-shore fisheries . , ...		5.00	0.67	1 .oo	0.60	1 .oo	1 .oo	1.00	—
10. Processing, preservation and marketing		17.75	3.08	3.10	4.56	4.57	4.57	4.86	
11. Mechanization and Improvement of fishing craft		54.25	24.96	2.84	3.98	3.91	3.91	3.99	—
12. Others		21.00	—	—	—	9.23	9.23	13.55	10.13
Total . .		**988.00**	**177.89**	166.56	179.91	200.00	200.00	225.00	48.15
1. Orissa Maritime Chilka Area Development Corporation		12.00	—	—	—	—	—	—	—
2. Economic Rehabilitation of Rural Poor..		—	22.61	—	—	—	—	—	—
Grand Total ..		1000.00	200.50	166.56	179.91	200.00	200.00	225.00	48.15

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Appendix 13.3

PROPOSED CAPITAL OUTLAY FOR 7TH FIVE-YEAR PLAN (1984/85 — 1989/90)

	Scheme	Proposed capital outlay (in lakhs)
1.	Construction of fishing harbour including quays, landing platform, slipway and workshop, auction hall, stores, fuel and drinking water and other ancillary facilities at Paradeep, Astarang (with 80 vessels), Gopalpur and Dhamara (expansion)	2,800.00
2.	Construction of fishing jetties including landing platforms, auction hall, fuel and drinking water and other ancilliary facilities at Krushnanagar, Kasafal, Podhuan, Chudamani, Talchua, Rajnagar	65.00
3.	Construction of fish landing platforms with ancilliary facilities at Dagara, Jambhirai,Talapada/Aruhabad, Chandipel, Kajalapatia, Garkujang Noliasahi, Sohona, Chandrabhaga Noliasahi, Puri, Arkhakuda, Gokharakuda, Aryapalli, Markundi, Sonapur, Patisonapur	19.00
4.	Approach road development to fish landing centres and important fishermen villages at Krushnanagar, Dagara, Jambhirai, Kasafel (including connected villages), Chandipur (repairs), Talapada/Aruhabad, Podhuan, Chandnipal, Talchua (other side of river) Rajnagar, Sohana, Chandrabhaga (Noliasahi) Kajalapatia, Arkhakuda, Gokharkuda, Gorkujang (Noliasahi) Markondi (other side of river) Patisonapur, Sonapur	280.00
5.	Cost of motorisation of 200 country fishing crafts at Rs. 0.40 lakhs for Krushnanagar, Kasafal, Chudamani, Jambhirai, Dagara, Podhuan, Talapada/ Aruhabad, Chandnipal, Talchua, Rajnagar	80.00
6.	Cost of 200 mechanised beach crafts at Rs. 0.50 lakhs for Puri,, Sohana, Chandrabhaga (Noliasahi), Kajalpatia, Arkhakuda, Gokharakuda, Garkujang (Noliasahi), Markondi, Gopalpur, Aryapalli, Sonapur, Patisonapur .	100.00
7.	Cost of 240 off-shore fishing vessels at Rs. 15 lakhs for Dhamara, Paradeep, Gopalpur	3,600.00
8.	Cost of 20 deep sea fishing trawlers (at Rs. 100 lakhs) for Paradeep ..	2,000.00
9.	Cost of 10 integrated freezing plants with frozen storeges, ice plants and cold storages at Rs. 50 lakhs each for Paradeep, Gopalpur (Rushikulya), Dhamara	500.00
10.	Cost of a fish meal plant for Paradeep	100.00
11.	Cost of 4 dry fish plants at Rs. 15.00 lakhs each for Paradeep, Gopalpur and Dhamara	60.00
12.	Housing facilities for needy marine fishermen (lump sum)	225.00
13.	Assistance for traditional crafts and gears at Rs. 7,500 each (either for displacement boats in N. Orissa or two-logged catamarans in S. Orissa) . .	225.00
14.	Insurance of marine fishermen at Rs. 12 premium per annum for the districts of Balasore (10,300 fishermen), Cuttack (8600 fishermen) Puri (5,800 fishermen), Ganjam (5,300 fishermen)	3.60

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15. Buildings and equipment for expansion of marine fishermen training with hostel arrangements for training at Paradeep and Chandipur 10.00

16. Buildings and equipment for marine fisheries research including cost of 2 research vessels at Rs. 15 lakhs each .. . ., ***50.00***

17. Buildings and equipment for surveillance including cost of ten speed boats at Rs. 3 lakhs each .. .. ., ***50.00***

18. Buildings and equipment for supervision .. , .. ***20.00***

Source: Master plan for in-shore and off-shore marine fishing development in Orissa.

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