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India  
Appraisal of  
Gujarat Fisheries Project

March 16, 1977

South Asia Projects Department  
Agriculture D Division

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### CURRENCY EQUIVALENTS

US\$1.00	=	Rs 9.00 <sup>1/</sup>
Rs 1.00	=	US\$0.111
Rs 1,000	=	US\$111.111
Rs 1,000,000	=	US\$111,111.111

### WEIGHTS AND MEASURES

Metric System

### ABBREVIATIONS

ARDC	-	Agricultural Refinance and Development Corporation
CCB	-	Central Cooperative Banks
CCC	-	Central Coordinating Committee
CIFT	-	Central Institute of Fishing Technology
CMFRI	-	Central Marine Fisheries Research Institute
EFP	-	Exploratory Fisheries Project
FPCS	-	Fishermen's Primary Cooperative Societies
FTD	-	Fisheries Terminal Division
GDF	-	Gujarat Department of Fisheries
GFCCA	-	Gujarat Fisheries Central Cooperative Association Ltd.
GOG	-	Government of Gujarat
GOI	-	Government of India
GPD	-	Gujarat Ports Directorate
GSCB	-	Gujarat State Cooperative Bank Ltd.
GSLDB	-	Gujarat State Land Development Bank Ltd.
DACFF	-	Department of Agriculture, Cooperatives, Forest, and Fisheries
ICAR	-	Indian Council for Agricultural Research
ICB	-	International Competitive Bidding
MFV	-	Mechanized Fishing Vessels (Trawlers or Gillnetters)
MPEDA	-	Marine Products Export Development Authority
MES	-	Monitoring and Evaluation System
PISFH	-	Pre-Investment Survey of Fishing Harbors
PSC	-	Project Supervision Committee
RBI	-	Reserve Bank of India
SFDA	-	Small Farmers Development Agency

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<sup>1/</sup> Until September 24, 1975, the Rupee was officially valued at a fixed Pound Sterling rate. Since then it has been fixed against a "basket" of currencies. As these currencies are floating, the US Dollar/Rupee exchange rate is subject to change. Conversions in this report have been made at US\$1 to Rs 9.00, which was the short-term average rate prevailing at the time of appraisal, May 1976.

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CHARTS

- |       |   |                                   |
|-------|---|-----------------------------------|
| 16235 | - | 14.8 m (48 ft) Trawler/Gillnetter |
| 16236 | - | 9 m (29 ft) Canoe                 |
| 16634 | - | Fishery Harbor at Mangrol         |
| 16633 | - | Fishery Harbor at Veraval         |

MAP

- |       |   |                          |
|-------|---|--------------------------|
| 12317 | - | India and Gujarat State  |
| 12318 | - | Gujarat Fishing Villages |

## INDIA

### GUJARAT FISHERIES PROJECT

#### SUMMARY AND CONCLUSIONS

i. This report appraises a fisheries project in the State of Gujarat. The project involves a total investment cost of US\$38 million for which the Government of India (GOI) has asked for an IDA Credit of US\$4 million and a Bank loan of US\$14 million under Third Window terms.

#### Objectives

ii. Both GOI and Gujarat Government (GOG) attach high priority to developing marine fisheries in the interests of increasing protein supplies and exports, and of improving employment opportunities in fishing districts. Up to now most of the GOG efforts have gone into sponsoring the use of mechanized fishing vessels (MFV) and the modernization of traditional fishing craft and gear. This drive has been generally successful, but the growth in catching capacity that it has generated is now placing great strain on existing fishing harbors and on marketing channels and facilities. The project described in this report is designed to alleviate these problems in Gujarat by modernizing and expanding the harbors and shore facilities at Mangrol and Veraval. It would complement these efforts by financing an additional expansion in MFV numbers and by furthering the modernization of traditional fishing craft. Importantly the project would include a first, although very modest, program aimed at improving the physical infrastructure in selected fishing villages.

iii. The project would be carried out over five years and would comprise the following principal components:

- (a) improvement of the fishing harbors at Mangrol and Veraval to permit more MFV to use these facilities and to provide better protection against adverse weather;
- (b) improvement of shore facilities and services at Mangrol and Veraval to provide suitable support for the existing fleet and expansions which are expected to occur as a consequence of the project;
- (c) provision of credit to entrepreneurs to establish fish processing, freezing, and ice plants at the two harbors;
- (d) construction and equipping of 270 14.8 m MFV and their sale on credit to fishermen;
- (e) assistance to traditional fisheries by the: (i) provision, on credit, of 350 9m fishing canoes equipped with outboard motors and gear, and of 1,050 outboard motors;

(ii) improvement in the infrastructure serving eight fishing villages; and (iii) improvement in the fish marketing system of these villages;

(f) provision of two net making machines for Gujarat Fisheries Central Cooperative Association Ltd. (GFCCA); and

(g) technical assistance for test fishing, a marketing study, and project implementation.

iv. The project, with the exception of the test fishing operations and the fish marketing study which would be the responsibility of GOI, would be carried out by GOG with refinance for credit operations being provided by the Agricultural Refinance and Development Corporation (ARDC).

v. GOI, in accordance with established policies for development assistance to the State, would make available part of the IDA Credit and Bank loan to GOG to finance: (a) improvement of the fishing harbors and shore facilities and services; and (b) improvement of the infrastructure and marketing system in selected fishing villages. A further part of the Credit would be made available to ARDC for on-lending through participating banks to fishermen, fisheries cooperative societies and private entrepreneurs for fishing vessels and installations, such as ice plants, freezing complexes, and processing plants. Lending to ultimate borrowers through ARDC would be on ARDC standard terms which follow closely current rates for institutional lending throughout India, including lending under on-going projects financed by IDA/Bank.

#### Organization

vi. The leading agency in project organization would be the GOG Department of Agriculture, Cooperatives, Forest and Fisheries (DACFF) in which a Project Supervision Committee (PSC) would be established. PSC would have a full-time secretary who would act as the project coordinator. The Gujarat Ports Directorate (GPD) would be responsible for the construction of the harbor investments and would continue to manage the harbors.

vii. A Fisheries Terminal Division (FTD) would be established under the Commissioner of Fisheries (GOG) to manage the zones allocated to the development of shore facilities and the fisheries terminals at Mangrol and Veraval. FTD would lease land, and in some cases buildings, to private, public and cooperative entities for the establishment of shore facilities to serve the fishing fleets and to process fish. Fish auction facilities at the two harbors would be owned and operated by FTD.

viii. ARDC would be the financing channel for the project credit components for which it would draw up a Project Banking Plan. ARDC, which is well known to Bank Group through its involvement in 26 IDA Credits, is well managed and its finances are satisfactory.

ix. GFCCA would play an important role in the project. It would be the source of supply of most, if not all, of the 14.8 m MFV, arrange for the supply of 9 m canoes for traditional fishermen and assist with fish marketing of Fishermen's Primary Cooperative Societies (FPCS). However, to carry out its responsibilities it requires a large measure of financial rehabilitation and the strengthening of its management. Assurances were given that GOG would assist with the establishment of FPCS, which would play an important role in the project as they would operate the hire purchase type scheme through which canoes and outboard motors would be provided to fishermen under the project.

#### Costs and Financing

x. Total project costs are estimated at US\$38 million equivalent of which about US\$11.5 million (30%) is the estimated foreign exchange component, and about US\$2.4 million are duties and taxes.

#### Project Cost Summary

<u>Project Component</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
Harbour Improvements	8.7	2.5	11.2
Shore Facilities	1.3	1.3	2.6
Vessels	5.2	0.6	5.8
Traditional Fishermen Sub-project	2.0	0.7	2.7
Miscellaneous Supporting Equipment	-	0.1	0.1
Technical Assistance	0.3	2.6	2.9
Contingencies	<u>9.0</u>	<u>3.7</u>	<u>12.7</u>
	<u>26.5</u>	<u>11.5</u>	<u>38.0</u>

xi. The proposed IDA Credit of US\$4 million and Bank loan of US\$14 million would finance about 50% of total project costs net of duties and taxes, including about US\$6.5 million of local currency costs.

#### Procurement

xii. Contracts for one major harbor improvements at Veraval, equipment of shore facilities (ice plants, freezing complexes, etc), dredging equipment, and for the procurement of outboard motors for canoes, would be awarded through international competitive bidding. International competitive bidding would not, however, be suitable for procurement of the smaller harbor improvement at Mangrol, the MFV or their engines. The vessels would be built in Gujarat boat building yards to proven designs and be of locally procured timber. The MFV would be equipped with one of two makes of domestically manufactured engines according to customer preference. Procurement of canoes, which are made in the State of Kerala, and fishing nets and gear which are locally manufactured, also would not be suitable for international competitive bidding. In these cases procurement would follow local competitive bidding procedures acceptable to IDA/Bank.

### Monitoring, Evaluation and Reporting

xiv. A monitoring, evaluation and reporting system would be established under the project and would provide base line and current information on project implementation, its benefits and costs. The system would also be concerned with monitoring exploitation rates in order to identify any possibility of over-fishing.

### Benefits and Justification

xv. The project would make an important contribution to GOI's development efforts to increase fisheries production for domestic consumption and export. Annual incremental output at full development (after project year five) is expected to be about 44,600 ton (including 3,700 tons of shrimp) valued at Rs 72.8 million (US\$8.1 million) at current landing prices.

xvi. The project would create employment for: (i) about 1,900 fishermen on 14.8 m trawlers; (ii) about 1,100 fishermen on canoes financed under the project and (iii) for about 500 persons in shore facilities. About 500 fishermen would benefit from the motorization of their canoes. Existing vessels based on Mangrol and Veraval, which are operated by about 3,000 fishermen, would be able to fish for longer periods because of the harbor improvements. In total, about 7,000 persons would benefit directly from the project. An additional 10,000 people would benefit from the improvement of the infrastructure in their villages. As a consequence of project construction activities about three million mandays of work would be generated by the project in its five year development period.

xvii. Financial returns to project beneficiaries would be satisfactory ranging from 23% to over 55%. The overall economic rate of return for the project is estimated at 24% and the economic returns from individual components from 16% to over 60%.

xviii. Subject to reaching satisfactory agreements and assurances which were obtained at negotiations, the project would be suitable for an IDA Credit of US\$4 million and a Bank loan of US\$14 million under Third Window terms.



INDIA

APPRAISAL OF THE GUJARAT FISHERIES PROJECT

I. INTRODUCTION

1.01 The Government of India (GOI) has asked for an IDA Credit of US\$4 million and a Bank loan of US\$14 million to help finance a fisheries project in the State of Gujarat. GOI attaches high priority to marine fisheries development and to this project which would be the first of its kind in India and the forerunner of similar projects now under preparation in other States.

1.02 The project was prepared by the Government of Gujarat (GOG) with assistance of an FAO/IBRD Cooperative Program Mission which visited India during November/December 1974 and at various times in the period July to December 1975. The Agricultural Refinance and Development Corporation (ARDC) participated in the preparation of the traditional fishermen component of the project.

1.03 This report is based on findings of an appraisal mission, composed of Messrs. R. L. Headworth, E. Chobanian, C. Helman, F. Kada (Bank) and M. Hewitt, J. Marr and P. Mornement (Consultants), that visited India in May 1976.

II. THE MARINE FISHERIES SECTOR<sup>1/</sup>

General

2.01 With total fisheries production in 1975 estimated at 2.4 million tons, of which 1.6 million tons (69%) from marine fisheries, India is a major fish producing country. During the past decade (1966 to 1975) marine catch and marine product exports increased at an average annual rate of about 8% and 13% respectively. The value of marine product exports in 1975/76 was Rs 1,269 million (US\$140 million) or about 3% of the total value of India's exports in that year. India's shrimp catch is the largest in the world and shrimp account for most (about 90% in 1975) of marine product exports. There is a good demand in world markets for India shrimp, and resources are sufficient for a considerable expansion in catch and exports. The main constraints are the shortage of harbor and processing facilities.

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<sup>1/</sup> Background on the economy and the agricultural sector is provided in reports on "Economic Situation and Prospects of India," Report No. 402-IN, May 7, 1974 and Report No. 1073-IN, March 29, 1976.

2.02 Protein supplies in India are estimated at about 88% of requirements, making it one of the most protein deficient areas in the world. Fish is amongst the cheapest sources of animal protein and increased production is one way to rectify this deficiency. Fish consumption in India is increasing. Annual per capita supply of fish in 1975 was estimated at about 4 kg per capita, nearly double the supplies available two decades ago.

2.03 Under the Fifth Five Year Plan (1974-1979) GOI is giving a special boost to the fisheries sector. An outlay of Rs 1,619 million has been planned and annual incremental production targets for marine fisheries averaging about 100,000 tons per annum are envisaged. Similar annual targets have been recommended by the National Commission on Agriculture (1976) for the period 1975-2000. If this is achieved, India's marine fisheries catch would amount to 3.5 million tons by the year 2000. These targets are realistic given that FAO estimates that India can harvest at least 2.4 million tons annually from its continental shelf without overfishing and that, in addition, there are substantial deep sea resources that so far are largely unexploited (see Annex 1). The latter is due both to lack of experience and to lack of supporting infrastructure for deep sea fishing. GOI has recently ordered a number of 23 m steel hull mechanized fishing vessels for the purpose of carrying out experimental deep sea fishing beyond the continental shelf. In addition to the excellent resource base, catching capacity is steadily rising and there has been a rapid expansion over the last decade of fishing by small mechanized fishing vessel (MFV). The number of MFV has increased from about 3,000 to 11,000 over the last ten years, and productivity per fisherman from about three tons to over five tons per year. The MFV generally are made of wood, range between 10-15 m in length and are fitted with inboard engines of 90 hp. Crewed by 4 to 8 men, most MFV make only day trips. Typically, the boats operate as trawlers when shrimp are plentiful, and convert to gillnetters when table fish are abundant. In contrast to the expansion in MFV numbers, the development of fishing harbors and shore facilities has not kept pace with the expansion of the MFV fleet, the increasing size of MFV, and introduction of deep sea fishing vessels, and, there is considerable congestion in most fishing harbors as well as unnecessary spillage of the catch. More detailed information on the marine fisheries sector is contained in Annex 1.

#### Marine Fisheries in Gujarat

2.04 In India, as a whole, commercial fishermen and companies employing MFV account for about 40% of total catch, with traditional fishermen catching the remainder. The same proportion exists in Gujarat which commands about 100,000 km<sup>2</sup> of India's continental shelf of 415,000 km<sup>2</sup> but only harvests about 11% (190,000 tons annually) of India's marine catch.

2.05 Commercial fishermen in Gujarat use the same general type of vessel described in para 2.03, but specifically a 14.8 m trawler-cum-gillnetter is preferred. It is estimated that the number of MFV operating from Gujarat bases has increased from about 400 in 1965 to 1,300 in 1975, and this trend is expected to continue. The average 14.8 trawler-cum-gillnetter catches about 120 tons annually, of which 10% is shrimp (50% of which usually is exportable). The principal commercial varieties of fish are Bombay duck, dhoma, clupeids,

and sharks. In addition, smaller quantities of high price and export varieties such as pomfret, seer fish, thread fin, Indian shad, giant herring, squid, cuttle fish, red snapper, lobster, perch, eels, and sea bream are landed. MFV land fish at four partially protected fishing harbors: Veraval and Mangrol, which would be the subject of project actions, and Porbandar, and Okha, as well as at fifteen other landing sites equipped with jetties or walls. Fishing stops during the monsoon due to the bad weather and in this period of unemployment, fishermen are frequently forced to borrow heavily.

### Traditional Marine Fisheries

2.06 Traditional fishing methods and craft have evolved over centuries. Craft include dugout canoes, plank boats and catamarans, all of which can operate from unprotected beaches. Modernization has extended to the use of nylon nets and improved gear, which are now used on most craft, and to an increasing use of outboard motors. Most fish is landed on the beach in good condition where it is sold to fish traders, occasionally by auction. About 10 to 15% of the catch is salted, mostly for sale in inland Indian markets, lower quality fish is smoked, and the remainder iced and marketed.

2.07 Catch rates are subject to weather conditions especially since non-motorized vessels cannot be launched from beaches when the surf is strong. During these periods, fishermen often resort to obtaining advances from fish traders against future catches.

2.08 There are about 200 traditional fishing villages in Gujarat with an estimated population of about 200,000. Fishing villages are usually isolated and often lack potable water, access roads, primary schools, medical facilities and communications. Unemployment in these villages is high and it is difficult for fishermen to obtain credit to purchase canoes. GOG is attempting to upgrade standards of living in these areas by improvement of the physical and social infrastructure and through making credit available for canoes and outboard motors. Demand for the latter is high because of the substantial increases in catch made possible by motorization. The proposed project would contain elements aimed at assisting traditional fishermen.

### Fishing Harbors

2.09 Under the project described in this report two of Gujarat's four protected harbors would be improved. The situation at these two harbors is summarized below and described in more detail in Annex 2.

2.10 Mangrol: Mangrol is exclusively a fishing harbor. Harbor facilities consist of a beach, partially protected by a 150 m breakwater, which is used by about 170 canoes, about 50 of which are motorized, and a basin used by 95 MFV; shallowness of the basin limits MFV to 13 m. There are no landing quays and the breakwater is used for landing fish; only 5-6 vessels can moor alongside and others have to tie up in parallel with the catch carried across moored vessels. The landing area is congested, and because conditions are unsatisfactory for hygienic fish handling, spoilage is high.

2.11 The harbor is inadequately protected from the weather, and during the monsoon season the harbor basin is swept by surf and all the boats including MFV, have to be ashore from April/May to September. The number of vessels operating from Mangrol cannot be increased without considerable expansion and improvement of the harbor.

2.12 The harbor is served by 7 block ice plants with a total rated capacity of 31.5 t/day but one of the plants (5 t/day) is now inoperative. About 60% of ice produced is used by the fishing industry, and the remainder by other commercial interests in the town of Mangrol. Ice production capacity is only about 50% of the existing requirement. There is no storage facility for ice or iced fish, and no freezing plants or frozen storage facilities. Fish for processing have to be transported in ice to Veraval or Bombay. There are plans for a private company to develop a complex, including a 15 t/day block ice plant with 50 tons storage capacity, a 5 t/day freezing plant with 100 tons of frozen storage capacity, and an iced fish store with capacity for 50 tons of fish. This will largely satisfy current requirements but will be insufficient for the expanded fleet that is expected to develop as harbor improvements planned under the project are carried out. There are two engine service stations in the port area and fuel is available. Minor repair facilities for boats are available, but MFV have to sail to Veraval for major repairs.

2.13 Veraval: Veraval is both a fishing harbor and a commercial port. The port handles 350,000 tons of cargo per year, mainly fertilizer, agricultural products and cement, and is a pickup point for frozen fish products, such as shrimp, squid, cuttlefish and pomfret. Fishing facilities comprise a 185 m MFV quay and a 300 m landing quay, neither of which are accessible at low tide. Because these facilities are insufficient, MFV also utilize the commercial harbor, aggravating its congestion. The port entrance is shallow, insufficiently protected from the south west monsoon winds, and, as a result, fishing operations are interrupted for 3-4 months every year. Facilities for landing, auctioning, handling and marketing fish are unsatisfactory. Fish are landed directly on the quay where there are inadequate washing facilities.

2.14 Although Veraval has 12 block ice plants, with a total rated capacity of 155 t/day, less than 70% of this capacity is achieved due to poor operating conditions and shortage of water. Ice is in short supply during the peak fishing months when it has to be brought from as far as Rajkot (150 km). A new 20 t/day block ice plant with 100 tons storage, financed by ARDC, is under construction for the Gujarat Fisheries Central Cooperative Association (GFCCA) and should be completed before mid-1977. When this is commissioned GFCCA will close an operating plant because it is obsolete, and total ice production capacity will be about 163 t/day, which is about 50% of maximum daily demand.

2.15 There are three fish freezing plants with installed capacity of 42 t/day with storage for 750 tons. An additional 4 t/day freezing plant with frozen storage of 200 tons of fish is being constructed for GFCCA with ARDC financing, and a 2.5 t/day freezing plant with 50 tons of frozen storage for a commercial enterprise (Tata) is at the planning stage. A commercial

prawn canning plant is also under construction. Freezing capacity in Veraval is adequate for present catch rates.

2.16 Fish is dried at Veraval in areas leased from the Gujarat Ports Directorate (GPD). Fish are laid out on unsurfaced areas, either on the bare ground, fences or frames. The techniques and facilities are primitive and a high proportion of dried fish is spoiled and unsuitable for human consumption.

2.17 Veraval has one makeshift fishmeal plant with a rated capacity of 50 tons of raw material per day; in addition, there are 9 plants with a total capacity of 90 t/day for grinding sun dried fish to make animal feed, and a shark liver oil unit with a rated capacity of 50,000 liters per annum. GFCCA operates a boat building and repair yard with a capacity of building 90 MFV per annum at Veraval and there are 4 engine repair shops and a fuel supply station.

### Marketing

2.18 Bombay is the center in India for marine fish sales, both fresh and dried fish, consumption of fresh marine fish, and is the largest wholesale and transshipment center for these commodities. Prices throughout India are closely related to Bombay prices which are determined daily by a Bombay Market Committee of private traders on the basis of supply and demand. The Committee determines maximum prices which are posted daily. The traders communicate price information daily to other fish production centers. Most dried fish is shipped to inland and tribal markets but a small percentage (about 15%) is exported to the Gulf States, Sri Lanka and Singapore.

2.19 Less than 15% of fresh fish produced in Gujarat is consumed there, because of a high percentage of vegetarians. A few traders purchase for urban centers in Gujarat but most fish is bought by traders and shipped to Bombay and other major cities.

### Boat Building

2.20 In Gujarat, all locally constructed fishing vessels are of wood (teak and sajad) from the forests of southern Gujarat. The cost of Gujarat teak is about 20% lower than the international price. MFV follow traditional designs that have proven suitable for local conditions. The only well equipped boat yard is that owned and operated by GFCCA at Veraval which employs a qualified engineer and naval architect. A small number of MFV are made on the open beaches by groups of individual carpenters; such boats are cheaper than those made by GFCCA but they rarely meet safety standards set by GOG.

### Fisheries Credit

2.21 The most important sources for medium and long term credit for the fisheries sector are commercial banks, the Gujarat State Cooperative Bank Ltd., (GSCB), and the Gujarat State Financing Corporation. ARDC provides refinance facilities for approved fisheries schemes.

### GOG Fisheries Extension Services

2.22 In each of Gujarat's coastal districts there is a GOG superintendent of fisheries supported by fisheries officers and extension workers. New developments are disseminated to fishermen mostly through regular community meetings, and a bi-monthly magazine. The work of fisheries personnel includes: monitoring the trade in fish and fish prices; helping in the formation and operation of fishermen's cooperatives; and conducting research and revenue surveys.

### Development Policies

2.23 Both GOI and GOG attach high priority to developing marine fisheries in the interests of increasing protein supplies and exports, and of improving employment opportunities in fishing districts. Up to now most of the Governments' efforts have gone into sponsoring the use of MFV and the modernization of traditional fishing craft and gear. This drive has been generally successful, but the growth in catching capacity that it has generated is now placing great strain on existing fishing harbors and on marketing channels and facilities. The project described in this report is designed to alleviate these problems in Gujarat by modernizing and expanding the harbors and shore facilities at Mangrol and Veraval. It would complement these efforts by financing an additional expansion in MFV numbers and by furthering the modernization of traditional fishing craft. Importantly, the project would include a first, although very modest, program aimed at improving living conditions in selected fishing villages.

## III. THE PROJECT

### General

3.01 The project would be carried out over five years and would comprise the following principal components:

- (a) improvement of the fishing harbors at Mangrol and Veraval to permit more MFV to use these facilities and to provide better protection against adverse weather;
- (b) improvement of shore facilities and services at Mangrol and Veraval to provide suitable support for the existing fleet and expansion which is expected to occur as a consequence of the project;
- (c) provision of credit to entrepreneurs to establish fish processing, freezing, and ice plants at the two harbors;
- (d) construction and equipping of 270 14.8 m MFV and their sale on credit and/or hire purchase to cooperatives and fishermen;

- (e) assistance to traditional fisheries by the: (i) provision, on credit, of 350 9 m fishing canoes equipped with outboard motors and gear, and of an additional 1,050 outboard motors; (ii) improvement in the infrastructure serving eight fishing villages; and (iii) improvement in the fish marketing system of these villages;
- (f) provision of two net making machines for GFCCA; and
- (g) technical assistance for test fishing, marketing studies, and project implementation.

3.02 The project, with the exception of the test fishing operations which would be the responsibility of GOI, would be carried out by GOG with refinance for credit operations being provided by ARDC.

#### Detailed Features

3.03 Fishing Harbors. The existing situation at Mangrol and Veraval is described in Annex 2 which details the works to be carried out under the project, the status of basic studies and engineering, the design criteria employed, and the methods and organization to be used. At Mangrol the harbor is too small to accommodate the existing fleet of 95 small, up to 13 m, MFV, and because of congestion, MFV have to be hauled up onto land for the monsoon period. This process entails considerable time as the first MFV have to be hauled up one month in advance of the end of season; conversely, it is about a month after the end of the monsoon season before the last boats are launched. Much fishing time is lost. Under the project an additional 250 m of breakwater would be constructed and dredging carried out to form a tidal basin about 190 m by 70 m and with a depth of 2.5 m below low water (the 14.8 m MFV draws about 1.7 m). The basin would be faced with 385 m of quay for landing fish, outfitting and berthing. At the completion of project works the harbor would be able to handle about 110 MFV at either morning or evening landing periods. During emergencies a fleet of 165 MFV could be accommodated in sheltered berths. Additionally a protected beach would be formed for use by traditional craft and 2 ha of land cleared and leveled as a fisheries terminal where supporting services and facilities would be located. (Chart 16634).

3.04 At Veraval the fishing harbor is inadequate for the 400 MFV that are based there and for vessels from other harbors that land fish and dock there. There is insufficient quay length for loading and outfitting, inadequate land area for the siting of shore facilities and, importantly, egress is restricted at low water and even during moderate seas. Slipway facilities for MFV are totally inadequate. Under the project the existing breakwater would be extended by 334 m to a total of 654 m; a lee breakwater of 500 m would be constructed, as would be 535 m of landing and berthing quays, and 1,120 m (both sides) of open berthing jetties. The entire harbor would be dredged to 3 m below low water (thus permitting use by MFV of up to 23 m) and the entrance channel from depths of 5.5 m at the harbor entrance to 4 m at the existing MFV quay. At completion of these works the harbor will be able to accommodate 700 MFV, and be open to vessels throughout the year, particularly the new 23 m and larger MFV which are expected to use the

port in the future. Improvements would also include construction of a slipway (to accommodate the equivalent of sixty 15 m vessels), and development of 7.5 ha as a fisheries terminal where shore facilities and services would be provided (Chart 16633).

3.05 Improvement works at Mangrol would not significantly disrupt harbor operations. At Veraval, however, the works would require construction of a cofferdam and dewatering of part of the harbor. As described in Annex 2, while this dam would not seriously restrict access to existing wharves and quays, it would be necessary to open it and to flood the whole basin before the start of the monsoon to provide a refuge for vessels.

3.06 Shore Facilities and Services. Under the project GOG would provide a number of shore facilities at the two terminals to serve fishermen, these are described in more detail in Annex 3. These facilities would be constructed at the fisheries terminals developed under the harbor improvement component which would be managed by Fisheries Terminal Division (FTD) (see para 4.09). The facilities would be owned by GOG and managed by GOG agencies, or leased to private companies or cooperatives. At Mangrol, GOG would provide and maintain roads and drainage facilities, offices, an improved water supply providing 250 t/day and, a 66 kv electricity supply line, and a 1,950 m<sup>2</sup> fish auction hall would be operated by FTD. A canteen for fishermen and workers, surfaced areas for fish drying and a 240 m<sup>2</sup> gear shed would be leased to entrepreneurs and MFV operators by FTD. At Veraval similar but more extensive facilities would be provided. They would include offices, roads and drainage, security fencing of the development area, a water system providing 2,000 t/day, and a 40 MW power supply. The auction hall would be much larger than at Mangrol, 8,250 m<sup>2</sup>, as would be the canteen drying areas, workshop (1,200 m<sup>2</sup>) and gear sheds (2,250 m<sup>2</sup>). Sites for fuel and oil stations would be provided at both harbors.

3.07 Fish Processing, Freezing, and Ice Plants. Under the project, credit would be provided (see para 4.08 ad 5.05) for entrepreneurs - private, corporate and cooperative, to construct and operate plants at the Mangrol and Veraval fisheries terminals. Sites for these plants, which will be needed to handle production generated by the project as well as to meet current shortfalls would be leased to entrepreneurs by FTD. For Mangrol, provision is made for a 75 t/day block ice plant with 200 t storage; a 10 t/day freezing plant for shrimp and other fish; and 100 t storage for iced fish. Currently it is anticipated that catch rates will justify the construction of the freezing plant by project year (PY) 4 (1980). At Veraval, a larger and more sophisticated program is planned which would comprise two 200 t/day block ice plants each with 400 t storage; an 18 t/day freezing plant with a 500 t storage for frozen fish with 150 t storage for iced fish; and fish meal plant with a daily throughput of 75 t day raw material. The ice plants are estimated to be required in PY 3 and PY 5; the freezing plant in PY 4; and the fish meal plant is planned for completion by PY 4. Annex 3 contains more details of these programs. During negotiations assurances were obtained that the design and capacity of the freezing complexes for Mangrol and Veraval would



be reviewed by ARDC; and the proposed second block ice complex for Veraval would be prepared by GFCCA and reviewed by ARDC by June 1981 (para 8.01(a)).

3.08 Construction of MFV. The project would finance 270 14.8 m MFV (70 to operate from Mangrol and 200 from Veraval). These would be fully equipped with 90 hp air or water cooled inboard engines (according to owner preference) and fishing gear (Chart 16235), and would cost an estimated Rs 180,000 to Rs 200,000 each. Operated by a crew of six, with a carrying capacity of 4 tons of fish, the vessels would be suitable for both trawling and gill-netting. A description of the vessels is at Annex 4. They would be constructed in Gujarat by GFCCA at Veraval. They would be of wooden construction and of proven design (see para. 5.07).

#### Assistance to Traditional Fisheries

3.09 Fishermen assisted under this component, which is described in more detail in Annex 5, would mostly be located in eight fishing villages situated between Mangrol and Veraval but recipients of the outboard motors would be drawn also from about 27 other villages (see Map 12318).

3.10 Canoes and outboard motors. The project would provide finance for 350 new 9 m canoes equipped with 8 hp outboard motors and fishing gear, 344 of these would be dugout canoes based on a single log of wood designed for a crew of three (Chart 16236), and six would be fiberglass canoes which would be used to test the suitability of this type of craft for Gujarat conditions. 1,400 outboard motors would be supplied on credit to fishermen: 475 for existing non-motorized canoes, 575 as replacements, and 350 for the new canoes to be constructed under the project. The motors would be provided together with spare parts equivalent to 20% of the value of the engines.

3.11 Marketing: To improve the marketing of fish produced by fishermen in the eight villages, the project would provide four trucks for use by GFCCA for the delivery of ice and spare parts and to collect fish from the eight villages (Map 12318). A shed would be provided by GOG at each village to be used as markets and for the temporary storage of fish.

3.12 Village Infrastructure. About 33.5 km of asphalted roads, 3.65 m wide, would be constructed by GOG to provide better access to the village fish markets and generally facilitate transportation of fish, ice and other inputs. Village water supply systems would be constructed by GOG in five villages which are now without them. The systems would comprise wells of 18 m x 6 m, energized by electrical pumps and piping (about 5 km/village) to stand pipes in the villages.

#### Provision of Net Making Machines

3.13 The project would finance two net manufacturing machines for GFCCA, which is one of India's leading net manufacturers. The net factory, which is now operating six days per week and three shifts per day, needs these machines to meet an increasing demand for nets.

## Technical Assistance

3.14 Test Fishing Operations: The project would finance two test fishing operations by GOI: one off Gujarat and the other off Andhra Pradesh. Objectives would be resource data collection, in particular details of distribution and catch rates of different species according to season, and the determination of improved methods of catching. The trials would be carried out by both foreign commercial vessels (trawlers and purse seiners) and GOI resource survey vessels recently built under Indo-Norwegian Project in Goa. Indian counterparts would be trained on board these vessels. Assurances were obtained that the test fishing operations would begin by December 1977 and be completed by June 1979. The results of the tests would be communicated to GOG and to the private sector. Quarterly progress reports, and final reports for each area, including economic analyses, would be prepared. Results of the tests would be reviewed by GOG and GOI. Assurances were obtained that IDA/Bank would be provided promptly with copies of progress reports and the final reports (para 8.01(b)).

3.15 Marketing Study: The project would finance a fish marketing study covering fresh and dried fish. The study would aim at identifying bottlenecks in fish marketing, developing solutions for overcoming them, and at assessing future export and domestic demand for fish. Particular emphasis would be placed on examining the problems of congestion and unsanitary facilities at Bombay, as well as on the efficiency and equity of the pricing mechanisms. The latter currently appear to be controlled by a relatively few traders. Terms of Reference for the study would be prepared by the Ministry of Agriculture (GOI), and the study would be carried out by the Indian Institute of Management, Ahmadabad or similar marketing research institution. Assurances were obtained at negotiations that Terms of Reference for the study would be agreed with IDA, and that the study would start not later than December 1977 (para 8.01(a)).

3.16 Consultants for Project Implementation: The project would finance consultants to assist in project implementation. About 50-man-months of consultants' time, costing an average of US\$8,000 per man-month for fees and expenses, would be required as described in Annex 6 and summarized below:

Harbor engineer to assist GPD in reviewing design and tender documents; coordinating the activities of local electrical/mechanical engineers and the rock excavation specialist; and supervising construction.

Rock excavation specialist to assist GPD in preparing specifications and other documents relating to the procurement of dredging equipment; and devising and implementing field trials for drilling and blasting, etc., and determining optimum methods for fragmentation of rock for dredging.

Fisheries resource management specialist to assist GOI in preparing Terms of Reference for the test fishing operations to be agreed with IDA/Bank, and in engaging a contractors to

carry out the tests, assessing the results of the test fishing operations, and developing fisheries resource policies appropriate to these results.

Management specialist to assist FTD in establishing management systems for its fisheries terminals and organizing fish auctions at the Mangrol and Veraval terminals.

Further details of the Technical Assistance elements of the project are at Annex 6.

### Project Implementation

3.17 The project would be implemented over the five years, 1977 through 1981. A project implementation schedule is at Annex 7.

### Project Beneficiaries

3.18 The major project beneficiaries would be entrepreneurs prepared to risk capital in marine fishing, a difficult and relatively risky venture. For canoes and canoe motorization these would mostly be individual small fishermen. For the 14.8 m MFV a wider range of individuals and entities would be involved; but given the relatively large down payment required from the entrepreneur, they would be corporate or cooperative entities or relatively well-to-do individuals. GOG selection criteria gives the following order of preference: cooperative and State undertakings; fishermen who have had training in fisheries whether from a State or a Central institution, fishermen who have adequate experience; fishermen who have worked or who are working as boat skippers on other people's vessels; and demobilized Navy officers.

## IV. ORGANIZATION AND MANAGEMENT

### General

4.01 With the exception of the test fishing surveys the project would be carried out by GOG. Details of the more important agencies involved are in Annex 11. The leading agency would be the State's Department of Agriculture, Cooperatives, Forest and Fisheries (DACFF) in which a Project Supervision Committee (PSC) would be established. PSC would be chaired by the Department's Secretary. The Commissioner of Fisheries would be the Secretary of PSC and would function as a full-time project coordinator. Membership would include the Secretary, Ministry of Finance or his representative, the Commissioner of Fisheries, the Director of Ports, and the Regional Director of ARDC. PSC would be empowered to coopt other State officials as necessary, for example the Chief Engineer, Department of Public Health (water supplies) and the Chief Engineer, Gujarat Electricity Board. PSC would be responsible for organizing execution of the project and would do this by delegating responsibilities to appropriate state agencies. For example the Ports Directorate (GPD) would be responsible for the construction of harbor improvements. A condition of effectiveness would be that PSC had been established under the chairmanship of Secretary

of DACFF, with the Commissioner of Fisheries (GOG) as Secretary and project coordinator (para 8.02(a)).

Gujarat Ports Directorate (GPD)

4.02 GPD would use as consultants India's Pre-Investment Survey of Fishing Harbors (PISFH), a unit established with UNDP assistance and which has designed the proposed improvements to Veraval and Mangrol (see Annex 1). To supervise the work at both harbors, GPD would appoint a chief engineer and, for Veraval, 3 executive engineers, 11 deputy engineers and 24 junior engineers; for Mangrol where the amount of work would be substantially less, GPD would appoint an executive engineer, 4 deputy engineers and 10 junior engineers. In addition to the construction of harbor improvements, GPD would continue to manage harbor services at Mangrol and Veraval. These would include: supervision of the use and maintenance of approach and entrance channels, navigation aids, and of all breakwaters, jetties, quays, and basins; control of vessel movements in basins and entrance channels; and the operation of slipways. An assurance was obtained at negotiations that GOG would provide by September 1977 the technicians and engineers needed to carry out the proposed improvement at Veraval and Mangrol (para 8.01(d)).

Gujarat Fisheries Central Cooperative Association (GFCCA)

4.03 GFCCA, more details of which are in Annex 11, would play an important role in the project. Its functions would include (i) construction of project financed 14.8 m MFV; it would construct all of these, unless and until other local builders are able to meet GOG standards; (ii) importing the outboard motors financed under the project; and (iii) assisting in obtaining a supply of canoes for traditional fishermen (as it is difficult for individual fishermen to organize the construction of canoes, GFCCA would act as middle man between fisherman and constructor).

4.04 GFCCA, which has its head office at Ahmadabad, would also be a direct beneficiary of the project insofar as the net making machines financed under the project would be used in its factory, and it would be eligible for project loans for the construction and operation of shore facilities, such as ice and freezing plants at Mangrol and Veraval. It would also be eligible for loans for the purchase of MFV to be sold under hire purchase agreements to fishermen. GFCCA was established in 1956 as an apex institution for fishing cooperatives. Currently it is engaged in a wide range of activities including direct fishing; fish marketing, transporting, processing, storing, freezing and exporting; fishing gear manufacture; MFV construction; and inland fisheries promotion. 60 cooperative societies constitute the Association whose Chairman is the Commissioner of Fisheries. As of June 30, 1975, GFCCA's authorized capital was Rs 5 million and paid-up capital Rs 1.6 million of which Rs 1.4 million was contributed by GOG and Rs 0.2 million by constituent societies and individual fishermen.

4.05 Until 1973/74 GFCCA was burdened with accumulated losses for several years. In that year, however, the Association was able to wipe out these losses and earn a small profit. Although profits and losses have

always fluctuated widely, the main contributors to profits have been its boat yard, marine engine and outboard motor sales, fish net factory, and inland fisheries unit; the loss makers have been the freezing and ice plants which are obsolete, and its trading operations in fresh and dried fish. GFCCA is in need of considerable strengthening, both organizationally and financially. A program for rehabilitation has been discussed with IDA, which was based on a report prepared by ECOTECH Consultants Pvt. Ltd., Ahmadabad. During negotiations, a rehabilitation program was discussed and agreed with GOG, ARDC and GFCCA. The program which will be carried out over five years, includes the establishment of suitable accounting, auditing, budgeting and inventory control systems and improvement of the Association's capital structure, the strengthening of top management; and the engagement of qualified engineers and a marketing manager. A schedule for implementation of the program was agreed at negotiations. Assurances were given that GOG would reorganize GFCCA in accordance with the proposal prepared by GOG in consultation with ARDC and approved by IDA/Bank; GOG would retain qualified accountants to maintain a sound financial system for GFCCA; and GOG would appoint additional engineers and a marketing manager for this purpose (para 8.01(e)).

#### Gujarat State Cooperative Bank Ltd.

4.06 The Gujarat State Cooperative Bank Ltd. (GSCB), together with commercial banks, would provide credit to project beneficiaries. GSCB is the apex body of the short and medium term cooperative credit structure in the State. This structure consists of fishermen's primary cooperative societies (FPCS) at village level, central cooperative banks (CCB) at district level and GSCB at the apex. GSCB, whose membership consists of CCB and other State Cooperative organizations throughout Gujarat, is in a sound financial position and has an excellent recovery record. Since inception it has been generating steadily increasing annual net profits (Rs 7.2 million for 1975), and a dividend of 9% on share capital has been paid for the last two financial years, 1973/74 and 1974/75. GSCB is fully qualified to undertake its project role.

#### Fishermen's Primary Cooperative Societies (FPCS)

4.07 Fishermen's Primary Cooperative Societies (FPCS) would play a key role in the traditional fisheries component (see Annex 5). These societies are based on the existing social structure of the fishing villages and usually the President of a FPCS is the village Patel or social leader. This form of organization benefits from its linkage with the traditional village structure, an important consideration given the risks of lending to fishermen. Under the project, loans for canoes and outboard motors would be made to the FPCS. In turn the FPCS would enter into hire purchase type arrangements with the final beneficiaries, the fishermen. Under this arrangement ownership of the item financed would remain the property of the FPCS until the loan was repaid. FPCS would be affiliated to District Cooperative Societies. In their establishment and management, FPCS would benefit from the assistance and supervision provided by GOG, GSCB and their affiliates, and by ARDC. An assurance was obtained that GOG would assist in the establishment and management of FPCS in the project area (para 8.01(f)).

Agricultural Refinance and Development Corporation (ARDC)

4.08 ARDC would be responsible for: (i) refinancing loans made by GSCB and commercial banks for MFV and shore installations, (ii) refinancing credits made under the traditional fishermen component for such items as canoes, out-board motors, and fishing gear; (iii) assisting participating banks and prospective borrowers to prepare and evaluate investment plans; and (iv) assisting GOG in the establishment and management of FPCS. ARDC would prepare a project Banking Plan which is a standard feature of other Bank Group operations involving ARDC, and it would be a condition of disbursement against the relevant credit components that such Banking Plan was acceptable to IDA/Bank (para 8.03(a)). Lending terms and conditions are shown in Schedule A and would be spelt out in a Refinance Agreement that would be concluded between ARDC and the participating banks. At this time ARDC is operating most satisfactorily in 26 IDA assisted projects in the agriculture sector 1/.

Fisheries Terminal Division (FTD)

4.09 A Fisheries Terminal Division (FTD) would be established under GOG Commissioner of Fisheries (DACFF) to develop and manage the terminals at Mangrol and Veraval. FTD would be responsible for all GOG owned land (except that used by GPD) in the harbor area at Mangrol and the area allocated for terminal development at Veraval. It would take over all existing GPD buildings at the two sites that are currently used to provide services to fishermen as well as new buildings for this purpose that would be constructed under the project. These would be offices for the agency, the auction hall at each harbor, and buildings designed to be used for canteens, gear sheds, and workshops. FTD would operate the auction halls itself but would lease the other buildings to entrepreneurs wishing to provide services to fishermen. FTD would also lease sites to entrepreneurs, private, public and cooperative, wishing to construct facilities such as fish processing plants, freezing, and fish storage plants and who would be eligible under the project for credit for these purposes. Assurances were obtained at negotiations that FTD would be established by December 1977 with the above powers; and, an assurance was also given that GOG would cause FTD to charge amounts sufficient to enable FTD to cover all operating expenditures and charges, including taxes, interest payment on borrowings, and depreciation. In addition, an assurance was given that GOG would furnish IDA/Bank by December 1977 a feasibility study on the deduction of proceeds of fish sales at FTD for the repayment of loans (para 8.01(g)).

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1/ For the most recent appraisal of ARDC see IDA Report No. 562a-IN: Appraisal of ARC Credit Project, March 15, 1975. IDA Credit 540-IN for US\$75 million.

### Central Coordinating Committee (CCC)

4.10 GOI involvement in the project mainly would be through a Fisheries Project Central Coordinating Committee (CCC) that would be established in its Ministry of Agriculture and Irrigation to establish policy for, to aid, and to monitor this and similar projects. CCC would be chaired by the Ministry's Joint Secretary for Fisheries, and the Deputy Commissioner for Fisheries (Planning) would be secretary. Other members would include the Managing Director of ARDC or his representative, and representatives of the Ministry of Finance and the Ministry of Shipping and Transport (GOI). Appropriate GOG or other state representatives would be coopted as needed for consideration of matters affecting the Gujarat project. A condition of credit effectiveness would be that CCC, with membership agreed with IDA/Bank, had been established (para 8.02(b)).

### Monitoring, Evaluation and Reporting

4.11 A project monitoring and evaluation system (MES) would be set up in DACFF to chase and report on progress in project implementation. Importantly, however, MES would study the economic and financial results of different project activities in order to provide information needed in the planning of future projects. More details are at Annex 10. Special attention would be given to obtaining reliable vessel production estimates and to relate these to vessel numbers and to the extent of the fishing resource in order to identify any risk of over fishing. Production surveys are already being carried out both by GOG and Central Marine Fisheries Research Institute (CMFRI) although staffing of the former is weak and needs strengthening by the appointment of an additional senior statistician and other staff. There would appear to be major benefits in amalgamating or coordinating this type of work in Gujarat, since the objectives of the two operations are similar, and such a possibility is being examined. Assurances were obtained that a senior Statistician would be appointed to the Statistical Cell of the GOG Department of Fisheries by October 1977. A MES unit has been set up, and during negotiations assurances were obtained from GOG that the unit would be adequately staffed to prepare reports on the progress of project implementation (Annex 10); and three basic surveys (Production, Fisherman's Households and Credit Recipients) would be carried out by MES and that Terms of Reference would be made available to IDA/Bank for comment by September 1977 (para 8.01(h)). Assurances were also obtained that, by September 1977, GOI would introduce a mandatory fishing vessel registration scheme for India as a whole as one of the means for better controlling resource exploitation, and that this scheme would be applicable to Gujarat (para 8.01(i)).

## V. COST ESTIMATES AND FINANCING

### Cost Estimates

5.01 Project costs including duties and taxes are estimated at Rs 341.7 million (US\$38.0 million) of which about 30% would be foreign exchange. Detailed cost estimates which include duties and taxes estimated at about US\$2.4 million are given in Annex 8 and are summarized below:

	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Foreign</u>
	(Rs M)			(US\$ M)			Exchange
	-----	-----	-----	-----	-----	-----	%
I. <u>Harbor Improvements</u>							
Mangrol	15.9	2.5	18.4	1.7	0.3	2.0	14
Veraval	63.0	19.8	82.8	7.0	2.2	9.2	24
Subtotal	<u>78.9</u>	<u>22.3</u>	<u>101.2</u>	<u>8.7</u>	<u>2.5</u>	<u>11.2</u>	<u>22</u>
II. <u>Shore Facilities</u>							
Mangrol	2.3	1.8	4.1	0.3	0.2	0.5	44
Veraval	8.7	9.8	18.4	1.0	1.1	2.1	53
Subtotal	<u>11.0</u>	<u>11.5</u>	<u>22.5</u>	<u>1.3</u>	<u>1.3</u>	<u>2.6</u>	<u>51</u>
III. <u>MFV</u>							
Mangrol	12.2	1.3	13.5	1.3	0.2	1.5	9
Veraval	34.8	3.6	38.4	3.9	0.4	4.3	9
Subtotal	<u>47.0</u>	<u>4.9</u>	<u>51.9</u>	<u>5.2</u>	<u>0.6</u>	<u>5.8</u>	<u>9</u>
IV. <u>Traditional</u> <u>Fishermen</u> <u>Component</u>							
Canoes	5.3	-	5.3	0.6	-	0.6	-
Motors, Nets & Equipment	8.2	5.0	13.2	0.9	0.6	1.5	38
Trucks	0.4	0.1	0.5	0.1	-	0.1	20
Infrastruc- ture	3.9	1.0	4.9	0.4	0.1	0.5	20
Subtotal	<u>17.8</u>	<u>6.1</u>	<u>23.9</u>	<u>2.0</u>	<u>0.7</u>	<u>2.7</u>	<u>26</u>
V. <u>Supporting</u> <u>Equipment</u>	0.4	0.9	1.3	-	0.1	0.1	69
VI. <u>Technical</u> <u>Assistance</u>	2.9	23.0	25.9	0.3	2.6	2.9	89
VII. <u>Total Before</u> <u>Contingen-</u> <u>cies</u>	<u>158.0</u>	<u>68.7</u>	<u>226.7</u>	<u>17.5</u>	<u>7.8</u>	<u>25.3</u>	<u>31</u>
VIII. <u>Contingencies</u>							
Physical	15.5	5.5	21.0	1.7	0.6	2.3	26
Price	65.8	28.2	94.0	7.3	3.1	10.4	30
Subtotal	<u>81.3</u>	<u>33.7</u>	<u>115.0</u>	<u>9.0</u>	<u>3.7</u>	<u>12.7</u>	<u>29</u>
<u>Total</u> <u>Project</u> <u>Cost</u>	<u>239.3</u>	<u>102.4</u>	<u>341.7</u>	<u>26.5</u>	<u>11.5</u>	<u>38.0</u>	<u>30</u>



5.02 Cost estimates are based on May 1976 prices. Physical contingencies have been applied at appropriate rates and average about 9% of project costs before contingencies. Price contingencies have been applied cumulatively as follows: for civil works and services 12% per annum 1977-79, 11% for 1979 and 10% thereafter. For equipment cumulative rates of 8% annually have been used until 1979 and 7% thereafter. Price contingencies account for about 38% of base cost and physical contingencies.

Financing

5.03 Financing of project costs would be as follows:

	<u>Borrowers</u>		<u>Banks</u>		<u>ARDC</u>		<u>GOI/GOG</u>		<u>Total</u> US\$M	<u>IDA/ Bank</u>	
	US\$M	%	US\$M	%	US\$M	%	US\$M	%		US\$M	%
1. Harbor Improvement	-	-	-	-	-	-	18.6	100	18.6	9.0	48
2. Shore Facilities	0.8	20	0.6	16	2.4	64	-	-	3.8	1.2	32
3. Trawlers	1.5	20	1.2	16	4.9	64	-	-	7.6	2.6	34
4. Traditional Fishermen											
a. Canoes motors, trucks	0.3	11	0.4	16	1.6	62	0.3	11	2.6	0.8	31
b. Infrastructure	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>0.8</u>	<u>100</u>	<u>0.8</u>	<u>0.3</u>	<u>38</u>
Subtotal	0.3	9	0.4	12	1.6	47	1.1	32	3.4	1.1	32
5. Supporting Services*	0.1	20	-	16	0.1	64	-	-	0.2	0.1	35
6. Technical Assistance	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>4.4</u>	<u>100</u>	<u>4.4</u>	<u>4.0</u>	<u>91</u>
Total	2.7	7	2.2	6	9.0	24	24.1	63	38.0	18.0	47

\* Figures and percentages may not tally due to rounding.

5.04 The proposed IDA Credit of US\$4 million would be made on standard terms, and the Bank loan of US\$14 million would be made to GOI on Third Window terms and would finance about 50% of project costs net of duties and taxes (about 47% of total cost). The credit would cover the foreign exchange costs of about US\$11.5 million and about US\$6.5 million or about 25% of local costs.

Lending Terms and Conditions

5.05 Project lending terms and conditions are detailed in Schedule A. They follow current rates for institutional lending throughout India, including lending financed under IDA Credits and Bank loan. Funds for harbor

improvements and other civil works would be on-lent to GOG in accordance with GOI established policies for development assistance to GOG. IDA/Bank funds for sub-loans i.e. for MFV, outboards motors, processing equipment and the like would be on-lent from GOI to ARDC under a Subsidiary Loan Agreement. ARDC would relend to participating banks at an annual interest rate of 8% minimum, for on-lending to final borrowers at not less than 11%. Security for loans would be in accordance with arrangements agreed between ARDC and the lending banks under a Refinance Agreement. ARDC refinance to lending banks would not exceed 80% of individual loans. Loans for freezing complexes at Mangrol and Veraval, and for the second block ice plant at Veraval would be granted only after a thorough review of plant capacity requirements (see para 3.07).

### Procurement

5.06 Civil works for harbor improvements at Veraval comprising the construction of breakwaters, quays, cofferdam and excavation (US\$4.75 million) would be procured on the basis of international competitive bidding in accordance with Bank guidelines. Equipment (US\$3.4 million) to be procured under international bidding would include net making machinery, refrigeration equipment for ice plants, cold stores and freezing units, as well as a rock dredger and ancilliary equipment. Also subject to international competitive bidding would be 1,400 outboard engines and spares (US\$0.6 million) required for the traditional fishermen component. In the case of equipment, exceptions to the ICB proposed above would be small contracts or orders of less than US\$100,000 which cannot be bulked. Of the total cost of items expected to be let on the basis of international competitive bidding (US\$8.75 million) about US\$4.75 million is likely to be won by domestic bidders. For the civil works, domestic contractors would receive a preference of 7-1/2%. For equipment, domestic suppliers would be accorded the usual preferential margin equal to 15% of the c.i.f. cost of competing imports or the existing rate of import duty, whichever is lower.

5.07 International competitive bidding is not considered suitable for the mechanized fishing vessels and their engines (US\$7.2 million) or for canoes and gear, other than the outboard motors. The mechanized fishing vessels are to be constructed to traditional design modified to customer specification; such vessels are not normally internationally traded and customer preference would be impossible if they were. Further, investigations indicate that Gujarat prices for these vessels are reasonable although exact comparisons are difficult to make. Consequently, the mechanized fishing vessels would be purchased from GFCCA or other local private mechanized fishing vessels builders according to customer preference. Inboard engines for mechanized fishing vessels would be procured locally from two suppliers on the basis of customer choice. It is considered inadvisable to insist on international competitive bidding for these in view of potential problems with spare parts and service for imported engines. Items procured with the proceeds of sub-loans for fishing gear (US\$0.9 million) would be according to customer demand and preference, and as such, would not be suitable for international competitive bidding. Canoes (US\$0.8 million) would be procured from local builders

constructing to traditional designs and standards. Contracts for civil works for shore facilities (US\$1.1 million) and for the traditional fishermen's component (US\$0.8 million) are to be spread over five years and scattered geographically, and, consequently, would be awarded to qualified local contractors on the basis of local competitive bidding. Harbor improvement works at Mangrol (US\$1.6 million) are too small to be of interest to foreign bidders, and are not considered suitable for international competitive bidding. Procurement of these works would also be on the basis of GOG local competitive bidding procedures which are satisfactory.

#### Disbursement

5.08 Disbursement of the IDA Credit and Bank loan would be in accordance with the following schedule:

- i. 100% of foreign expenditures or 100% of local expenditures (ex-factory price) on dredging equipment procured under ICB, about US\$1.4 million;
- ii. 50% of expenditure, about US\$7.9 million, on harbor improvements and infrastructure in the traditional fishermen component, excluding cost of supervision; This would include civil works awarded under ICB;
- iii. 100% of expenditure on consultants, about US\$0.6 million.
- iv. 90% of expenditure on the local marketing study and test fishing operations, about US\$3.4 million; and
- v. 55% of ARDC disbursements against shore facilities, vessels, canoes, outboard motors, fishing gear, trucks and net manufacturing machines, about US\$4.7 million. This would include equipment purchased under ICB.

Disbursements under (i), (ii), (iii), and (iv) would be against documents certified by GOG and GOI. Disbursement under (v) would be made against expenditure statements certified by ARDC; supporting documents would not be submitted to IDA/Bank for review, but would be retained by ARDC and be available for inspection by IDA/Bank during project supervision. A schedule of estimated quarterly disbursement is in Annex 9. Funds remaining in the Credit and the Loan account following project completion would be cancelled unless otherwise agreed between GOI and IDA/Bank.

#### Accounts and Audit

5.09 IDA/Bank funds would be disbursed by: (i) GOI for test fishing surveys and consultants; (ii) GOG, for expenditures on harbor improvements and GOG owned shore facilities, infrastructure improvement under the traditional fishermen component, and consultants; and (iii) ARDC, for expenditures under its refinance program for loans for fishing vessels, outboard motors, fishing gear, shore facilities, transport equipment, and net manufacturing equipment.

Separate accounts would be maintained for all project expenditures. Accounts under (i) and (ii) would be subject to the usual government control and auditing procedures, which are satisfactory. Audited ARDC accounts are sent to IDA/Bank each year as a requirement of on-going IDA/Bank projects, so that no special arrangements for audit of its accounts for this project would be required. As part of its refinancing agreements, ARDC requires participating banks to maintain separate accounts for each approved scheme and to have these audited, thus no special arrangements would be needed. Assurances were obtained at negotiations that the above arrangements would be employed, and that accounts under (i) and (ii) would be audited each financial year and the audit report sent to IDA/Bank within four months of the end of that financial year. Assurances were obtained that FTD would maintain separate accounts audited and that such audited accounts would be sent to IDA/Bank within four months of the close of each financial year. Given the importance of GFCCA to the fisheries sector as a whole and to the project in particular, assurances were also obtained that its audited account would be sent to IDA/Bank within four months of the close of each financial year (para 8.01(j)).

#### Subsidies

5.10 GOG currently grants a number of subsidies to fishermen. These range from 22.5% on the total cost of MFV, to varying amounts of the costs of items used in the traditional fishing sector, such as canoe hulls (7.5%), sails and equipment (15%), nets (10%), outboard motors (Rs 400 or about 13%), and fully equipped 9 meter canoes (Rs 2,700 or about 8%). GOG has agreed to eliminate the subsidies on MFV as a condition of disbursement against this component of the loan/credit (para 8.03(b)). The equivalent of the subsidy would be made available by GOG as a loan for purchase of MFV on terms set in consultation between ARDC and GOG. GOG intends, however, to retain subsidies on motorized canoes and fishing gear, as the beneficiaries of these are among the poorest sections of Indian society. This is consistent with the capital grant assistance provided to small farmers by the GOI Small Farmers Development Agency (SFDA). As traditional fishermen are a disadvantaged group and the subsidies assist substantially in introducing new technology, in particular the use of outboard motors, the subsidy policy appears justified. Eligibility criteria which, inter alia, limit the subsidy to one canoe per beneficiary, are satisfactory, and the subsidy funds are channeled through the banking system.

#### Boat Risk Fund

5.11 GOG is considering establishing a Boat Risk Fund to insure vessel owners against losses. Few, if any, owners take out insurance because of the relatively high cost of commercial coverage. Currently, annual premiums for a MFV are about Rs 6,300 and does not cover partial loss. GOG proposes tentatively that the Boat Risk Fund, which would include provisions for total loss, and for the cost of repairs and replacements in excess of Rs 10,000 in the case of partial loss, would be furnished in part by funds saved through the abolition of subsidies on MFV. Such a fund could act as an incentive for investment in marine fishing operations, and in view of its potential importance GOG provided assurances, during negotiations, that, it would prepare proposals for the establishment and operation of a Boat Risk Fund which would be furnished for the Bank Group's consideration by September 30, 1977 (para 8.01(k)).

VI. PRODUCTION, MARKETS AND PRICES, AND FINANCIAL  
RETURNS TO PROJECT BENEFICIARIES

Production

6.01 At full development, project annual incremental output of fish would be about 44,600 tons, including 3,700 tons of shrimp. At 1976 prices the value of this catch to producers would be about US\$8.1 million. It is assumed that about 1,500 tons of shrimp and 2,000 tons of fish meal (equivalent to 10,000 tons of fresh fish) processed in facilities financed by the project would be exported for a total of about US\$7.2 million.

Markets

6.02 Export market prospects for shrimp are excellent since world demand is expected to continue to grow faster than supply; the world demand for fish meal, as a livestock feed, is also very strong. India has developed excellent export markets in Japan which now takes about 65% of India's fish and fish product exports and the range of exports to Japan and elsewhere is growing. Improved processing financed under the project should further enhance India's export and competitiveness.

6.03 Over 30,000 tons of annual project induced production would be consumed domestically. There are no firm data on demand for fish in India; future demand for fish would be investigated as part of the project's marketing study (see para 3.15). However, GOI forecasts that the consumption of fish by the fish eating population would increase from about 6.6 kg per capita in 1975 to 11.0 kg in 1985, an annual growth of 6.5%. This forecast appears realistic given past growth rates which averaged 8% over the last decade, expected increases in real income, and the growing awareness by the population of the benefits of protein and of fish as a cheap source of protein. That portion of the project catch consumed domestically would represent about 1.0% of estimated total fish consumption in India in 1985.

6.04 While the project would do relatively little to improve marketing channels these are not foreseen as constraints. Project production is very small in relation to demand and would develop gradually over five years. It is anticipated that this production would be absorbed by the present system which, while not necessarily the most efficient, has been able to deal with the very steady and substantial growth in production that has occurred in marine fish production in recent years in the project area.

Prices

6.05 Prices used for financial projections in this report are based on average prices received by fishermen at landing sites in May 1976. Given the anticipated growth in demand the use of these on a constant basis for project calculations is reasonable. The prices are: shrimp Rs 8,960

(US\$996)/ton, MFV caught fish Rs 837 (US\$93)/ton and canoe caught fish Rs 1,500 (US\$167)/ton. The higher prices for canoe fish reflect the more selective nature of the smaller scale canoe operation. In the case of processing plants, export value for shrimp of Rs 41,400 (US\$4,600)/ton is used for estimating the benefits of the freezing complex while the price of fishmeal Rs 2,400 (US\$267)/ton is an average of export value (80%) and local market values (20%). Prices used in project economic analysis are the foregoing and are in line with Bank forecasts.

#### Financial Returns to Project Beneficiaries

6.06 Models of typical enterprises financed under the project are at Annex 13. For investments in shore facilities financial rates of return of about 36% are indicated for the ice plants, over 55% for the freezing plants, and about 23% for the fishmeal plant. These returns are more than sufficient to ensure adequate investor interest and competition for leases in the fishery terminal areas.

6.07 For motorized canoe fishermen satisfactory financial returns are indicated (about 30%). At 1976 prices annual operating income is estimated to average Rs 8,600 for the owner of one of these vessels after payment of a total of Rs 7,200 in wages for a crew of three. This would be adequate to service a loan of Rs 26,300 under the terms proposed in Schedule A. During the loan repayment period of seven years the debt service coverage would be about 1.4. Incremental operating income consequent upon equipping a canoe with an outboard motor is estimated at about Rs 4,200 annually giving a debt service cover of 2.2 during the three-year repayment period proposed.

6.08 For MFV a financial rate of return of about 53% is indicated and annual operating income of about Rs 84,000, after a wage bill of Rs 23,000 for a crew of six. During the proposed ten-year loan repayment period debt service coverage would be a satisfactory 2.3.

#### Financial Returns to Government

6.09 Direct returns to GOG from project activities would be increased harbor revenues from expanded fishing activities and the rents and other payments from leases let in fishing terminals. These benefits would be insignificant in comparison with GOG investment in harbor improvements at the two project sites which would amount to about Rs 150 million. GOG has no plans for recovering these costs through increases in harbor user charges or any other mechanism. An in-depth review of policy governing this issue is required, not only for Gujarat, but for India as a whole given the need for similar investments in harbor works elsewhere. As this would be the first in a series of fishing projects promoted by GOI and for which Bank Group assistance probably would be sought, the Bank has asked GOI to carry out such a review by July 1978 as a condition of further Bank involvement in fishing harbor and related projects.

## VII. ECONOMIC BENEFITS AND JUSTIFICATION

7.01 The project's primary economic benefits would be: (i) increased fish catch of about 45,000 ton per year by project vessels; (ii) the enhancement of the value of the project catch as well as some of the existing production by processing in project facilities; (iii) the reduction of spoilage made possible by provision of improved handling facilities and ice plants under the project. The details of economic analyses and sensitivity tests are given in Annex 14, and summarized below.

7.02 The largest project investments are those in harbor improvements at Veraval and Mangrol and account for 44% of total project costs. Assuming that the only benefits of the harbor improvements would be the catch of the project vessels that are expected to make use of these harbors, the estimated economic rate of return is 18% for Veraval and 16% for Mangrol. A composite return has been calculated for the traditional fishermen component which accounts for about 10% of project costs. The benefits of this component would comprise the catch of 280 project canoes and the incremental catch resulting from the 402 existing canoes that would be motorized under the project. The economic costs attributable to these catches would be the full cost of project canoes and outboard motors, and part of the investments in infrastructure, such as sheds, access road and water supply system. The estimated economic rate of return based on this is about 53%. Estimated economic rates of return for other principal investment items are:

MFV	48%
Motorized canoes	31%
Outboard motor	over 60%
Ice and processing plants	45-59%
Fishmeal plant	33%
Freezing plant	60%

The estimated overall rate of return is 24%.

7.03 The main risk involved in the project is that the catch rates of vessels using Mangrol and Veraval might decline, because of possible over-fishing, to levels inadequate to justify the investments in harbor improvements. As shown in Annex 14 the rate of return on investments in harbor improvement is quite sensitive to decreases in benefits. This risk is considered minimal, however, given the conservative catch rates used in project calculations and that existing resource data show that the planned increase in MFV numbers at Mangrol and Veraval would not over tax the resource. Under the project, measures would be introduced to monitor the resource and to control the number of vessels permitted to fish (para 4.12).

7.04 The project would have substantial employment benefits providing about 3,500 new jobs (1,900 on MFV, 1,100 on canoes, and about 500 in shore establishments). Most of these people would come from the fishing community where incomes are low and unemployment and under-employment are serious problems. About another 3,500 fishermen would benefit from using the improved

harbor facilities and from the motorization of canoes, and some 10,000 people living in the eight project fishing villages would benefit from infrastructure improved under the project.

## VII. RECOMMENDATIONS

8.01 During negotiations, agreement was reached on the following points:

- (a) The design and capacity of the freezing complexes for Mangrol and Veraval would be reviewed by ARDC; and the proposed second block ice plant for Veraval would be prepared and reviewed by ARDC by June 1981 (para 3.07);
- (b) GOI would begin the two test fishing operations by December 1977 and complete by June 1979; copies of all quarterly fishing operations shall be furnished to IDA/Bank (para 3.14);
- (c) GOI would begin the marketing study by the Indian Institute of Management, or similar institution, by December 1977 and complete by March 1979; and terms of reference for the marketing study be prepared by GOI satisfactory to IDA/Bank (para 3.15);
- (d) GOG would cause GPD to appoint qualified technical staff by September 1977 to carry out the proposed improvement at Veraval and Mangrol (para 4.02);
- (e) GOG would: reorganize and strengthen GFCCA in accordance with the proposal prepared by Gujarat in consultation with ARDC and approved by IDA/Bank; retain qualified accountants to maintain a sound financial system for GFCCA; and appoint additional engineers and a marketing manager (para 4.05);
- (f) GOG would assist in the establishment and management of FPCS (para 4.07);
- (g) GOG would: establish FTD by December 1977 to manage the fisheries terminals, lease land and buildings to entrepreneurs for project related work, and operate auction halls; ensure that FTD would have adequate land necessary to carry out these operations; cause FTD to charge amounts sufficiently to enable FTD to cover all operating expenditures and charges, including taxes, interest payment on borrowings, and depreciation; and furnish IDA/Bank a feasibility study by December 1977 on the deduction of part of the proceeds of fish sales for the repayment of loans obtained by fishermen from participating banks (para 4.09);



- (h) GOG would: appoint a senior statistician by October 1977 to DACFF; ensure that the project monitoring and evaluation system in DACFF is adequately staffed to prepare reports on the progress of project implementation; consolidate production, fisherman's households and credit recipients survey; and furnish IDA/Bank Terms of Reference for these surveys by September 1977 (para 4.11);
- (i) GOI would institute a mandatory fishing vessel registration scheme by September 1977, which would be applicable to Gujarat (para 4.11);
- (j) GOG and GOI would ensure separate accounts for the project and such accounts would be audited in accordance with procedures set out in para 5.09; and
- (k) GOG in consultation with ARDC would furnish IDA/Bank a proposal for establishing a Boat Risk Fund by September 1977 (para 5.10).

8.02 Conditions of effectiveness would be:

- (a) Establishment of PSC under the chairmanship of Secretary of DACFF, with the Commissioner of Fisheries as its Secretary and project coordinator (para 4.01); and
- (b) Establishment of CCC, whose membership has been agreed upon with IDA/Bank, by GOI to provide policy guidance (para 4.10).

8.03 Conditions of disbursement would be:

- (a) For credit component provision by ARDC of a Banking Plan satisfactory to IDA/Bank (para 4.08); and
- (b) Discontinuation of subsidies to fishermen on MFV (para 5.10).

8.04 Subject to these conditions, the project would be suitable for an IDA Credit of US\$4 million and a Bank loan of US\$14 million under Third Window terms.



INDIA

GUJARAT FISHERIES PROJECT

Project Lending Terms and Conditions

The following lending terms and conditions would be used to implement the project and would not be changed without prior agreement with IDA/Bank.

IDA to GOI

Normal IDA/Bank terms and conditions.

GOI to GOG

- (a) To finance construction of fishing harbors at Mangrol and Veraval, to provide improved facilities for fish landing, berthing area for fishing vessels, slipways, service stations, harbor amenities, navigation lights, auction hall, oil bunkers, drainage, water, lighting, etc. including staff training and consultants in accordance with GOI established policies for development assistance to GOG.

GOI to ARDC

For ARDC refinancing for up to 9 years:

- (a) annual interest rate of 6.75% minimum, less 0.25% for prompt payment;
- (b) repayment at the end of 9 years; and
- (c) borrower to carry exchange risk.

ARDC to Participating Banks

- (a) annual interest rate of not less than 8% to Participating Banks;
- (b) installment repayments based on repayment schedule to coincide with agreed collection dates from ultimate borrowers; and
- (c) ARDC to refinance Participating Banks by loans not exceeding 80% of individual loans.

Participating Banks to Ultimate Borrowers

(a) to GFCCA, cooperatives and private entrepreneurs:

- (i) relending is for the construction and equipment of ice, freezing and fish processing plant, ice and fish storage, provision of trucks and two fish net manufacturing machines;
- (ii) a loan ceiling of 80% of the cost of equipment and civil works;
- (iii) annual interest rate not less than 11%;
- (iv) repayment period not exceeding 9 years from the date of each withdrawal; and
- (v) ultimate borrowers to have capital and staff considered adequate by ARDC to operate the facilities.

(b) to cooperatives and fishermen:

- (i) relending is for the purchase of mechanized trawlers;
- (ii) annual interest rate of not less than 11%.
- (iii) repayment period not exceeding 9 years from the date of each withdrawal;
- (iv) a loan ceiling of 85% of the purchasing cost; and
- (v) existing trawler owners are not eligible for this financing.

(c) to cooperatives and fishermen:

- (i) relending is for the procurement of 9 meter canoes with outboard motors and fishing gear and for outboard motors only for existing canoes;
- (ii) a loan ceiling of 92.5% of the cost (90% for provision of outboard motors only);
- (iii) annual interest rate of not less than 11%; and
- (iv) repayment period not to exceed 5 years (3 years for outboard motors only) from the date of each withdrawal.

General

- (a) ARDC and Participating Banks to maintain separate accounts for each of the above schemes and GFCCA and FPCS shall maintain accounts satisfactory to ARDC;
- (b) Security and insurance to be in accordance with arrangements between Participating Banks and ARDC;
- (c) ARDC to refinance Participating Banks only after determining that the completion of agreed items of development is critical to project implementation;
- (d) ARDC to advise IDA/Bank prior to inviting bids for the acquisition of equipment and contracts for civil works where such bids are subject to international competitive bidding under the Schedule to the Gujarat Project Agreement;
- (e) all application for refinancing having total investment costs in excess of \$500,000 equivalent, together with appraisal reports and all other other relevant data, to be forwarded to IDA/Bank for final approval;
- (f) loans may be rescheduled, if necessary and in agreement with ARDC, in the event of natural calamities resulting in wide-spread fish famine or closure of fishing operations for more than 100 days between the months of April and October in any calendar year;
- (g) all fish landings from trawlers registered at Mangrol and Veraval shall be sold through their action halls, and shall be weighed and records maintained of catch and prices of each class and variety of fish;
- (h) repayments from ultimate borrowers under paragraphs (a) and (b) above shall be made from fish sale proceeds on regular weekly basis or when repayments are made according to established practices of Participating Bank and/or ARDC; and
- (i) where vessels are purchased under hire purchase agreements through GFCCA or FPCS, such institutions shall be permitted to retain an interest margin not exceeding 0.5% to meet hire purchase costs.



INDIAGUJARAT FISHERIES PROJECTMarine FisheriesA. Introduction

1. Continental India lies roughly between  $8^{\circ}$  and  $37^{\circ}$ N Lat. and between  $68^{\circ}$  and  $97^{\circ}$ E Long. It has about 5,650 km of coastline and a continental shelf area (to a depth of 200 m) of about 415,000 km<sup>2</sup>, of which about 68% is on the west coast.

2. The climate of India and oceanographic regime of adjacent seas are dominated by two monsoon seasons, southwest and northeast. The southwest (wet monsoon) lasts from May to September; winds are strong and may reach a force of Beaufort 10 on the west coast. The northeast (dry monsoon) lasts from November to March; winds are less strong, reaching Beaufort 5.5 on the west coast. During the southwest monsoon, surface currents in the Arabian sea and Bay of Bengal move in a clockwise direction; in the northeast monsoon they move in a counter-clockwise direction. Associated with the southerly along shore current on the west coast during the southwest monsoon, there is also an offshore component of movement. As a result, subsurface water moves onshore and towards the surface. This water is not only colder than the surface layer, but also has an extremely low oxygen content which is so low that fish and shrimp cannot survive in it. Thus, when such water reaches traditional trawling grounds, fish and shrimp must move to more favorable waters and catch rates fall to zero. On the other hand, catch rates of pelagic fish may improve as fish are trapped in an increasingly thinner layer of water between air-sea interface above and colder, oxygen deficient water below.

3. Gujarat, the most northwesterly State, lies roughly between  $20^{\circ} 10'$  and  $24^{\circ} 40'$  N Lat. and between  $68^{\circ} 10'$  and  $74^{\circ} 30'$  E Long. It has a coastline of 1,500 km marked by Gulf of Cambay and Gulf of Kutch, and a continental shelf area (to a depth of 200 m) of 99,373 km<sup>2</sup>.

B. Resources

4. About 75% of India's present catch of marine fish is produced on the west coast (Arabian Sea) of India which has about 70% of the continental shelf area. The catch of pelagic species in the past has substantially exceeded the catch of demersal species, but in recent years the catch of demersal species has been increasing and the catches of the two groups are now about equal. Most catches are made inside the 35 fa depth line and very few are made beyond the 50 fa line. A 1973 estimate of potential annual catch of resources beyond the 35 fa depth line of demersal, pelagic and mid-water resources of Gujarat, Karnataka, Kerala, Tamil Nadu, and Andra

Pradesh was placed at 2.3 million tons. In view of the largely unfished resources, this estimate seems to be conservative. According to an estimate made by the National Commission of Agriculture (1976), production of marine fish could be increased to 3.5 million tons per annum. While this estimate may be realistic, more data on resources would be required to confirm it.

### C. Production

5. During 1975, fishery production in India was 2.4 million tons of which 0.8 million tons were fresh water production and 1.6 million tons were marine production; in 1974, India ranked 7th in relation to all other countries. Since 1950, the average annual increase in fishing production has been about 62,000 tons or at a compound rate of about 4% (Table 1).

6. Fishery production in Gujarat in 1975, was about 199,000 tons of which about 188,000 tons were of marine origin and about 11,000 tons were of fresh water origin. Since 1960, (prior to 1960 Gujarat was not a State and statistics for earlier years are, therefore, not available) average annual increase in production has been about 8,000 tons or at an average rate of 6.5% (Table 2)..

7. During 1962-75, productivity per fisherman increased by 50% from 2.8 tons to 4.2 tons per year. This development has been brought about by extensive activity on the part of GOI and State Governments and an active private sector, particularly in the processing of export products and in domestic marketing. Government (at both Central and State levels) has been particularly active in: (a) stimulating mechanization; (b) providing infrastructure including harbors and ice plants; (c) providing credit facilities; (d) carrying out research in fishery biology, product development and exploratory fishing; and (e) providing training facilities. GOI has expended or budgeted on fisheries through the 5th Plan in excess of Rs 2,800 million. The private sector has been particularly active in developing shrimp fishery and shrimp processing (primarily freezing) for the export market. Mechanization (starting in 1947), introduction of trawling, existence of shrimp resources and access to highly profitable export markets for shrimp have been key factors in the growth of the fishing industry in India.

8. The catch and effort statistics for mechanized boats in Gujarat show a classical pattern of fishery development that also has been experienced elsewhere. In the early years there are few boats and catch rates are relatively high. As more and more boats enter fishery, catch rates per boat decrease. The decline from higher catch rates to lower catch rates occurred in the 1960's. The relationship between catch and effort in this particular situation is such that the entry of additional boats now will have relatively little effect on catch rates. By the time there are about 1,500 mechanized boats, the catch rate will be reduced by about 10% from the present rate when there are slightly more than 1,250 boats, and by the time there are 2,000 boats, catch rate will be reduced by about 15% from the present rate. However, these rates are based on insufficient information and should be examined as more and better data become available.



#### D. Fishermen

9. The 320,000 fishermen of India, who live in 1,805 villages (191 in Gujarat) belong to a variety of ethnic and religious groups. They are in the lower level of the economic and social structure and possibility, for upward mobility is generally slight to non-existent. While the literacy rate of India as a whole is about 30% and in Gujarat about 36%, amongst fishermen in Gujarat it is only about 5% and in some fishing communities it may drop to 1% or less. Government (both Central and State) is attempting to raise the standard of living of fishermen through a wide spectrum of development activities, as well as by increasing educational and health facilities.

#### E. Landing and Shore Facilities

10. Landing facilities range from unimproved beaches with no facilities to protected harbors with ice plants, processing plants, fuel docks, shipyards and other related facilities. The main fish landing points in Gujarat, with varying degrees of development, include Veraval, Porbandar, Mangrol and Okha. In addition, there are 17 other principal landing points (annual landings in excess of 100 tons) in Gujarat and 191 fishing villages. Some villages are not served by roads, and, generally, the development of landing facilities has not kept pace with the rate of mechanization, and increase in production and has led to congestion and waste. Any increase to the mechanized fleet without corresponding increase in landing and shore facilities would aggravate the situation.

11. The numbers and capacities of ice making plants, cold storages, freezing plants, frozen stores, boat building yards, fuel docks and engine repair shops in Veraval, Mangrol and all Gujarat are shown in Table 3. About half of ice making capacity, three-fourths of cold storage capacity and all of freezing and frozen store capacity are in Veraval.

#### F. Marine Fishery Research

12. Marine fishery resource research in India is carried out primarily by the Central Government, secondarily by State Governments and to a very minor degree by universities. The Central Government fishery institutions, including those receiving technical assistance from abroad, are: (a) Deep Sea Fishing Organization (established in 1946) which was renamed Exploratory Fisheries Project (1974); (b) Central Marine Research Institute (1947); (c) Indo Norwegian Project (1952) which subsequently became the sole responsibility of GOI and was renamed the Integrated Fisheries Project (1972); (d) Central Institute of Fishery Technology (1957); (e) National Institute of Oceanography (1966); and (f) UNDP/FAO Pelagic Fisheries Project (1971). The geographic center of fishery research is Cochin, where headquarters of (b), (c), (d) and (f) are located. Fishery research in Gujarat is the responsibility of Gujarat Department of Fisheries, but Exploratory Fisheries

Project, Central Marine Fisheries Research Institute and Central Institute of Fishery Technology also have substations in Gujarat.

13. The Exploratory Fisheries Project (EFP) has operated over the entire coast line, while the Integrated Fisheries Project has worked largely off Kerala and southern Tamil Nadu, and the Pelagic Fisheries Project has worked off Kerala and Karnataka. Possible additional fishing surveys in future include a UNDP/FAO survey off Tamil Nadu and a Polish/Indian survey off Gujarat and northern Maharashtra. GOG has carried out a survey off Gujarat.

14. EFP is located in Bombay, with four additional bases on the west coast, including one at Kandla, and six on the east coast. It operates 30 vessels; 20 of 17.4 m, five smaller and five larger. Its function, as the name indicates, is primarily exploratory fishing.

15. EFP has carried out trawl fishing in Gujarat since 1948. From 1948 through 1973 it fished for about 11,000 hours. over 80% of this effort was in the areas off southwest Gujarat (Veraval) and southeast Gujarat (Jafrabad) in the 20-39 m depth zone. On the basis of this work, GOI estimated that in the 0-40 fa depth zone between 20° and 23°N there is a standing stock of about 225,000 tons of demersal species with a potential annual yield of about 112,500 tons or about 40% more than the demersal catch in 1972 and 1973. This estimate is also conservative.

16. The Central Marine Fishery Research Institute (CMFRI) headquarters is in Cochin, with 42 out-stations of varying rank including one in Veraval. CMFRI is part of the Indian Council for Agricultural Research (ICAR) but has been handicapped by lack of vessels. The objectives of CMFRI are to:

- (a) estimate catches of marine fishes and other animals throughout the year by different types of vessels and gear;
- (b) conduct research on marine fisheries resources in order to increase production to the maximum;
- (c) locate new fishing grounds, conduct environmental studies in relation to fisheries, increase production through mariculture; and
- (d) recommend measures for rational exploitation of marine resources.

17. Work has been carried out by CMFRI in all of these areas. One important accomplishment was the design and implementation of a sampling system to obtain catch and effort statistics for India. CMFRI has conducted demersal resource surveys, studies biology of commercially important species, stock assessment studies, work on the relation of environmental changes to variations in yield of certain fisheries and work on prawn culture.

18. CMFRI has 42 physical establishments, including headquarters in Cochin, a regional center in Mandapam Camp, 8 substations, 4 research units and 28 survey and research centers located around the coastline and in the Laccadive and Andaman Islands. Mandapam regional center, which was originally the headquarters site, and the substations, are concerned with regional fisheries and problems. Research units are concerned with sub-regional matters. Survey and research centers are concerned with local matters, including collection of fishery statistics. Survey and research centers and research units are administratively responsible to substations which are in turn responsible to headquarters.

19. Present GOI policy calls for increased attention by CMFRI to achieve results of more immediate and practical application as well as of importance. Since CMFRI is the main fishery research organization in India and is the repository of existing fishery information, it is expected that personnel associated with Gujarat and Andhra Pradesh fish testing surveys (Annex 6), including those supplied under technical assistance, would work closely with CMFRI.

20. The Integrated Fisheries Project, also located in Cochin, has 14 vessels with seven of 17 m or larger. It has done work in a variety of fields and particularly in exploratory fishing in deeper waters off Karnataka, Kerala and southern Tamil Nadu. Promising resources have been discovered, but these have not been brought into commercial production.

21. The Central Institute of Fishery Technology (CIFT) headquarters is in Cochin, with seven out-stations, including one in Veraval. CIFT works in the areas of vessels and gear technology and processing technology.

22. The National Institute of Oceanography is located in Goa. It is concerned with oceanographic studies not necessarily of direct application to fishery problems.

23. The UNDP/FAO Pelagic Fisheries Project, also located in Cochin, operates two vessels. It has discovered important resources of several species of pelagic fishes, but these have not yet been brought into production. A second phase of the Project, about to commence, will concentrate on the practical development of these resources.

24. The Gujarat Marine Biology Research Station is located in Okha. It operates six vessels; three vessels of 49' and one of 58' are based at Okha and operate to depth of 30 fa; two steel vessels of 57' are based at Porbandar and operate in depths of 30 to 35 fa. Trawl surveys carried out by these vessels have helped the trawl fishery of Gujarat to become established and to expand. The Research Station also carries out some processing technology and recent work has been done on fish protein concentrate production.

25. Improvements are being made by GOI in the area of marine fishery research by reorienting programs to more practical development ends and by improving operational efficiency.

26. In spite of information available from fisheries themselves and from exploratory surveys, additional information is needed to plan the expansion of Gujarat fisheries into more offshore fishery resources. There is the possibility of a Polish - Indian survey (which will cost India Rs 8.0 million in direct costs) off the shelf area from Bombay north to the Pakistan border. However, the ship to be used is a 60 m stern trawler, 1,650 hp engine, 300 tons frozen storage capacity, fish meal plant with capacity of 15 tons (wet weight)/day. Such a vessel is too large, production costs are accordingly high leading to high product prices; landings will be too large leading to reduced market prices and, in general, it will be difficult to interpret the results of such a survey in the form of a meaningful economic feasibility study for boats of the sizes likely to be used by India.

27. There is need for a survey of demersal, pelagic and mid-water resources not presently utilized. This will require use of both a stern trawler and a purse seiner, each manned and operated by commercial fishermen, for a period of at least one year. Such a survey should provide information on the kinds of resources present, their distribution over space and time, how they can be caught and at what catch rates, all integrated in the form of economic feasibility studies of indicated kinds and sizes of vessels (Annex 6).

28. Apart from Gujarat, the only area of the Indian coastline which has not already been surveyed or is not due to be surveyed in the near future, is the area lying north of Madras including especially the coast of Andhra Pradesh. Since the fishery harbor preparation report for Andhra Pradesh is almost completed, GOI requested that a survey of fishery resources be provided for this area. The requirements are identical with those for Gujarat (Annex 6).

#### G. Training and Extension

29. Fishery training in Gujarat is provided by the Department of Fisheries through its Training Centers. There are Marine Training Centers in Veraval and Bulsar and an Inland Training Center in Ukai.

30. The Veraval Center offers five expanded courses, four of which last 12 months. These include: (a) shore mechanics for five trainees (an engine repair shop is operated in conjunction with this course); (b) engine driver for five trainees; (c) craft and gear for five trainees; (d) fishing secondhands for 25 trainees; and (e) fish processing and preservation for ten trainees (which lasts six months). There are about 155 applicants for these courses. Matriculation is a requirement for entrance. In addition,

there are two other training courses at Veraval. One is a general course in fishing for boys who have finished fourth standard (15-16 years of age). This course lasts 10 months and can accommodate 15 trainees; there are about 100 applicants per course. The other is a course for girls in fish processing and handling; this course lasts three months, ten trainees per course can be accommodated and the course is given three times per year.

31. The courses in Veraval are carried out in two separate facilities, one in the harbor area, and the other on two 45' training trawlers. There are plans for a new facility in the harbor complex. The center at Bulsar offers a general course in mechanized fishing; 30 trainees can be accommodated and the course lasts ten months.

32. In addition to training activities carried out by GOG, there are also training activities carried out by GOI. Especially important is the Central Institute of Fisheries Operatives (CIFO) in Cochin, established in 1963. A unit of CIFO was established in Madras in 1968. CIFO offers seven courses: (a) fishing secondhands; capacity for 40 trainees in Cochin and 40 in Madras, 15 months duration; (b) engine drivers, 40 + 40 trainees, 15 months; (c) radio telephone operators, 10 + 10 trainees, 9 months; (d) gear technicians, 20 + 10 trainees, 9 months; (e) boat building foremen, 20 trainees Cochin only, 15 months; (f) shore mechanics, 20 trainees, 12 months; and (g) teachers training, 10 trainees, 6 months.

33. The Department of Fisheries has no Extension Division as such, but in fact extension activities are carried out by Fishery Officers and other Departmental personnel stationed in fishing areas. These activities include especially dissemination of information about recent advances in fishery matters, and information on subsidies and other forms of Government assistance.

#### Fishing Harbor Development

34. PISFH is a self-contained unit with the Ministry of Agriculture and Irrigation (GOI), with headquarters at Bangalore. It was established in January 1968 with UNDP technical assistance for identifying potential harbor sites for the operation of fishing vessels drawing more than 1.2 m, UNDP technical assistance ended in December 1972 but PISFH also received technical assistance from the Swedish International Development Authority between January 1974 to June 1976. PISFH has conducted pre-investment investigations at seven sites and has prepared feasibility reports including preparation of detailed designs and drawings for six of them. The unit is headed by a Director who is an engineer and four Deputy Directors, of which three are engineers who have been trained and have experience in harbor engineering. The other Deputy Director is an economist who is assisted by an Assistant Director (economist) and two economic investigators to conduct economic investigations, evaluation and preparation of reports. The engineering staff included in further four senior and six junior engineers, draftsmen, and a unit for carrying out sub-oil investigations. Total strength is 57.

Export Promotion of Fishery Products

35. MPEDA was established in 1972, by an act of Parliament, in the Ministry of Commerce, succeeding the Marine Products Export Promotion Council which was established in 1961. The function of MPEDA is to promote development of marine products industry with special reference to exports. In order to carry out this function, MPEDA is given wide authority including:

- (a) developing and regulating off-shore fishing (beyond 40 fathoms);
- (b) registering fishing vessels, processing plants, storage facilities and conveyances;.
- (c) fixing export standards;
- (d) rendering financial or other assistance to owners of fishing vessels, processing plants, storage facilities and conveyances;
- (e) inspecting marine products;
- (f) regulating export of marine products;.
- (g) improving export marketing;
- (h) registering exporters;
- (i) collecting and publishing statistics; and
- (j) training.

The activities of MPEDA thus far include marketing, product diversification, collection and publication of statistics, improvement of quality including establishment of standards and provision of infrastructures (a 1,000 ton -30°C cold store is under construction in Cochin).

3. MPEDA Board of Directors consists of a Chairman and Director, both appointed by GOI, representatives of GOI, State Governments, and of various parts of the fishing industry. MPEDA also has a Secretary appointed by GOI, an elected Executive Committee, Export Promotion Committee, and Technical Committee. MPEDA headquarters are in Cochin and regional offices in Bombay, Calcutta, Cochin and Madras.

INDIA

GUJARAT FISHERIES PROJECT

Growth of Indian Fisheries, 1950-1975

Year	Catch /1			Catch Value/2 (Rs M)	Number of Mechanized Boats /2	Number of Fishermen/3	Tons per Fisherman	Export		
	Marine	Fresh Water	Total					Weight /4 (1,000 t)	Value/5 (Rs M)	value as % of total exports/6
1950	580	237	817		13			19.7	25	
1951	533	218	751					22.2	33	
1952	528	216	744					24.8	38	
1953	581	238	819					30.9	44	
1954	588	240	828					28.6	47	
1955	596	243	839		963			24.0	39	
1956	718	294	1,012					18.1	37	
1957	875	358	1,233					22.8	46	
1958	756	309	1,065					30.7	59	0.70
1959	584	239	823					33.7	62	1.02
1960	879	282	1,161	820	1,298	229,354	3.8	16.3	40	0.63
1961	684	277	961	920				17.3	47	0.62
1962	644	330	974	970				11.6	37	0.55
1963	656	390	1,046	1,010				17.9	59	0.76
1964	860	460	1,320	1,150				21.5	68	0.84
1965	824	507	1,331	1,320	3,045			15.5	69	0.86
1966	889	478	1,367	1,460				19.2	135	1.15
1967	863	537	1,400	1,630				21.8	199	1.65
1968	904	622	1,526	1,840	6,458			24.8	221	1.67
1969	914	693	1,607	2,100				30.6	331	2.40
1970	1,086	670	1,756	2,160				37.2	355	2.34
1971	1,162	690	1,852	2,560				34.0	392	2.48
1972	971	666	1,637	3,340				38.3	581	3.13
1973	1,210	748	1,958	5,570	9,300			48.8	796	3.51
1974	1,472	733	2,255	9,370	10,126			46.4	763	2.41
1975	*1,562	*806	*2,368	11,940	10,886	317,642	4.9	54.5	1,049	2.91

1/ 1950-64 Jhingran (1975), FAO Yearbook Fishery Statistics Vol.22; 1965-73 FAO Yearbook Fishery Statistics Vol.36, 1974-75 Ministry Agriculture and Irrigation.

2/ Ministry Agriculture and Irrigation; 1960 = 1960-61, 1961 = 1961-62, etc.

3/ Ministry Agriculture and Irrigation, 1950-74.

4/ 1950-74 Marine Products Export Development Authority (1974); 1975 MPEDA; 1950 = 1950=51, 1955=1955-56, 1956=April-December 1956.

5/ Rs per US\$: pre-6 June 1966=4.76; 6 June 1966 to mid-December 1971=7.50; mid-December 1971 to end June 1972=7.28; after end June 1972 floating.

6/ MPEDA  
(JCM June 24, 1976)

\* Provisional estimate.

INDIA

GUJARAT FISHERIES PROJECT

Growth of Gujarat Fisheries, 1960-1975.

Year	Catch		Total value	Number of boats		Number of fishermen	
	Marine	Fresh water <sup>1</sup>		Non-mech.	Mech.		
	--(1,000 t)--		(Rs M)				
1960	79.4	na	79.4	20.8	2,099	131	-
1961	80.5	-	80.5	21.2	2,246	152	11,732 <sup>2</sup>
1962	82.7	-	82.7	24.8	2,491	163	-
1963	85.0	0.1	85.1	24.9	2,740	223	-
1964	89.0	0.2	89.2	28.8	2,843	355	15,110
1965	109.9	8.9	118.8	40.3	2,853	370	-
1966	115.2	11.0	126.2	42.0	2,887	425	-
1967	124.9	10.2	135.1	52.3	3,099	489	-
1968	131.7	11.3	143.0	57.6	3,410	543	-
1969	139.0	11.3	150.3	64.0	3,569	618	-
1970	146.7	12.2	158.9	78.1	3,874	755	-
1971	147.8	13.4 <sup>2</sup>	161.2	98.5	4,080	945	-
1972	152.1	14.6 <sup>2</sup>	166.7	105.4	4,208	865	24,416
1973	167.8	15.9	183.7	168.6	4,404	923	-
1974	164.4	10.8	175.2	160.8	4,652	1,032	-
1975	187.8	11.0	198.8	200.8	4,971	1,263	-

<sup>1/</sup> 1961 - 70 from Jhingran (1975).

<sup>2/</sup> Interpolated

<sup>3/</sup> GOI

Source: GOG Department of Fisheries except as noted

(JCM:mbw June 24, 1976)



INDIA

GUJARAT FISHERIES PROJECT

Existing Ancillary Facilities in Ports & Landing  
Places, Gujarat as of June, 1976

Facilities		Veraval	Mangrol	Other Ports	Total Gujarat
Ice making plant	No.	12	7	17	36
	t/day	155	31	121	307
8° C Storage depot	No.	9	-	7	16
	t/day	1,300	-	470	1,770
Freezing plant	No.	3	-	-	3
	t/day	42	-	-	42
-18° C Storage facilities	No.	3	-	-	3
	t/day	750	-	-	750
Boat building yard <sup>1/</sup>	No.	1	-	7	8
	Boats/year	90	-	100	190
Fuel dock or station	No.	1	1	1	3
Engine repair shop	No.	4	2	4	10
Fish meal plant	No.	1	-	-	1
	t/day raw material	50	-	-	50

<sup>1/</sup> A number of boats are also built outside of boat building yards.

Source: GOG Department of Fisheries and mission observations.

(JCM:mbw June 24, 1976)

INDIAGUJARAT FISHERIES PROJECTFishing Harbor FacilitiesA. VERAVALDescription of Existing harbor

1. Veraval is situated on the south west coast of Saurashtra Peninsula and is about 300 km south by sea from Bombay. It is connected by meter gauge rail to the Ahmedabad - Bombay and the Ahmedabad - Delhi main railway lines. The tidal range at spring tides is 2.4 m.

2. Veraval port was initially developed in 1920 by the construction of two basins with a depth of 2.5 m at low water giving a landing quay of about 570 m in length. A vertical face breakwater 330 m long was subsequently constructed to provide protection from the monsoon. During the 1930s a further 340 m of wharf of the same depth was constructed as the first stage of an inner harbor on the northern side of a creek about 400 m to the east of the original development. At the same time, a small dry dock and workshop facilities were constructed. Around 1950, a further 200 m of wharf was constructed in the inner harbor to cater for sailing vessels handling limestone, bauxite, etc. In the early 1960s a development for fishing vessels was carried out on the south side of the creek. It comprised a trawler quay 185 m long with 60 m wide berth deepened to 5 m below low water, a boat wharf of the same length opposite the trawler quay on the north side of the creek, a landing wharf 300 m long and 2.5 m deep and a reclaimed land area of about 12 ha. A plan of the existing facilities is shown in Chart 16633.

3. There is a relatively small amount of littoral drift along the coast and about 30,000 tons of sand and silt are dredged each year, principally at the entrance to the inner harbor and from the channel and basins near the trawler quay. Minimum depths of about 2 m at the trawler quay and 0.3 m at the landing quay are maintained. As there are no significant streams discharging into the inner harbor this situation probably arises from sand transported along the coast by the swell (principally in the monsoon) and the transport of some fine material by the nearby Hiran river which is carried in suspension into the harbor during the monsoon.

4. The commercial activities of Veraval port, amounting to a total of about 350,000 tons per annum, consist of export of cotton, raw wool, onions, oilcakes, groundnuts, and limestone, and import of sulphur and fertilizers. Movements are mainly by lighters from ocean-going ships, the

lighterage wharves being those nearest to the breakwater. These wharves are also used by fishing vessels and there is a considerable amount of congestion.

5. Gujarat Ports Directorate (GPD) owns an old steam-powered dipper dredger, bottom-dump barges and tugs. Regular maintenance dredging up to about 30,000 tons per annum hopper measure is carried out, but is frequently impeded by dredger breakdowns.

6. To the south east of the quays, further up the creek, there is an area of about 10 ha which dries out at low water and which is used by fishermen for beaching their boats during the monsoon and at other times when the boats are not being used. This area is crossed by a causeway, which gives access to the area used by fishing vessels, and which incorporates a swing bridge to allow vessels to pass. At the further end of the creek is the boat-building yard of the Gujarat State Fisheries Central Cooperative Association (CFCCA). Private boat building activities, on a smaller scale, are also carried out along the creek.

7. Existing harbor facilities are inadequate for the present scale of fishing operations. Quay length is insufficient, the back-up area for fish auction halls, etc. is too small, access to the harbor is restricted at low water and during even moderate seas, and there is a lack of proper slipway facilities.

#### Improvements to be carried out under the project

8. General description. Improvements to be constructed would comprise the following:

- (i) extension of the existing breakwater by a length of 334 m to a total length of 664 m.
- (ii) construction of a lee breakwater 500 m long and reclamation of 7.5 ha of beach;
- (iii) construction of landing and bunkering quays 535 m long;
- (iv) construction of open berthing jetties of total length 1,120 m (both sides);
- (v) deepening of entire fishing harbor area to 3 m below low water;
- (vi) excavation of an entrance channel 45 m wide varying in depth from 5.5 m at the harbor entrance to 4 m at the existing trawler quay;

- (vii) construction of a slipway with a transfer cradle capable of accommodating a total of 12 vessels of up to 28 m long and 28 vessels up to 20 m long (or 60 vessels up to 15 m long);
- (viii) construction of an elevated high-level footbridge across the fishing harbor along the line of the existing causeway and swingbridge; and
- (ix) construction of roads, paved areas, buildings, navigation aids, etc.

9. Site and other investigations. In order to design the works the following investigations have been or are being carried out:

- (i) Wave records. The original design for the harbor was based on a design wave height of 4.9 m, the same as has been adopted at Porbandar, 120 km to the north west where a harbor is under construction. This wave height was calculated by reference to storm records but is low when compared with ships observations of actual wave heights in the area. Scientific wave records are now being obtained at Okha, 200 km to the north west, and a wave rider buoy has been installed at Veraval for the 1976 monsoon. GDP has undertaken to obtain records of wave heights observed at Bombay High oil field, about 200 km to the south west, and to revise the design wave height in the light of these results (para. 10).
- (ii) Land survey. A land survey of existing facilities was carried out in 1973 by a theodolite traverse, and closure was checked across the entrance channel by triangulation. Orientation was determined by compass bearing. The survey has not been related to a grid and, although not essential, it is desirable that this is done before work commences.
- (iii) Marine survey. A hydrographic survey was carried out in December 1973 by echosounder. Lines were at 50 m spacings and depths were checked from time-to-time by lead line. The sea-bed levels in places varies rapidly, a maximum difference of 5.5 m in about 30 m having been observed.
- (iv) Boreholes. 23 boreholes have been sunk by GPD. Boreholes Nos. 12 to 23, in the outer harbor and approach channel were sunk in 1961 and Nos. 1 to 11, in the inner harbor in 1974. The boreholes were carried out using a rotary core drill and rock cores have been retained and are available for inspection. There are some discrepancies between the sea-bed levels shown on the 1961 borehole logs and the hydrographic survey, but these can be explained in some cases by siltation between 1961

and 1974 and in other cases by errors in the horizontal position of the boreholes which, coupled with the uneven nature of the sea bed, can give significant level differences. The discrepancies do not significantly affect the validity of the estimates as the entire quantity of channel dredging in the area concerned has been assumed to be rock and the quantities calculated from the hydrographic survey.

(v) Trial Pit. To obtain further insight into the difficulties of carrying out the inner harbor construction in the dry behind a cofferdam a trial pit was excavated during appraisal. The hole filled with water to about mid-tide level fairly rapidly, but there was no significant variation of water level with tide. This indicates that, although the ground is saturated, there appears to be no open fissure network, and confirms the experience gained during construction of the trawler quay that there should be no major difficulties in keeping the area dry during construction.

(vi) Materials. At present, concrete aggregates and road stone for Veraval come from a quarry at Keshod (about 50 km) but it is proposed to open a quarry at Ankara where similar outcrops of basalt occur. This site is 26 km by road from Veraval, of which 5 km is unsurfaced.

(vii) Wave penetration model. Tests were carried out on a 1:150 scale model of the harbor at the Central Water and Power Research Station at Pune to determine a suitable arrangement of the breakwater to give an acceptable degree of wave attenuation within the harbor. The alignment of the breakwaters in the project is based on the results of these tests, which are fully described in specific note 1498 of July 30, 1975 prepared by the Research Station.

(i) Breakwaters

10. (c) Design criteria. The original design wave for the breakwaters was 4.9 m, but this will be reassessed in the light of further information now being obtained (para 9). Even with better wave climate data in the area, a conservative approach should be adopted and the breakwater designed for minimal damage during a storm of a probability of not less than once in 50 years. This is because the costs of breakwater repairs are particularly high in the case of a small port, where heavy plant for repair work cannot be easily mobilized. (Project estimates used in this report are based on allowing for a design wave of 7 m).

(ii) Lengths of quay

11. It is difficult to be precise about the length of quay needed for servicing fishing vessels as fishermen seem generally quite happy to moor

their boats several deep alongside one another for landing fish and outfitting and to do these tasks without any major loss of efficiency.

12. Estimated total number of trawlers at the end of the project period (1981) is 700 most being of the 14.8 m long type. There are two main landing times a day, the evening period being more protracted than that of the morning. As a proportion of MFV are always inoperative, it is estimated that 360 will need to be serviced at any one time. The landing period is estimated at three hours and assuming that on average it takes 20 minutes to offload a MFV and thus that there is a 30-minute off loading cycle 6 MFV could be serviced per boat space and a total of 60 spaces needed.

13. It is proposed at completion the existing length of quay of 185 m would be increased to 620 m by adding 345 m of new landing quay and 90 m of outfitting quay. As the outfitting quay would be used for loading and unloading at different times, about 480 m of quay would be available for unloading. 30 MFV 14.8 long could be accommodated with a 1 m gap between them. Double banking, with berthing parallel to the quay, would suffice. In the alternative 60 boats, if moored low, could be accommodated in 240 m of quay. Therefore there would be ample room for loading and unloading, with longer fueling and watering time, and shorter service time.

14. For trawlers to tie up to during intervals between fishing trips, 7 double-sided jetties 80 m long would be provided. Each jetty would be able to take 10 trawlers single banked, but as the width between jetties would be 53.5 m six deep berthing would be possible and accommodate a total of 420 MFV. This would be rather more than half the total number of MFV expected by 1981 though tight should be adequate in the fishing season. During the monsoon, when all the trawlers will be in the harbor, it would not be possible for them all to tie up at the berthing jetties, but the quays could then be used and MFV could also moor in the manoeuvring areas.

15. An area is available for future expansion of the fishing harbor south east of the road at the south east of the site (Chart 16633). This could provide another 5 ha of water area, enabling another three jetties to be constructed, accommodating another 180 trawlers.

(iii) Depths of basin and channels

16. The berthing basin and the landing and outfitting quay basin would be dredged to 3 m below chart datum, the MFV quay area to 4 m, and the entrance channel would be dredged progressively deeper towards the harbor entrance where it is 5.5 m.

17. The trawler quay area was excavated to full depth when the harbor was constructed and only the removal of soft silt is needed. The majority of material to be removed from the other areas is rock.

18. Mean low water of spring tides is at +0.24 m, and a study of the tide tables shows a lowest-predicted tide for 1976 of -0.04 m and two other tides of -0.01. Hence, 93% of the low tides are, above +0.2 m and 68% above +0.5 m.

19. Of the vessels which would use the fishing harbor, the 14.8 m vessels have a draught of 1.7 m and the 23 m vessels 2.6 m. The dredged depths are, therefore, adequate for accommodating 23 m vessels and for allowing them to use the entrance channel at lowest low water and under monsoon condition with a swell of up to 3 m.

20. Although at the outset the proportion of 23 m vessels using the harbor will be small, the extra cost of providing depths to accommodate vessels of this size is considered justifiable in view of the great difficulty and cost of deepening later, the need for the harbor to act as a refuge, and increase of time between occasions it will be necessary to carry out maintenance dredging.

(iv) Slipway

21. The slipway would be provided with a tilting bridge and transfer cradle to serve 6 repair bays, 60 m long and 14 bays 50 m long. Each bay would be able to accommodate a maximum of 3 vessels at a time, (the vessel requiring longer-term repair occupying the inner portion), so that up to 60 vessels could be repaired simultaneously. Assuming major repairs takes 8-10 weeks and minor repairs 4-5 weeks, this envisages an average of one-and-a-half slippings and unslippings per day. The peak rate would be around twice this, but there should be no difficulty in achieving this, as the 14.8 m boats can be moved at most states of the tide.

22. A theoretical maximum of around 500 boats per year could, therefore, be served by the slipway, or an average for each vessel of about once every one-and-a-half years. In addition to the slipway, a landing beach would be funded where minor bottom repairs, painting, etc., could be carried out. Areas would be made available for this on the protected beach outside the harbor or on the reclaimed land to the west of the slipway.

23. Slipway capacity is similar to that planned for other fishing harbors on the west coast of India. It is designed for an all up weight of cradle plus vessel of 200 tons which corresponds to a vessel length of around 28 to 30 m. A vessel of such length would have to be slipped with great care as the maximum keel length that can be supported on the cradle is 15 m, although fishing vessels can be slipped with appreciable overhangs at the bow and stern. Although this size is significantly greater than the vessels which are planned to use the harbor initially, it is prudent to design the slipway for a capacity that may be needed in the future.

24. The depth of water at the lower end of the slipway rails is adequate to enable a vessel drawing 3 m to be slipped on most days of the year. It should be possible to trim larger vessels to achieve this.

Project Implementation

(a) Design

25. Design and tender documents have been prepared by GPD. With the exception of the aspects shown in the Appendix 1 which have been taken up with GOG, they are satisfactory:

(b) Supervision

26. GOG proposes to employ the following staff in supervision of project construction: 1 chief engineer (who would also be in overall charge of the Mangrol project); 3 executive engineers; 11 deputy engineers; 24 junior engineers; and accountants, clerks, supervisors, etc. It is proposed that these staff should be drawn from GPD and GOG Public Works Department. Experience requirements for the engineers would be that they are graduates in the relevant branch of engineering and should have not less than 3, 10 and 15 years experience respectively in ports and harbors construction for the post of deputy engineer, executive engineer and chief engineer respectively. Recruitment of this establishment, particularly for the senior position, would be coordinated with the construction schedule to ensure that adequate supervision is available from the commencement of project works.

28. Technical assistance would be provided to the project engineering team in the following areas: (i) preparation of detailed designs for the slipway; (ii) general supervision of the project; and (iii) underwater rock dredging. The proposed assistance is described in more detail in Annex 6.

(c) Execution of Works

29. Rock excavation. Rock excavation would be carried out by GPD as the quantities involved are small (about 100,000 cm) and are at such a shallow depth that the value of contract would be too small to interest an international contractor. GPD has a dredging unit comprising a dipper dredger and bottom dump barges but the dredger is virtually at the end of its useful working life and it would not be practicable to attempt to excavate this quantity of rock with it. A small drilling barge and tugs are also available.

30. GOG has been contemplating the purchase of a replacement dipper dredger but preliminary enquiries have indicated that its cost would be too high. Furthermore, a dipper dredger is a relatively inflexible tool in that it cannot readily be adapted to work at greater depths than these for which it is designed and the cost of a dredge increases very substantially with ability to dredge at greater depths. Consequently, new grab dredger would be acquired under the project. Such a dredger is relatively cheap, and can easily be adapted to work at greater depths as may be required at other ports. Additional drilling equipment would also be needed and obtained under the project.



31. Other work. The remainder of the work would be carried out by contractors employed through international competitive bidding. Hence, although ICB would be used it is unlikely that foreign firms would be interested or competitive. There are a small number of firms in India with the experience and resources to carry out such a project, but a much larger number would be able to carry out the work satisfactorily, largely using intermediate technology, if help were provided in terms of major items of construction plant and engineering advice and if the work were properly supervised and controlled. Such a firm is engaged in the construction of the breakwater at Porbandar and, although at the start of the contract the rate of progress was slow, it is now reported to be adequate. The quality of work, although not as high as one would expect from an international contractor, appears adequate for the purpose.

32. In anticipation that domestic contractors will eventually win the contracts of the works, GDP proposes to invite tenders from all contractors in their Class A list. It would appear that preselection would be a wise course of action to limit bidders to those with experience of similar projects, a reasonable level of resources and experience particularly with regard to plant, and a good record of completion of substantial projects within prescribed time schedules.

(d) Construction program:

33. GDP has prepared a critical path program for works construction. It assumes approval for the scheme by April 1, 1977, tender awarded by September 1, 1977, and completion of the marine works by April 1981. This program allows one month between scheme approval and issue of tender documents, three months for the tender period, and one month for appraisal of tenders and award of contract. Given suitable preparatory work, terms of the first two items is adequate, but it is unlikely that appraisal and award will occupy less than three months.

34. The proposed sequence of operations is generally in order and the output needed to complete each activity within the scheduled time should be attainable by a reasonably competent contractor working under good supervision.

35. The main problem during construction would be maintenance facilities for the fishing fleet during the construction period, both as regards normal fishing operations and the provision of an adequate area of sheltered water to act as a harbor of refuge if a cyclone strikes outside the monsoon period. The plan, as proposed by GOG, was for the inner harbor to be constructed within a cofferdam running across the short path between the western end of the south wharf and the south east corner of the commercial utilities wharf. This cofferdam would be opened for a period before and after each monsoon, and the areas flooded temporarily to allow boats to enter, beach, and be sheltered from the monsoon. This plan would have the following disadvantages: (i) it would prevent the south wharf being used during the construction period for fishing activities and the east side of the commercial wharf and the north

wharf for commercial activities; and (ii) the sheltered area available for fishing boats as a harbor of refuge would be inadequate and damage to boats would be likely to occur if a cyclone arose outside the monsoon season.

36. A more practical arrangement would be for a main cofferdam to be constructed from the east end of the south wharf to the east end of the north wharf, and a subsidiary cofferdam on the original line to be closed only during the monsoon. GOG has accepted the proposal and project cost estimates have been amended to allow for this. Adoption of the plan should not involve any significant change in to the construction period.

## B. MANGROL

### Description of existing harbor

37. Mangrol is a small fishing village about 40 km to the north of Veraval. It is served by road but has no rail access. Existing facilities consist of a vertical-faced breakwater 150 m long with a landing quay on the inner face providing partial shelter to a water area of about 1 ha, and a small land area with a few buildings. During the monsoon, fishing boats have to be hauled up onto the land and the time taken for this is considerable, the first boat having to be hauled up rather more than a month before the onset of the monsoon and the last boat launched a corresponding time after the close of the monsoon.

### Improvements to be carried out onto the project

#### (a) General description

38. The new facilities to be constructed would comprise the following:
- (i) extension of the breakwater by a length of 250 m;
  - (ii) formation of a tidal basin about 190 m by 70 m, and to a depth of 2.5 m below low water, faced with 385 m of vertical face quay for landing, outfitting and berthing.
  - (iii) formation of a protected beach for canoes; and
  - (iv) formation of a land area of just over 2 ha for fishing related activities;
  - (v) construction of roads, paved areas and navigation aids, etc.

(b) Site and other investigations

39. In order to design the work the following investigations have been or are being carried out:

(i) Wave records

Information regarding wave heights is not so important as at Veraval as the breakwater is in water of a depth that limits the wave height to 4.9 m (or less in the case of the lee breakwater), thus the design of breakwater sections has been based on the maximum wave that can occur at that point.

(ii) Land and marine survey

A land and marine survey was carried out in August 1974 covering about 15 ha land and 25 ha water. It adequately covers the project area.

(iii) Boreholes

7 boreholes were sunk in the area in 1972 and 1973 and show that the entire area is rocky.

(iv) Materials

An existing quarry at Keshod, which is about 30 km from the site by road, can produce basalt suitable for the secondary armour and core material for the breakwater.

(v) Wave penetration model

Tests were carried out at the Central Water and Power Research Station at Pune on a 1:150 scale model of the harbor to determine a suitable arrangement of breakwater and width of entrance to the inner basin to give an acceptable degree of wave attenuation. The harbor layout is based on the results of these tests, which are fully described in specific notes 1518 and 1499 of November 15 and July 31, 1975.

(c) Design criteria

(i) Size of basin

40. The total number of trawlers at the end of the project period is estimated at 165. The length of landing quay is 140 m, so 9 14.8 m trawlers can moor alongside, or 18 if double banked. Assuming each space can service 6 boats during a three hour landing operation, as at Veraval, a total of 108 boats can land during the morning or evening landing period. Similar considerations apply to the outfitting quay.

41. For berthing, lengths of quay of 160 and 33 m have been provided, which would be capable of accommodating 12 trawlers at a time alongside or 50 end on. If all the quays are used for berthing these figures increase to 22 and 85. The width of the basin will allow an ultimate packing of boats 8 deep along quays at two sides so the entire fleet could, in an emergency, berth within the sheltered basin. Normally, however, a substantial proportion will be at sea or can moor in the lee of the breakwater, but it is clear that 165 is about the practical upper limit to the number of boats than can operate at Mangrol. The depth of the basin and entrance channel is 2.5 m which is adequate.

Project implementation

(a) Design

42. Design and tender documents have been prepared by GPD. The same comments as on the Veraval documents, see Chart 16634, apply to concrete mixing, construction plant and contractual matters (para 25). Apart from these, the documents appear adequate.

(b) Supervision

43. GOG has proposed an establishment to carry out day-to-day supervision of the project as follows: 1 executive engineer; 4 deputy engineers; 10 junior engineers; and accountants, clerks, supervisors, etc. These would work under the Chief Engineer in charge of Veraval.

(c) Execution of works.

44. Rock Excavation: The amount of rock excavation at Mangrol is small and would be carried out by the unit established for dredging the Veraval entrance channel. It would be done at a time convenient to the construction program of both projects, bearing in mind the needs of the commercial operations at Veraval as it would require the full time services of a tug.

45. Other Work: The same procedures would be adopted as at Veraval (para 31).

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GUJARAT FISHERIES PROJECT

Project Implementation

- (i) Concrete mixing: The specifications for concrete mixing should be amended to require weight batching rather than volume batching;
- (ii) Foot bridge: The designs and documents should be amended to ensure that access to the two ends of the foot bridge, crossing the fishing harbor, is obtained from outside the port area;
- (iii) Temporary cofferdam construction; The documents should be amended to require the contractor to construct temporary cofferdams in such a way that, except during the monsoon, vessels are allowed free access to the commercial utility wharf and the majority of the north and south wharves.
- (iv) Slipways: The documents should allow for the supply and installation of the cradle, tilting bridge, and mechanical and electrical equipment to be carried out by a nominated subcontractor.
- (v) Construction plant: The documents should be amended to ensure that procurement of those items of plant proposed to be ordered by GPD for the purpose of the contract, which the contractor needs to use, become entirely the contractor's responsibility. This can best be achieved by requiring the contractor to purchase the plant for amounts stated in the documents, if necessary giving the contractor (against the security of the plant) an advance of up to 90% of the value of the plant, repayable by deductions from progress payments, and, if necessary, undertaking to repurchase the plant at a fair value when no longer required.
- (vi) Contractual points:
  - a) The documents preclude release of foreign exchange. This should be altered to allow for international competitive bidding; and
  - b) The documents should be amended to require the contractor to insure the works.

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GUJARAT FISHERIES PROJECT

Shore Facilities and Services

1. The project would provide a range of shore facilities as described below:

Veraval

2. (a) Refrigeration complex: This would include two 200 t/day block ice plants with 400 tons of storage of  $-2^{\circ}\text{C}$  each, storage for 150 tons of iced fish at  $+2^{\circ}\text{C}$ , a freezing plant for 18 t/day of shrimp and frozen storage at  $-25^{\circ}\text{C}$  for 500 tons. A stand-by generator would be provided for the frozen fish store to ensure that there would be no large fluctuations in fish temperature due to disruptions in electricity supply. Ice plants would be installed in project years 3 and 5. Ice would be used in the auction hall for icing fish on landing, and during processing and transport of fish. About 2 tons of ice per ton of fish retailed wet would be used during handling and transport. About 50% of the fish would be handled in this manner. Fishermen, who at present use ice only on trips of 2-3 days and over, are expected to increase their use of ice under the project. In this they would be encouraged by fishery officers from GOG Department of Fisheries. Some ice would also be used for transport of fish from villages included in the sub-project. The 18 t/day freezing plant, which would be based on horizontal plate freezers, and include an iced fish store would be installed in year 4. The frozen store operating at  $-25^{\circ}\text{C}$ , which would be erected as part of the freezing complex, would also be completed in year 4.

(b) Fish meal plant: A fish meal plant of 75 t/day raw material would be provided and this would be operated by the private or cooperative sector. There would be sufficient raw material available in year 4 to give 70% utilization of the plant although fish dryers and fish meal manufacturers would have the same pool of raw material. The plant would be erected in year 3.

(c) Auction hall: A  $8,250\text{ m}^2$  auction hall would be provided. The floor would be graded to allow wash-water to drain, and the surface would be smooth, durable and easily cleaned. Stand pipes for wash-water would be supplied at frequent intervals along the hall. Weighing machines would be installed and a market container system introduced by Fisheries Terminal Division (FTD) in consultation with project consultants.

(d) Offices: Offices would be provided for the Fisheries Terminal (FTD) and also for Gujarat Ports Directorate (GPD) staff necessary to operate the berthing system and maintain buildings and services.

(e) Canteen: A canteen for fishermen and personnel involved in the shore terminal would be provided. This would be leased to an operator in the private sector.

(f) Gear shed: A 2,250 m<sup>2</sup> gear shed would be provided and space would be leased to vessel owners by FTD. The shed would be an open structure.

(g) Water supply: 2,000 t/day is included in the project. This would be piped from the new municipal supply from Hiran Dam due to be completed in 1977.

(h) Electricity supply: The supply would be increased from 20 MW to 40 MW and sufficient power would be available for the project and future developments.

(i) Drainage: Adequate drainage would be provided for the terminal area.

(j) Drying areas: Surfaced areas would be provided and leased to fish dryers by FTD.

(k) Security: The terminal area would be completely fenced in.

(l) Roads: Surfaced roads would be provided around the terminal facilities and sites.

(m) Workshop: A workshop of masonry construction would be provided. This would have an area of 1200 m<sup>2</sup> and would provide accommodation for 6-8 engine repair companies. The workshop would be leased out by FTD.

(n) Fuel supply: Sites for fuel supply stations would be leased to recognized oil companies by FTD.

#### Mangrol

4. (a) Refrigeration complex: The refrigeration complex at Mangrol would include a 75 t/day block ice plant with 200 tons of ice storage at -2°C, freezing plant for 10 t/day of shrimp, frozen storage at -25°C, and fish storage for 100 tons. A stand-by generator with a capacity of 32 kw would be provided for the frozen store. The refrigeration complex would be installed in year 4.

- (b) Auction hall: A 1,950 m<sup>2</sup> auction hall would be provided. The floor would be suitably graded to allow wash-water to drain and the surface would be smooth, durable and easily cleaned. Stand pipes for wash-water would be supplied at frequent intervals along the hall. Weighing machines would be installed and market containers introduced by FTD.
- (c) Offices: Offices would be provided for FTD and GPD staff.
- (d) Canteen: A canteen for fishermen and terminal personnel would be provided. This would be leased to an operator in the private sector.
- (e) Gear shed: Two 200 m<sup>2</sup> gear sheds would be provided and these would be leased to vessel owners by FTD.
- (f) Water supply: A pipe would be laid from the municipal main to give a supply of 245 t/day.
- (g) Electricity supply: A 66 kv line would be run into the port area. Adequate power would be available.
- (h) Drainage: Adequate drainage would be provided in the terminal area.
- (i) Drying areas: Surfaced drying areas would be provided and leased to fish dryers by FTD.
- (j) Roads: Surfaced roads would be provided for facilities in the terminal area.
- (k) Workshop: A 240 m<sup>2</sup> workshop would be provided for mechanical and electrical repairs. This would be leased out by FTD.
- (l) Fuel supply: Sites for fuel supply stations in both ports would be leased to recognized oil companies by FTD.



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GUJARAT FISHERIES PROJECT

Marine Fishing Vessels

Vessels

1. Marine fishing vessel designs have evolved in different parts of India and Gujarat according to local sea and wind conditions. Original designs were of sailing vessels, but these have been modified, or new designs have been introduced by institutions such as the Central Institute of Fishery Technology (CIFT), the Indo Norwegian Project, and FAO. It has been proved that locally manufactured vessels function well under local conditions while designs introduced from other areas or as de novo designs may not be compatible with local sea and wind conditions. Also local construction permits minor modifications to be incorporated in response to owner needs.

2. Most of the larger, mechanized fishing vessels (MFV) are built at the Gujarat Fisheries Central Cooperative Association (GFCCA) boatyard in Veraval. This yard has standardized on a 14.8 m vessel (just below the size requiring certificated personnel under the Indian Shipping Act of 1958) which is based on indigenous design. The MFV costs Rs 93,000 excluding the engine. These have rugged wooden hulls made from trees from Gujarat forests. There are other individual boat builders, but their standards fall short of levels recently introduced by GOG.

3. While vessel designs are appropriate for local operating conditions, changes in equipment probably would result in higher catch rates. For example, on trawlers, greater capacity winches and a more powerful main engine would enable the trawlers to fish deeper, haul a larger trawl and/or haul faster. On gill netters, power haulers would permit one or two more sets of the nets per fishing period. On an experimental basis GFCCA should i) equip some trawlers with 100-110 hp engines and with 1,500 ft drum capacity winches, and ii) some gill netters with power net haulers. Winches and net haulers should be powered by the main engine with a mechanical clutch linkage.

Engines

4. GFCCA installs 88 hp Ashok Leyland Engines (for which they are the local distributors), but 87 hp Ruston Engines are also available. The Ashok Leyland (water cooled) sells for about Rs 88,000 while the Ruston (air cooled) sells for about Rs 105,000. These engines have been produced in India for 15 years by what were originally joint venture companies. Imports of similar engines are prohibited. Both companies, which also manufacture and sell truck engines, have good distribution systems. Engines, spare parts and servicing facilities are readily available throughout India and Gujarat. These engines are priced competitively and are exported.

### Gear

5. A basic hull design of 14.8 m is rigged as a trawler-cum-gill netter. Trawlers have a double spool winch mounted just forward of the house, which is powered by the main engine through a mechanical clutch. Each spool has a 1,200 ft capacity of 3/8 in wire rope. However, ordinarily only 1,000 ft is used, since this is the length in which wire rope is commonly supplied. Thus, at a scope of 5:1, 30 fathoms is about the maximum depth to which these boats can fish. Ropes are led aft in customary manner through sheaves on both sides to gallows frames on the after deck at the stern. Fish holds are insulated with 2 in of polystyrene covered by 1/2 in of wooden sheathing which in turn is covered by a sheet of galvanized iron or fibreglass. Engine and winch controls are on the bridge, along with engine instruments. There is no compass. There are usually one or two bunks in the bridge, as well as access to the engine room immediately below. The house also contains a toilet and space for a small galley.

### Trawling

7. Nets used for trawling are large bag-shaped, constructed of synthetic monofilament, with large mesh in the wings and small mesh in the cod end of the bag. The net "size" is considered to be the length of head rope, which is roughly the width of the mouth opening. The most common sizes of nets are 18, 20, 23, or 25 m, with 23 m being the most common. When nets are towed, usually at about 2 knots, the mouths are held open by otter boards or doors between the towing warps and net bridle. A tow usually lasts about 1-1/4 hours and about 5 tows are made per fishing day. On one-day trips, on which no ice is carried, when the net is emptied on the deck, trash fish are separated from more valuable shrimp and fish. Valuable species are placed in the fish hold, while trash fish are left on deck. Trash fish are species for which there is no market for direct human consumption because of their small size or other undesirable features. In order to catch shrimp, the most valuable component of the catch, it is necessary to use small mesh in the cod end and trash fish appear as a by-catch. On landing, valuable species are off-loaded first and trash fish last. Trash fish are generally sun-dried, although there is one fish meal plant in Veraval making international grade (65% or more protein) fish meal for export from trash fish. Sun-dried fish are ground to make fish meal. This has about 45-55% protein and is used in India as a component of stock feed. Some is exported to Iran. On trips longer than one day, ice is carried and usually trash fish are discarded at sea in favor of using hold space for more valuable species. Trawling is carried out by day. Boats making one-day trips leave port early in the morning and return late in the afternoon.

### Gill Netting

8. In contrast to trawlers, most gill netters fish at night, leaving port late in the afternoon and returning early in the morning. Gill nets, of synthetic material, are constructed in units 4-5 fm deep and 20 fm long.

Forty units are fished at one time. There are plastic floats at the top and weights (stones) at the bottom, balanced so that the float line is at the surface when the net is set. Buoyed flags are used to mark the position of the net and to provide flotation. Mesh size varies from 4-1/4 to 5 in. Nets are manufactured by GFCCA net factory in Ahmedabad. While some fishermen prefer nets made of monofilament because of their higher catch rates, such nets are bulky to stack and difficult to handle, and most fishermen prefer multi-filament nets. Gill nets take about 10 minutes to set, are left in the sea for 1 - 1-1/2 hours and take about an hour to bring back aboard. Gill net catch differs from the composition of trawl catch and gill nets take more of the relatively higher priced table species. When MFV are used for gill netting, the mast in the foredeck is unstepped and sometimes even the winch is removed. The gill net is shot from the port side and picked up over the starboard side. Some vessels are built specially for gill netting, these have lower freeboard than trawler-cum-gill netters and there is no house--only a low engine cover--in order to reduce windage, and steering is by rudder at the stern.

Crew

9. Crew size varies from five to eight depending upon vessel size and fishing method, and pay varies from Rs 200 to Rs 500 per month, depending upon vessel size, experience and position held. Details are shown in Table 1. In addition, crew members are provided food when aboard and are allowed to take fish home. Skippers are paid at half rate during the south west monsoon but other crew members are usually not paid during this period. Information on pay relates to those vessels (the majority) on which crew members are on a set pay scale. On some gill net vessels crew income is also based on a share of the catch, in which case their income tends to be higher than those who are entirely on a set scale. In order to participate in catch sharing crew here to provide some of the nets, which are expensive. Vessel owners, therefore, have difficulties in the recruitment of crew for payment on a share basis.

10. GOG proposes to revise its vessel registration scheme.

11. Under the GOG proposals registry records would be kept separately for:

- (i) trawlers of 9 to 20 gt;
- (ii) gill-netters of 8 to 10 gt;
- (iii) motorized vessels of 1 to 5 gt; and
- (iv) non-mechanized sailing vessels of 1 to 10 gt.

12. Survey of vessels exceeding 50 ft with engines of and 149 hp would be required. Other information required and procedures that would be used would be declaration of ownership, issuance of certificate of registry,

custody and use of certificate, replacement of defaced or lost certificates, endorsement on certificate of change of master, endorsement on certificate of change of ownership, removal from registry of vessels lost or ceasing to be a vessel, temporary pass in lieu of certificate, transfer of vessel or shares, registry of transfer, transmission of property in a vessel on death or insolvency, transfer of vessel on sale by order of court, registration of mortgage, entry of discharge of mortgage, other matters associated with mortgage, name of vessel, registry alterations on vessel alterations, registry anew of change of ownership, transfer of port of registry, inspection of registry and certified copies of certificates, and other matters.

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GUJARAT FISHERIES PROJECT

Boat Risk Fund

1. GOG proposes to establish a Boat Risk Fund to supply insurance to boat owners. GFCCA would operate the Fund and beneficiaries of this project and members of GFCCA and its affiliates would be eligible for participation.
2. Coverage would be provided for: (a) total loss; and (b) 50% of the cost of repairs and replacements in excess of Rs 10,000 in the case of partial loss. Following the project period, such coverage would be continued but at a higher premium rate if necessary. Existing commercial rates are 2 1/2% of value for loss and an additional 3/4 of 1% for partial losses (total annual premium about Rs 6,300).
3. Initial capital for the Fund would be provided by GOG in the form of a contribution. Additional income to the Fund would arise from return on investments and premiums.
4. Over the past few years the loss rate of vessels has been very low, less than 0.5%. There is, however, always the possibility of heavy losses owing to unexpected cyclonic storms. The proposed funding could cover losses of up to 10% of project vessels.
5. The Fund would be managed by an Executive Committee, which would meet at least once per quarter or more often as necessary, with the following membership:
  - Commissioner of Fisheries - Ex-officio Chairman;
  - Registrar of Cooperative Societies;
  - Financial Adviser to Agriculture, Forest and Cooperative Department;
  - Representative of Fishermen's Societies;
  - Representative of State Cooperative Bank;
  - Representative of individual boat owners;
  - General Manager of GFCCA;
  - Deputy General Manager of GFCCA at Veraval - Secretary
6. Establishment expenses charged to the Fund would not exceed 3% of the capital of the Fund on July 1 of a year or Rs 15,000 whichever is least.

GUJARAT FISHERIES PROJECTVessel Crew Size and Pay Scales, Veraval  
(Rs per month)

Crew	11 m - gill netter - cum trawler		13 m trawler cum - gill netter		14.8 m trawler/ gill netter	
	Number	Pay	Number	Pay	Number	Pay
Skipper	1	400	1	500	1	500
Engine driver	1	300	1	400	1	400
Deckhand	3	200	3	250	4	250
Total crew	5	1,300	5	1,650	6	1,900

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Source: GOG Department of Fisheries

(JCM:mbw June 24, 1976)

INDIA

GUJARAT FISHERIES PROJECT

Traditional Fishermen Component

A. Introduction

1. This component would extend to about thirty-five central and northern fishing villages of which eight, around Mangrol and Veraval, would be the primary target. The villages, which lie between 22.8° and 20.8° latitude, range in location from the Bay of Kutch to about the entrance of the Gulf of Cambay near Diu facing the Arabian sea. The villagers are almost solely dependent on fishing for their existence. In early 1976, the total population of these villages was about 27,000. Average family size is around seven and the birth rate over 3%. Fishermen live in thatched huts with an earth floor, and most villages are without potable water supplies, often women carry water from 1 km to 3 km. Roads are frequently rough paths impassable during the monsoon. The sea coast villages are situated on, or adjacent to shifting sand beaches which have a high pitch, subject to large surge waves, and have no natural protection. Capital investments for breakwaters or jetties in any one small village, would cost as much as these needed for a minor harbor facilities, such as Mangrol. There are no sheds for sorting fish and ice seldom is available. Many fishermen are unemployed and without canoes. Hired boat hands earn Rs 200 to Rs 225 per month in the fishing season.

2. Six out of the eight coastal villages between Mangrol and Veraval lack access to main roads. Only four of the villages have primary schools, and all of them lack telecommunication and medical facilities. GOG has a long range plan to assist these villages and has recently serviced them with power lines. The usual marketing channels for fish are traders who are money lenders, and leading families in the villages. During the monsoon, when no fishing takes place, many boat owners borrow from traders in return for which they usually have to accept pre-fixed prices for their fish; these prices are often 30 to 40% lower than market prices.

B. Vessels, Outboard Motors, and Fishing Gear

4. Two types of traditional boats are used in the project area. The 9 m dug-out sea-going canoe and the 9-10 m plank, either flat or 'V' shaped, boat used in the Gulf of Kutch. Construction of a canoe is started when the buyer goes to Kerala and selects a suitable mango tree. Workman prepare a canoe to his specifications. The landed cost of a canoe of Gujarat is about Rs 15,000. The canoes have a life of at least 20 years and as they

are built to meet local conditions they are able to absorb the punishment of heavy waves. The canoes can be easily moved forward or backed without turning the boat about, and an outboard motor can be attached. The demand for canoes is great, but the demand for outboard motors is greater. Village fishing zones are immediately adjacent to the villages. If fishermen have outboard motors it takes about two hours to get to the fishing grounds; consequently they are able to fish for up to six hours before having to start back. If the canoes rely on sail it takes four hours each way and only two to three hours are available to fishing. Motorized canoes, which are able to take quite large surf waves that are common preceding and during the monsoon, produce at least 40% more catch than sailing canoes. All outboard motors are imported. In early January 1976, GFCCA imported 200 kerosene powered outboard motors from Japan and was able to sell them in two days. There are about 1,600 canoes working the area of which only 600 have outboard motors (4-8 hp). Estimated total demand exceeds 1,600 motors, including replacements (Table 1).

5. Canoes use gill nets and drift nets from end of August to November to catch pomfrets, giant herrings, Indian shad, seer, shark and cat fish; during winter months from December to March they operate bottom-set nets, and catch white pomfrets, perch, eel, catfish, sharks and rays. They fish from late March to mid-May in rocky grounds at 5-10 fathoms for rock lobsters using gill nets. These nets are made of 210 denier nylon 2 x 2 construction 'S' twist, mesh size of 13-15 cm., 45-50 meshes depth and 1,000 meshes in length, and 3 mm. dia hard twisted monofilament twines with 50% filling. Synthetic floats (locally manufactured) are attached to the board rope at intervals of 3 m along with stone sinkers. GFCCA manufactures the nets in Ahmedabad for Gujarat and surrounding States.

#### C. Sub-Project Components

6. The sub-project would include the following main components:

- (a) provision to fishermen on credit and over four years, 1,400 outboard motors of about 8 hp, of these about 475 would be for non-motorized canoes, 575 to replace old motors in motorized canoes and 350 for new canoes. The motors and 20% spare parts would be imported by GFCCA;
- (b) provision to fishermen on credit and over three years, 350 new 9 m dug-out canoes fully equipped with outboard motors, nets, sail, rope and anchors. The outboard motors for the canoes are included in (a) above. Six of the canoes would be made of fiber glass as an experiment, and initially would be owned by GFCCA and leased to fishermen;
- (c) provision of four trucks to GFCCA for delivery of ice and spare parts, to fish the eight villages between Veraval and Mangrol and for the transportation of fish therefore.



- (d) erection of 8 permanent sheds at the eight villages for collection and temporary storage of fish, and storage of ice. The sheds would include space for auctioning fish (Table 2);
- (e) construction of 33.5 km of approach roads to six villages (Table 2); and
- (f) provision of potable water supply for five villages (Table 2).

7. Finance for items (a), (b) and (c) with an aggregate investment of Rs 20.5 M would be channelled through the Agricultural Refinance and Development Corporation (ARDC) Funds for items (d), (e) and (f) would be channelled through GOG. The sub-project would benefit at least 10,000 villagers, and the annual catch of the villages is estimated to increase by about 8,000 tons by 1981 as a consequence of the project.

#### D. Organization and Management

8. Each fishing village would form a fishermen's primary cooperative society (FPCS) with the existing social leader, the Patel, as its President. FPCS would be affiliated to the District Cooperative Society which would in turn be affiliated to GFCCA.

9. Because of the risks inherent in this type of lending and to ensure prompt loan repayments, canoes and outboard motors would be owned by FPCS which would have separate sales agreements with individual fishermen. Under this 'hire-purchase' type operation a fishermen would become owner of his canoe only when his final loan repayment has been made. Lending terms and conditions are in Schedule A to the main report. FPCS would obtain loans from project participating banks, which would in turn be refinanced by ARDC. Participating banks would be those banks approved by and included in the ARDC Banking Plan for the project. ARDC would pay particular attention to the financial structure and organization of participating FPCS and would closely supervise these societies.

10. Fishermen purchasing canoes and motors from FPCS would agree to permit FPCS to make deductions from their fish sales proceeds which would be credited to members loan accounts. Each FPCS would be staffed with a trained secretary, who would be provided by GOG, and with a bookkeeper. Staff training would be carried out under the direction of GOG, GFCC and ARDC.

11. It is estimated that GFCCA, would be able to handle up to 30% of the total marketable surplus generated in project villages. It would provide ice to the villages, and collect fish from them. The remainder of the catch would handled by the traditional trading community.

INDIA

GUJARAT FISHERIES PROJECT

Demand for Canoes and Outboard Motors

Name of village <sup>1/</sup>	Population of fishing community		No. of canoes or flat-bottom boats		Demand for new canoes			Demand for outboard motors replacement				Total demand for outboard motors						
	1971	1976	With outboard motor	Without outboard motor	Year			Year				Year						
					1	2	3	1	2	3	4	1	2	3	4			
1. Kotda	965		20 (10) <sup>2/</sup>	55	10	5	4	19	2	3	5	10	20	67	8	9	10	94
2. Madhwad	2,350		58 (7)	40	12	10	10	32	14	17	20	7	58	46	27	30	7	110
3. Muldwarka	1,385		69 (2)	29	10	10	5	25	10	19	40	2	71	49	29	45	2	125
4. Dhamiej	1,238		77 (20)	63	10	10	6	26	12	18	27	20	77	85	28	33	20	166
5. Sutrapada	1,332		65 (15)	71	10	10	6	26	10	15	25	15	65	91	25	41	15	172
6. Hirakot	1,149		72 (20)	12	8	5	4	17	10	15	26	20	71	30	20	30	20	100
7. Jaleshwar (Veraval)	2,100		97 (56)	52	30	30	30	90	7	13	21	56	97	89	43	51	56	239
8. Chorwad	953		54 (15)	53	8	8	4	20	6	14	19	15	54	67	22	23	15	127
9. Mangrol	2,137		13 (10)	73	25	25	20	70	1	1	2	10	14	99	26	22	10	157
10. Mangrol Bara	742		58 (10)	27	10	5	2	17	8	18	22	10	58	45	23	24	10	102
11. Jamnager Dist. (incl. 22 villages)	4,910		1	661	25	27	28	80			1		1	25	27	18	30	100
12. Porbandar	3,340		5	421	6	8	9	23			5		5	42	21	21	5	89
13. Miani	232		1	18	1	1	2	4			1		1	2	1	3	1	7
14. Navabandar	249		2	13	1	2	2	5			2		2	2	4	4	2	12
	<u>23,082</u>	<u>26,800<sup>3/</sup></u>	<u>592</u>	<u>1,588</u>	<u>166</u>	<u>156</u>	<u>132</u>	<u>454</u>	<u>80</u>	<u>133</u>	<u>216</u>	<u>165</u>	<u>594</u>	<u>739</u>	<u>304</u>	<u>354</u>	<u>203</u>	<u>1,600</u>

1/ The project will concentrate on villages 1 through 10.

2/ Fishing villages are assumed to have 3% population growth from 1972-76.

3/ New Outboard motors by GFCCA in 1975-76.

Source: Government of Gujarat, Department of Fisheries, May 1976.

June 30, 1976

EC

GUJARAT FISHERIES PROJECTTraditional Fishermen Sub-Project

	Shed <sup>1/</sup>		Roads <sup>2/</sup>		Water Supply <sup>3/</sup>		
	Unit	Cost/Rs	Km.	Cost/Rs	No. of wells	Length of line to village (km)	Cost Rs
Chorwad	1	39,000			1	6.0	425,000
Dhamleg	1	39,000	16.0	1,028			
Hirakot	1	39,000	3.5	223	1	4.5	300,000
Kotada	1	39,000					
Madhwad	1	39,000	1.0	98			
Mangrol Bara	1	39,000	4.0	293	1	7.0	450,000
Mul-Dwarka	1	39,000	5.5	268	1	4.5	300,000
Sutrapada	1	39,000	3.5	223	1	8.0	500,000
TOTAL	8	312,000	33.5	2,133	5	30.0	1,975,000

<sup>1/</sup> Sheds are 10 m X 8 m of brick, cement, walls, asbestos sheet roofs, electricity tanks for fish, and fresh water connection.

<sup>2/</sup> Roads are of asphalt at 3.65 m wide.

<sup>3/</sup> Includes wells (6 m diameter and 18 m deep), pump house, pump machinery, rising main distribution pipeline, cistern, stand post, and electricity.

INDIA

GUJARAT FISHERIES PROJECT

Technical Assistance

A. Gujarat and Andhra Pradesh Test Fishing Operations

1. Introduction: Demersal resources of Gujarat inshore waters have been surveyed by GOI and GOG survey vessels and are being exploited by a growing fleet of trawlers. Inshore pelagic resources have been exploited to a lesser extent by gill netters. Little is known of the nature, abundance, distribution and potential catch rates of offshore demersal and pelagic resources and mid-water resources in general. Exploratory surveys elsewhere in India, offshore surveys in the northern Arabian Sea by other countries, e.g. Japan, and what is known of the general productivity of the northern Arabian Sea, all suggest that the waters offshore Gujarat should be highly productive. However, additional information about resources of this area is required so that further development and management of fishery resources proceed on a rational basis, avoiding over-capitalization and over-fishing. Such information can best be provided by commercial fishing vessels manned by experienced commercial fishermen fishing in commercial fishing style.

2. Elsewhere in India, coastal waters have been, or will be, extensively surveyed in all areas except the east coast (Bay of Bengal) north of Madras. Some survey work has been done there in inshore water by GOI and some information is available from the commercial fishery, which started to develop there much later than that on the west coast. However, more information is needed on offshore resources. Since a fisheries project similar to the Gujarat operation is being prepared for Andhra Pradesh, GOI gives priority to a survey of this area. Because of evidence already at hand suggesting offshore (beyond 200 m depth) resources of pelagic fish, pelagic and mid-water surveys should be extended off-shore well beyond the edge of the continental shelf; such surveys should be carried out in each area over two years; one year for demersal and one for pelagic.

3. Terms of Reference: The surveys will be commercially oriented and will be of fishery resources on and over the continental shelf area (to a depth of at least 200 m) off Gujarat and on, over and beyond the continental shelf area off Andhra Pradesh. Under terms of reference yet to be prepared in detail the contractor would be required to:

- (a) in each area, fish during the first year with a trawler capable of bottom and mid-water trawling and capable of fishing a minimum of 20 days per month (240 days per year);

- (b) fish in such a manner as to provide information on the nature of the bottom and kinds, distribution and catch rates of fishery resources according to season;
- (c) prepare and distribute to GOG, GOI and GOAP, quarterly progress reports and a final report on demersal and mid-water resources including an economic analysis of the feasibility of commercial trawlers in the area;
- (d) in each area, fish during the second year with a commercial purse seiner capable of fishing with purse seine for a minimum period of 20 days per month (240 days per year);
- (e) fish in the second year in such a manner as to provide information on the kinds, distribution and catch rates of fishery resources according to season;
- (f) prepare and distribute to GOG, GOI and GOAP, quarterly progress reports and a final reports on pelagic resources including an economic analysis of the feasibility of purse seining in the areas; and
- (g) train on all vessels, Indian counterparts to officers and crew, on a one-to-one basis.
4. Cost. The total cost over two years is estimated to be:

Foreign exchange:

Vessel charter	= US\$2,190,000 = Rs 19,710,000
Contingency (@ 10%)	= US\$ <u>219,000</u> = Rs <u>1,971,000</u>
Total foreign exchange	= US\$2,409,000 = Rs 21,681,000
<u>Local costs:</u> (Rs 1,100,000 year one; Rs 728,000 year two)	<u>1,828,000</u>
	Subtotal 23,509,000
Less value of catch by trawlers	- 8,100,000
Less value of catch by seiners	- <u>4,050,000</u>
	TOTAL Rs <u>11,359,000</u>

5. Vessel charter contract(s) should be executed at the lowest possible daily rate but include an incentive provision based on the amount of catch in order to ensure that maximum effort is extended by the contractor. Contract(s)

should be written with an end-of-contract option for GOG, GOI or GOAP to purchase the vessels at a price to be determined by an independent surveyor.

#### B. Fish Marketing Study

6. Incremental catch resulting from the project is estimated at 45,000 tons per annum for which existing marketing facilities are adequate. However, according to GOI plans about 100,000 tons of incremental marine fisheries catch would reach the market each year and this would require a considerable improvement in marketing channels. A domestic fish marketing survey has not been carried out in India since 1958. No analysis of the market has ever been undertaken for dried fish, whether used either for human consumption or as a component (fish meal) of animal feed. Little is known as to the extent of the dried fish and fish meal market in either Gujarat, Bombay (the largest collecting point in India) or India as a whole. In addition, little is known about interior consumer demand and the marketing channels for fresh fish.

7. An intensive marketing study should be undertaken to assess market prospects for increased production of both fresh and dried fish. Terms of reference for the study would be prepared by Ministry of Agriculture (GOI) and the study would be carried out by the Indian Institute of Management, Ahmedabad, or a similar marketing research institution, and the Indian Institute of Foreign Trade (GOI).

8. The objectives of the study would be to identify consumer or end user demand both along the coast and the interior of India. It would examine competitive foods (animal proteins and legumes) for which fish must compete as to consumer acceptance and prices. It would attempt to measure demand and per capita consumption by regions, metropolitan areas, income groups and other relevant categories indigenous to India, such as religious and ethnic groups.

9. The study would analyse marketing channels for fresh, dried and export varieties of fish and crustacea through Bombay. It would identify the trading community, its locations, its bottlenecks, and measure its ability to absorb additional quantities of fish. The study would endeavor to measure the ability of the present infrastructure especially transport, godowns, inflows and outflows to handle fresh, dried and export varieties of fish in the Bombay area. The study would identify markets, bottlenecks, and recommend solutions for the bottlenecks. It would also examine the need for a cold store chain system to facilitate the marketing of fish of consistent quality. It is estimated that the study would take ten to eleven months and cost about Rs 625,000.

### C. Technical Assistance

10. Outline terms of reference for consultants employed under the project would be as follows:

- (a) Harbor Engineer: The harbor engineer would be responsible to the Director of Ports in an advisory capacity for the review of design with particular reference to:
- (i) examination of the model studies conducted in the Central Water and Power Research Station, Khadak Wasala in order to assess justification of minor changes in the western breakwater extension;
  - (ii) other design work with particular reference to civil engineering components of the slipway;
  - (iii) ensuring that conditions of contract which might be contrary to normal practice in international tendering and would deter contractors from bidding;
  - (iv) procurement of additional excavating plant; and
  - (v) review pollution control at Veraval.

Coordinate the activities of the local mechanical/electrical engineers and the rock excavating specialist; pay regular visits to the sites to review quality of work being executed, progress of work and consider, in conjunction with GOG and the contractor, ways in which any difficulties encountered could be overcome; and report his findings and recommendations to GOG for onward transmission to IDA.

11. The harbor engineer should be a graduate in civil engineering from a recognized university or technical college, with not less than 12 years experience in planning, design and construction of major civil engineering works of which not less than six years should have been spent in port and harbor activities. He should be familiar with methods of analysis of wave records, breakwater design and slipway design, and be accustomed to problems associated with harbor work in tropical countries. His services would be needed for an initial period of up to eight weeks followed by eight site visits at six monthly intervals each of about two weeks in the field followed by up to one week's report writing (estimated cost US\$84,700).

- (b) A Rock Dredging Specialist: The rock dredging specialist would assist in drawing of a schedule of functional requirements for procurement of additional dredging equipment; he would also devise and direct a program of field trials to determine suitable spacings, burdens, undercuts and charges for underwater drilling and blasting to achieve satisfactory fragmentation of the rock for dredging.

12. The rock-dredging specialist should be a graduate or diploma holder in civil engineering or an allied science from a recognized university or technical college (or have exceptional practical experience), and should have not less than ten years experience of heavy civil engineering works (or similar activities) of which not less than five years should have been spent on operations involving extensive rock blasting. He should be experienced varying spacings, etc., of charges for underwater blasting of rock, and in devising and directing field trials for determining satisfactory procedures.

13. His services would be needed for a period of about nine weeks, including an eight week visit to experiment and advise on the drilling pattern to be adopted (estimated cost US\$24,600).

- (c) For Gujarat and Andhra Pradesh Marine Test Fishery Operations a Fisheries Resources Specialist: A fisheries resources specialist would provide advisory services to GOG, GOI, and GOG with respect to:

- (i) planning commercially oriented surveys of demersal, mid-water and pelagic fishes on the continental shelf area (to a depth of 200 m) off Gujarat and on the continental shelf area and beyond off the east coast (Bay of Bengal) of India north of Madras;
- (ii) planning observations to be made and data to be collected;
- (iii) planning data processing and analysis methods;
- (iv) reviewing progress at six months intervals; and
- (v) preparing progress reports and final reports for each area including economic feasibility analysis in form useful to GOG, GOI, GOAP and private sector.

14. The consultant should be a senior fishery biologist with broad experience in fisheries, who is development oriented and accustomed to working in developing countries. Experience should include, in addition to fishery science, planning surveys, data processing and analysis, and fishing industry. His services would be needed over two years, including an



initial three month period followed by one month twice a year and a final two month, in each area (for a total of sixteen man-months in country estimated cost US\$194,000).

(d) Management Specialist for Fisheries Terminal Division (FTD): A fisheries terminal organization specialist to advise FTD management on:

- (i) FTD organization and its organization of services; these would include landing, market sales, levying and collection of landing charges, provision of water, fuel and ice;
- (ii) method of unloading vessels, laying out fish for auction and clearing the auction hall;
- (iii) development of an auction system;
- (iv) proper handling and hygienic operation of the terminal area and facilities; and
- (v) demonstrate the efficient use of ice to fishermen in order to improve the quality of fish.

15. The specialist should be a graduate of a recognized University or technical college/institute, with at least 10 years experience in the operation of fishing port shore facilities. He should have experience in the operation of wholesale marine fish auctions preferably in tropical countries and should also have experience of icing techniques on fishing vessels. A candidate with appropriate experience but without a degree may be considered. His services would be needed for two years, commencing six months before the FTO is ready for operation (estimated cost US\$100,000).

#### Summary

16.	<u>Consultant</u>	<u>Period</u> (man months)	<u>Estimated Cost</u> (US\$)
	Harbor engineer	about 8	84,700
	Engineer rock excavating specialist	about 3	24,600
	Fisheries resources specialist	about 16	194,000
	Fisheries terminal specialist	about 24	<u>100,000</u>
			403,300

INDIA

GUJARAT FISHERIES PROJECT

Project Implementation Schedule (Marine Works)<sup>1/</sup>

Activity	Responsibility	Date of Completion
Prepare documents for ICB for dredging equipment	GOG	April 1977
Invite tender for dredging equipment	GOG	May 1977
Place order for dredging equipment	GOG	April 1977
Place order for construction plant	GOG	April 1977
Prequalify civil contractors	GOG	April 1977
<u>Other activities to end 1977</u>		
Invite tender for marine works	GOG	April 1977
Appraise tender for marine works	GOG	August 1977
Place order for marine works	GOG	November 1977
Appoint supervisory staff	GOG	September 1977 (nucleus)
Ensure housing for supervisory staff	GOG	November 1977

<sup>1/</sup> This schedule will be updated at negotiations.

A detailed GOG critical surveys covers all phases of construction.

August 24, 1976

**INDIA  
GUJARAT FISHERIES PROJECT  
PROJECT IMPLEMENTATION SCHEDULE**

	1976	1977	1978	1979	1980	1981
<u>Marine Works</u>						
Dredging						
Procurement		—————				
Dredging				—————		
Tender Documents		———				
Construction						
Veraval		—————				
Mangrol		—————				
<u>Shore Facilities</u>						
Veraval		—————				
Mangrol		—————				
<u>Trawler Construction</u>						
<u>Traditional Fishermen Subproject</u>		—————				
<u>Technical Assistance</u>						
Resource Survey						
Gujarat & Andhra Pradesh		—————				
Marketing Survey		———				
Harbor Engineer		■	■	■	■	■
Rock dredging Specialist		———				
Fisheries Resources Specialist		■	■	■	■	■
Fisheries Terminal Organization Specialist		—————				



INDIA

GUJARAT FISHERIES PROJECT

Cost Estimates

	Local	Foreign	Total	Local	Foreign	Total	Foreign
		(Rs '000)			(US\$ '000)		Exchange
							%
<b>1. Harbour Improvements and Shore Services</b>							
<b>Mangrol</b>							
Dredging	200	100	300	22	11	33	33
Breakwater	8,500	1,500	10,000	944	167	1,111	15
Cofferdam	200	-	200	22	-	22	-
Excavation	2,500	200	2,700	278	22	300	7
Quays	1,300	200	1,500	145	22	167	13
Auction hall	456	24	480	51	2	53	5
Management offices	209	11	220	23	1	24	5
Workshop	95	5	100	10	1	11	5
Canteen	104	6	110	11	1	12	5
Gear shed	86	4	90	10	-	10	4
Roads and pavings	320	80	400	36	9	45	20
Water supply	350	150	500	39	17	56	30
Electricity	375	125	500	42	14	56	25
Drainage	285	15	300	31	2	33	5
Navigation aids	50	50	100	6	5	11	50
Fences and walls	126	14	140	14	2	16	10
Sub-total	15,156	2,484	17,640	1,684	276	1,960	14
Contingencies 20%	3,031	497	3,528	337	55	392	14
Supervision	762	-	762	85	-	85	-
Sub-total Mangrol	18,949	2,981	21,930	2,106	331	2,437	14
<b>Veraval</b>							
Dredging-plant	4,500	10,500	15,000	500	1,167	1,667	70
Dredging-other costs	5,700	2,300	8,000	633	256	889	29
Breakwater	15,600	2,800	18,400	1,733	311	2,044	15
Cofferdam	900	200	1,100	100	22	122	18
Excavation	16,400	1,400	17,800	1,822	155	1,977	8
Quays	4,800	700	5,500	533	78	611	13
Slipways	3,400	600	4,000	378	67	445	15
Footbridge	700	100	800	78	11	89	13
Auction hall	1,890	100	1,990	210	11	221	5
Management offices	323	17	340	36	2	38	5
Workshop	446	24	470	50	3	53	5
Canteen	161	9	170	18	1	19	5
Gear shed	503	27	530	56	3	59	5
Roads and pavings	1,200	300	1,500	133	33	166	20
Water supply	700	300	1,000	78	33	111	30
Electricity	750	250	1,000	83	28	111	25
Drainage and sewage	1,235	65	1,300	137	7	144	5
Navigation aids	80	70	150	9	8	17	47
Fences and walls	405	45	450	45	5	50	10
Sub-total	59,693	19,807	79,500	6,632	2,201	8,833	25
Contingencies 20% *	11,039	1,861	12,900	1,227	206	1,433	14
Supervision	3,330	-	3,330	370	-	370	-
Sub-total Veraval	74,062	21,668	95,730	8,229	2,407	10,636	23
Sub-total Marine Works	93,011	24,649	117,660	10,335	2,738	13,073	21
<b>2. Shore Facilities</b>							
<b>Mangrol</b>							
FTD (equipment)	380	33	413	42	4	46	8
Ice complex	708	842	1,550	79	93	172	54
Freezing complex	1,180	980	2,160	131	109	240	45
Sub-total	2,268	1,855	4,123	252	206	458	45
Contingencies 5%	113	93	206	13	10	23	45
Sub-total Mangrol	2,381	1,948	4,329	265	216	481	45
<b>Veraval</b>							
FTD (equipment)	1,071	71	1,142	119	8	127	6
Ice complex (2 plants)	3,044	3,756	6,800	338	417	755	55
Freezing complex	2,150	1,580	3,730	239	176	415	42
Fishmeal plant	2,400	4,340	6,740	267	482	749	64
Sub-total	8,665	9,747	18,412	963	1,083	2,046	53
Contingencies 5%	433	487	920	48	54	102	53
Sub-total Veraval	9,098	10,234	19,332	1,011	1,137	2,148	53
Sub-total Shore Facilities	11,479	12,182	23,661	1,276	1,353	2,629	51

\* On all items excluding the dredging plant.

INDIA  
GUJARAT FISHERIES PROJECT

Cost Estimates

	Local	Foreign	Total	Local	Foreign	Total	Foreign
	(Rs '000)	(Rs '000)		(US\$ '000)	(US\$ '000)		Exchange %
<b>3. 14.8 m Trawlers</b>							
<b>(a) Veraval</b>							
Hulls	18,580	-	18,580	2,064	-	2,064	-
Diesel engines	14,040	3,500	17,540	1,560	389	1,949	20
Nets	1,900	100	2,000	211	11	222	5
Miscellaneous items	260	40	300	29	5	34	13
Sub-total	34,780	3,640	38,420	3,864	405	4,269	9
<b>(b) Mangrol</b>							
Hulls	6,503	-	6,503	723	-	723	-
Diesel engines	4,914	1,225	6,139	546	136	682	20
Nets	665	35	700	74	4	78	5
Miscellaneous items	91	14	105	10	1	11	12
Sub-total	12,173	1,274	13,447	1,353	141	1,494	9
Sub-total trawlers	46,953	4,914	51,867	5,217	546	5,763	9
<b>4. Traditional Fishermen</b>							
<b>Sub-project</b>							
<b>(a) Canoes</b>							
Canoes (wooden) (344)	5,160	-	5,160	573	-	573	-
Canoes (fiberglass) (6)	101	11	112	12	1	13	10
Sub-total Canoes (350)	5,261	11	5,272	585	1	586	-
<b>(b) Motors, nets, equipment</b>							
Motors for new canoes (350)	962	998	1,960	107	111	218	51
Motors for existing canoes (475)	1,306	1,354	2,660	145	150	295	51
Motors for re-placement (575)	1,581	1,639	3,220	176	182	358	51
20% spare-parts	770	798	1,568	85	89	174	51
Nets for new canoes (350)	3,097	158	3,255	344	18	362	5
Equipment for new canoes (350)	525	-	525	58	-	58	-
Sub-total Motors	8,241	4,947	13,188	915	550	1,465	38
<b>(c) Infrastructure</b>							
Permanent sheds (8)	312	-	312	35	-	35	-
Roads (33.5 km)	1,706	427	2,133	190	47	237	20
Water supply (5)	1,382	593	1,975	153	66	219	30
Sub-total	3,400	1,020	4,420	378	113	491	23
Contingencies 15%	510	153	663	57	17	74	23
Engineering, supervision, administration 10%	508	-	508	56	-	56	-
Sub-total Infrastructure	4,418	1,173	5,591	491	130	621	21
<b>(d) Trucks (4)</b>							
Trucks	432	108	540	48	12	60	20
Traditional fishermen							
Sub-total	18,352	6,239	24,591	2,039	693	2,732	25
<b>5. Miscellaneous Supporting Equipment</b>							
Netting machine for 200 meshes	186	414	600	21	46	67	69
Netting machine for 400 meshes	205	455	660	23	50	73	69
Installation	10	-	10	1	-	1	-
Sub-total	401	869	1,270	45	96	141	68
Contingencies 10%	40	87	127	4	10	14	69
Sub-total supporting services	441	956	1,397	49	106	155	68
<b>6. Technical Assistance</b>							
Marine works	109	985	1,094	12	109	121	90
Shore facilities (FTD)	90	810	900	10	90	100	90
Resources surveys	175	1,571	1,746	19	175	194	90
Marketing survey	625	-	625	69	-	69	-
Gujarat resources survey	914	9,855	10,769	102	1,095	1,197	92
Andhra Pradesh resources survey	914	9,855	10,769	102	1,095	1,197	92
Sub-total	2,827	23,076	25,903	314	2,564	2,878	89
Contingencies 10%	282	2,308	2,590	31	257	288	89
Sub-total technical assistance	3,109	25,384	28,493	345	2,821	3,166	89
<b>Total Project Cost (excluding price contingencies)</b>							
	173,345	74,324	247,669	19,261	8,257	27,518	30

## INDIA

## GUJARAT FISHERIES PROJECT

Price Contingencies<sup>1/</sup>

<u>Year:</u>	<u>1977/78</u>	<u>1978/79</u>	<u>1979/80</u>	<u>1980/81</u>	<u>1981/82</u>	<u>Total</u>
1. <u>Civil works and services</u>						
Base cost estimate Rs '000	8,900	42,601	52,820	35,551	1,498	141,370
Contingency rate %	12	12	11	10	10	
Price contingencies Rs '000	1,575	13,547	24,773	22,148	1,176	63,219
2. <u>Equipment</u>						
Base cost estimate Rs '000	24,639	22,462	26,053	19,300	13,846	106,300
Contingency rate %	8	8	8	7	7	
Price contingencies Rs '000	3,030	4,785	8,076	7,874	7,020	30,785
3. <u>Total price contingencies</u>						
Contingencies Rs '000	4,605	18,332	32,849	30,022	8,196	94,004
4. <u>Total Project Cost</u>	38,144	83,395	111,722	84,873	23,540	341,674

<sup>1/</sup> Base cost estimates are based on May 1976 prices. Contingency rates for 1976/77 were assumed to be 11% and 8% for civil works and equipment respectively.

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INDIAGUJARAT FISHERIES PROJECTCost Estimates14.8 m Trawler

<u>Item</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
	----- (Rs '000) -----		
Hull <sup>1/</sup>	92.9	-	92.9
Diesel Engine <sup>2/</sup>	70.2	17.5	87.7
Nets <sup>3/</sup>	9.5	0.5	10.0
Miscellaneous items <sup>4/</sup>	<u>1.3</u>	<u>0.2</u>	<u>1.5</u>
Total	<u>173.9</u>	<u>18.2</u>	<u>192.1</u>

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<sup>1/</sup> Including winch, wire rope, pulleys, gallows, anchors, tanks, life saving equipment, navigation lights, compass, fishhold insulation, etc.

<sup>2/</sup> 88 hp ., water cooled with 4:1 reduction gear box. Includes stern gear and accessories, propeller, etc.

<sup>3/</sup> 3 trawl nets including doors and wire ropes.

<sup>4/</sup> Ropes, drums, fish boxes, cooking utensils, etc.

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Table 4

GUJARAT FISHERIES PROJECTCost EstimatesOutboard Motor and Canoe with Outboard Motor

<u>Item</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
	- - - - - { Rs '000 } - - - - -		- - - - -
Motor <sup>1/</sup>	2,750	2,850	5,600
Canoe <sup>2/</sup>	15,000	-	15,000
Sail and equipment <sup>3/</sup>	1,500	-	1,500
Gill nets	<u>8,850</u>	<u>450</u>	<u>9,300</u>
Total	<u>28,100</u>	<u>3,300</u>	<u>31,400</u>

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<sup>1/</sup> 8 hp kerosene outboard motor

<sup>2/</sup> Length 9m

<sup>3/</sup> Auxiliary sail, mast, anchor, rope, etc.

<sup>4/</sup> 40 units at Rs 232

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GUJARAT FISHERIES PROJECT

Cost Estimates

Ice Plant 200 ton - Veraval<sup>1/</sup>

<u>Item</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
	-----	(Rs '000) -----	-----
Compressors, motors, etc. <sup>2/</sup>	336	624	960
Ice making tanks <sup>3/</sup>	378	702	1,080
Insulation <sup>4/</sup>	98	392	490
Erection, commissioning, testing <sup>5/</sup>	28	112	140
Buildings <sup>6/</sup>	532	28	560
Miscellaneous <sup>7/</sup>	150	20	170
Sub-total	<u>1,522</u>	<u>1,878</u>	<u>3,400</u>
Contingencies 5%	76	94	170
Total	<u>1,598</u>	<u>1,972</u>	<u>3,570</u>

<sup>1/</sup> 200 ton/day production, 400 ton storage.

<sup>2/</sup> 4 compressors for ice makers complete with 180 hp motors and starters, 1 compressor complete with 20 hp motor and starter for ice store, necessary receivers, oil separators and condensers .

<sup>3/</sup> Ice making tanks of 6 mm thick steel plate, 8 evaporator coils, 3,000 ice cans for 25 kg blocks with grids, can dump, dip tank, can filler, brine agitators, blowers, hoist and evaporator for ice storage.

<sup>4/</sup> 100 mm thermo-foam complete with vapor barrier and cold store doors .

<sup>5/</sup> Erecting and commissioning of refrigeration plant only .

<sup>6/</sup> Concrete building with foundation 1,400 m<sup>2</sup> at Rs 400/m<sup>2</sup>; includes ice plant room, ice storage room, machine room, locker room, office and materials room .

<sup>7/</sup> Refrigerant, salt, spare parts, wiring to main switchboard, electricity for welding and water for construction .

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GUJARAT FISHERIES PROJECT

Cost Estimates

Ice Plant 75 ton - Mangrol<sup>1/</sup>

<u>Item</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
	----- (Rs '000) -----		
Compressors, motors, etc. <sup>2/</sup>	165	305	470
Ice making tanks <sup>3/</sup>	199	371	570
Insulation <sup>4/</sup>	20	80	100
Erection, commissioning, testing <sup>5/</sup>	16	64	80
Buildings	238	12	250
Miscellaneous	70	10	80
Sub-Total	<u>708</u>	<u>842</u>	<u>1,550</u>
Contingencies 5%	35	42	77
Total	<u>743</u>	<u>884</u>	<u>1,627</u>

<sup>1/</sup> 75 ton/day production, 200 ton storage.

<sup>2/</sup> 3 compressors for ice makers and tanks complete with 125 hp motors and starters, separators, receivers and condensers.

<sup>3/</sup> Ice making tanks of 6 mm thick steel plate, 3 evaporator coils, 1,080 ice cans for 25 kg blocks, with grids, can dump, dip tank, can filler, brine agitators, blowers, hoist and evaporator for ice storage .

<sup>4/</sup> 100 mm thermofoam complete with vapor barrier and cold store doors .

<sup>5/</sup> Erecting and commissioning of refrigeration plant only .

<sup>6/</sup> Concrete building with foundations 625 m<sup>2</sup> at Rs 400/m<sup>2</sup> including ice plant room, ice storage room, machine room, locker room, office and materials store .

<sup>7/</sup> Refrigerant, salt, spare parts, wiring to main switch board, electricity for welding and crater for construction.

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GUJARAT FISHERIES PROJECT  
Cost Estimates  
Freezing Complex<sup>1/</sup> - Veraval

<u>Item</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
	----- (Rs '000) -----		
Compressors, motors, etc. <sup>2/</sup>	340	490	830
Plate freezers, piping, coolers <sup>3/</sup>	300	460	760
Erection, testing, commissioning	50	180	230
Insulation <sup>4/</sup>	70	260	330
Building <sup>5/</sup>	1,200	60	1,260
Generators <sup>6/</sup>	40	90	130
Miscellaneous <sup>7/</sup>	150	40	190
Sub-total	<u>2,150</u>	<u>1,580</u>	<u>3,730</u>
Contingencies 5%	110	80	190
Total	<u>2,260</u>	<u>1,660</u>	<u>3,920</u>

- <sup>1/</sup> Freezing capacity 18 ton/day; includes 500 ton frozen storage and 150 ton iced fish storage
- <sup>2/</sup> 4 compressors complete with 40 hp motors and starters for freezers, 2 compressors complete with 30 hp motors and starters for frozen storage, and 2 compressors with 15 hp motor and starter for iced fish store. Separators, receivers, condensers, pipes and fittings.
- <sup>3/</sup> Refrigerant piping, coolers and fans, 4 double contact plate freezers.
- <sup>4/</sup> Polystyrene insulation complete with vapor barrier, 150 mm thick for frozen storage, 100 mm thick for iced fish store.
- <sup>5/</sup> Concrete or brick building 3,150 m<sup>2</sup> at Rs 400/m<sup>2</sup>. Includes peeling and packing areas, freezing areas, offices, material store, loading bags, etc.
- <sup>6/</sup> 64 kw generator for frozen storage.
- <sup>7/</sup> Main switchboard wiring, electricity during construction and installation, refrigerant and spares .

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GUJARAT FISHERIES PROJECT

Cost Estimates

Freezing Complex<sup>1/</sup> - Mangrol

<u>Item</u>	<u>Local</u>	<u>Foreign</u> <u>(Rs '000)</u>	<u>Total</u>
Compressors, motors, etc. <sup>2/</sup>	160	300	460
Plate freezers, piping, coolers <sup>3/</sup>	150	290	440
Erection, testing, commissioning	30	110	140
Insulation <sup>4/</sup>	40	180	220
Building <sup>5/</sup>	700	40	740
Generators <sup>6/</sup>	20	40	60
Miscellaneous <sup>7/</sup>	80	20	100
Sub-total	1,180	980	2,160
Contingencies 5%	60	50	110
Total	1,240	1,030	2,270

<sup>1/</sup> Freezing capacity 10 ton/day; includes 240 ton frozen storage and 100 ton iced fish storage

<sup>2/</sup> 2 compressors complete with 20 or 25 hp motor and starter for freezers, 2 compressors with 20 hp motors for frozen storage, 1 compressor with 15 hp motor and starter for iced fish storage, separators, receivers, condensers, pipes and fittings.

<sup>3/</sup> Refrigerant piping, coolers and fans, 2 double contact plate freezers

<sup>4/</sup> Polystyrene insulation complete with vapor barrier, 150 mm thick for frozen storage, 100 mm thick for iced fish store

<sup>5/</sup> Concrete or brick building 1,850 m<sup>2</sup> at Rs 400/m<sup>2</sup> Includes peeling and packing areas, freezing area, offices, material store, loading bays, etc.

<sup>6/</sup> 32 kw generator for frozen storage

<sup>7/</sup> Main switchboard wiring, electricity during construction and installation, refrigerant and parts.

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GUJARAT FISHERIES PROJECT

Cost Estimates

Fish Meal Plant -75 ton

<u>Item</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
		(Rs '000)	
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Cooker, dryer, grinder, bagger, conveyor and screens 1/	1,750	4,070	5,820
Boiler 2/	300	50	350
Buildings 3/	240	10	250
Miscellaneous 5%	110	210	320
Sub-total	<u>2,400</u>	<u>4,340</u>	<u>6,740</u>
Contingencies 5%	120	220	340
Total	<u>2,520</u>	<u>4,560</u>	<u>7,080</u>

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1/ Including installation.

2/ Boiler producing 100 ton steam/24 hours.

3/ 625 m<sup>2</sup> at Rs 400/m<sup>2</sup>. Includes plant 200 m<sup>2</sup>, office and workshop 100 m<sup>2</sup> and meal store 325 m<sup>2</sup>.

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GUJARAT FISHERIES PROJECT

Cost Estimates

Fisheries Terminal Division (FTD)

<u>Item</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
		(Rs '000)	
<b>A. <u>Veraval</u></b>			
Vehicles <u>1/</u>	218	55	273
Boxes <u>2/</u>	630	-	630
Weighing machines <u>3/</u>	143	16	159
Office furniture	<u>80</u>	<u>-</u>	<u>80</u>
Sub-Total	1,071	71	1,142
Contingencies 5%	<u>53</u>	<u>4</u>	<u>57</u>
Total	1,124	75	1,199
<b>B. <u>Mangrol</u></b>			
Vehicles <u>4/</u>	110	28	138
Boxes <u>5/</u>	162	-	162
Weighing machines <u>6/</u>	48	5	53
Office furniture	<u>60</u>	<u>-</u>	<u>60</u>
Sub-Total	380	33	413
Contingencies 5%	<u>19</u>	<u>2</u>	<u>21</u>
Total	399	355	434

- 
- 1/ 1 car at Rs 45,000; 1 jeep at Rs 48,000; 2 pick ups @ Rs 90,000.  
2/ 14,000 @ Rs 45.  
3/ 12 # Rs 13,250.  
4/ 1 jeep at Rs 48,000; 1 pick up at Rs 90,000.  
5/ 3,600 @ Rs 45.  
6/ 4 @ Rs 13,250.

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GUJARAT FISHERIES PROJECT

Cost Estimates

Procurement

<u>A. ICB Items</u>	<u>US\$ M</u>
1. Civil works for harbor improvement and shore services <u>1/</u>	15.4
2. Equipment:	
a. Dredging equipment <u>2/</u>	1.4
b. Equipment for shore facilities <u>3/</u>	1.9
c. OBM motors and spare parts <u>4/</u>	0.6
d. Netting machines	0.1
	<u>4.0</u>
Sub-total	19.4 *
<u>B. Non-ICB Items</u>	
1. Civil works	
a. Water supply and electricity	0.4
b. Traditional fishermen	0.8
c. Shore facilities (ice factories etc.)	1.1
	2.3
2. a. MFV (hulls, engines, misc. equipment)	7.2
b. Canoes and misc. equipment	0.8
c. Fishing gear	0.9
d. Trucks	0.1
	<u>9.0</u>
Sub-total	11.3
<u>C. Technical assistance</u>	<u>4.4</u>
<u>D. Duties <u>5/</u>, supervision etc.</u>	<u>2.9</u>
TOTAL:	<u>38.0</u>

- 1/ Sub-total 1 in table 8, less navigation aids, dredging equipment, water supply and electricity, less supervision, plus price contingencies.  
2/ 70% of estimated price including price contingencies.  
3/ Excluding FTO equipment; 80% of cost including contingencies.  
4/ Price cif plus 21% price contingencies.  
5/ ICB items only.

\* Of this sum US\$16.4 million is likely to be won by local bidders (civil works for harbour improvement and 50% of equipment for shore facilities.)

January 6, 1977



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## GUJARAT FISHERIES PROJECT

Estimated Quarterly Schedule of Disbursements <sup>1/</sup>

<u>IBRD FY and Quarter Ending</u>	<u>Commitments</u>	US \$ M	<u>Disbursements</u>	<u>Cumulative Disbursements</u>
<u>1977/78</u>				
September 30, 1977	0.2		-	-
December 31, 1977	0.3		-	-
March 31, 1978	0.6		-	-
June 30, 1978	0.7		0.2	0.2
<u>1978/79</u>				
September 30, 1978	1.2		0.3	0.5
December 31, 1978	1.3		0.6	1.1
March 31, 1979	1.2		0.7	1.8
June 30, 1979	1.3		1.2	3.0
<u>1979/80</u>				
September 30, 1979	1.5		1.3	4.3
December 31, 1979	1.5		1.2	5.5
March 31, 1980	1.6		1.3	6.8
June 30, 1980	1.6		1.5	8.3
<u>1980/81</u>				
September 30, 1980	1.0		1.5	9.8
December 31, 1980	1.0		1.6	11.4
March 31, 1981	1.0		1.6	13.0
June 30, 1981	1.1		1.0	14.0
<u>1981/82</u>				
September 30, 1981	0.3		1.0	15.0
December 31, 1981	0.2		1.0	16.0
March 31, 1982	0.2		1.1	17.1
June 30, 1982	0.2		0.3	17.4
<u>1982/83</u>				
September 30, 1982	-		0.3	17.7
December 31, 1982 <sup>2/</sup>	-		0.3	18.0

<sup>1/</sup> Estimated date of effectiveness: July 1, 1977.

<sup>2/</sup> Estimated closing date.

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GUJARAT FISHERIES PROJECT

Monitoring, Evaluation and Reporting

A. Monitoring and Evaluation

1. The main objective of the monitoring, evaluation and reporting system would be to provide the Central Coordinating Committee (CCC), the Project Supervision Committee (PSC), GOG, GOI, ARDC, and IDA/Bank with base-line and current statistics on project implementation, its benefits and costs. Such information would lead to better decision making and would enable a timely and realistic assessment of project progress.

2. The rate of return sensitivity tests (Annex 14) indicate that project success would depend primarily on the realization of planned benefits. Monitoring and evaluation activities would concentrate, therefore, mainly on factors affecting project benefits. The most important ones are as follows:

- (a) timely increase in the number of trawlers, canoes with outboard motors, installation of outboard motors in non-motorized canoes;
- (b) average catch per vessel and its composition;
- (c) effect of the increase in the number of vessels on the average catch per vessel;
- (d) landing prices of fish and shrimp; and
- (e) timely completion of marine works and shore facilities.

Surveys

3. Baseline and current information on the number of vessels according to type, size, age and ownership would be obtained from two independent sources:

- (a) registration records of the Gujarat Ports Directorate (GPD); and
- (b) a complete census of all the vessels in Veraval, Mangrol and the villages covered by the project, during the monsoon season (June-August) in 1977. This census would be repeated every second year.

Data on annual sales of vessels and motors obtained from suppliers (mainly GFCCA) would be compared with changes in their numbers based on the registration and census data in order to ensure reliability.

4. The main sources of statistics on catch per vessel would be a sample survey of fish production (Table 1). Such a survey has been conducted independently by both GOG and Central Marine Fisheries Research Institute (CMFRI) resulting in inefficient use of resources and differing and unsatisfactory estimates. There would appear to be major benefits in amalgamating the two operations, and such a possibility is being examined 1/. The data collected would remain basically unchanged but the size of the sample and the number of sampling days per center would be increased in order to permit stratification by type of vessel with an acceptable degree of precision. In addition, data on operational costs would be collected from a sub-sample of vessels and selected socio-economic data would be collected at the beginning and at the end of the project. Present methods of data collection would be revised and a control system would be incorporated in order to ensure reliability. Centers surveyed would include Veraval, Mangrol and a sample of 3-4 villages. The survey would be designed by the Department of Fisheries (GOG) and a draft design would be sent to IDA/Bank two months before the commencement of data collection. The draft would include the questionnaire(s) format, methodology of sampling data collection and control, proposed tabulation and an indication of the expected precision of the main estimates. The revised survey would start by January 1978.

5. Data on fish prices would be obtained from the on-going survey of fish prices which has been conducted by the Department of Fisheries (GOG). These data would be supplemented (from year 4) with price statistics recorded by the Fisheries Terminal Division (FTD).

6. All applicants for project credit would be required to provide relevant information on their household, particularly on income and employment, which would serve as base-line data. A sample of credit recipients stratified by type of investment (trawler, canoe, outboard motor) would be interviewed in year 5 for obtaining similar information. A comparison of the base-line and end of project data would indicate the project effect on the recipients of credit. In addition a base-line socio-economy survey of a sample of all fisherman households would be conducted at the beginning of the project. Its main objective would be to identify and measure project effect on all fisherman households, including those which are not direct recipients of credit. The end of project part of this survey would be combined with that of the credit recipients survey (see above). An additional base-line and end of project survey would cover production and employment in the processing industries. Draft designs of these surveys would be sent to IDA/Bank 2 months before their commencement.

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1/ A recommendation to integrate the States and CMFRI surveys is included in the Report of the National Commission on Agriculture (1976) Part III.

7. The Department of Fisheries (GOG) would be responsible for conducting the surveys. A senior statistician and other required staff would be attached to its Statistical Cell no later than three months after project effectiveness to enable efficient and timely implementation. The analysis of data would be done in cooperation with the Department of Economics and Statistics (GOG) which would provide technical advice, and the use of its computer. Analysis of production and price surveys would be done in two stages: (i) simple analysis i.e. calculation of means, totals, percentage distribution and comparisons with the parallel month in the previous year, would be done at the end of each month and the results would be incorporated in quarterly progress reports; and (ii) a further and more elaborate analysis would take place at the end of each season. The incremental cost of the surveys would be minimal as-

- (a) most of the surveys (production and price, census of vessels, fishermen households) are either being currently carried out or have been conducted from time to time, and
- (b) a considerable saving would be realized by unifying the two production surveys.

#### Harbor Improvements and Shore Facilities (Table 2)

8. The harbor improvements consist of many interdependent activities whose execution sequence is important; delays could slow the development of the fishing fleet, reduce benefits and increase costs. Timely implementation would be assisted by network charts prepared by GOG for both Veraval and Mangrol. Visits of consultants provided under the technical assistance included in the project, should facilitate timely detection of any serious deviation from the plan and enable timely correction actions.

#### ARDC Studies

9. ARDC would conduct its regular follow-up supervisory studies and concentrate mainly on credit aspects. Particular attention would be given to GFCCA and to the traditional fishermen cooperatives. Coordination with the Department of Fisheries (GOG) would be maintained through PSC and duplication of effort would be avoided. Data and results of studies conducted by the Department of Fisheries (GOG) would be made available to ARDC and vice versa. Results of ARDC studies like those of any other project related surveys would be discussed in PSC meetings and be included in PSC progress reports in order to facilitate a comprehensive evaluation of project progress.

#### B. Reporting (Table 3)

10. Quarterly Progress Reports. Quarterly progress reports would be issued by PSC no later than one month after the end of each quarter and a copy of each report sent to IDA/Bank. The report would review the physical and financial progress of each project component during the quarter as well as cumulative (from the beginning of the project) and compare it to the plan.

The reasons for delays and/or deviations from the plan would be fully explained and their possible effect on project results would be clearly indicated. Quarterly progress reports would include the main results of surveys completed during the quarter.

11. Annual Progress Reports. Annual reports would be issued no later than three months after the end of each year and summarize the physical and financial progress of the project during the year. They would cover items similar to those indicated for the quarterly reports.

12. ARDC Reports. Information on progress of ARDC related project activities together with general comments on project progress would be included in ARDC quarterly progress reports, a copy of which would be sent to IDA/Bank.

13. Technical Assistance Report. Consultants provided under this project would submit a final report to GOI and GOG before the end of their assignment. In the case of consultants on marine works, a report would be submitted after each visit. A copy of these reports would be sent to IDA/Bank.

14. Survey Reports. A detailed report including conclusions and recommendations would be prepared for each survey no later than three months after the end of data collection. In the case of continuous surveys (production, prices) a report would be prepared at the end of each season. A copy of each report would be sent to IDA/Bank.

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GUJARAT FISHERIES PROJECT

Tentative List of Estimates to be Derived from the  
Production Survey

1. The following estimates would be provided separately for Veraval, Mangrol and project villages included in the sample:
  - (a) total catch by variety. (monthly and annual);
  - (b) number of vessels operating by type of vessel (monthly and annual);
  - (c) average catch per vessel by variety, type of vessel and type of gear. (monthly and annual). Statistically significant estimates would be required for the following types of vessel: 14.8 m trawler, 9 m canoe with outboard motor, 9 m canoe without outboard motor;
  - (d) distribution of vessels by type of vessel, type of gear, fishing grounds, and proportion of long trips. (monthly where relevant and annual);
  - (e) use of ice by type of vessel and gear and by the length of the trip. (monthly and annual);
  - (f) methods of payment to crew by type of vessel and type of gear (annual);
  - (g) number of potential fishing days by month (monthly and annual); and
  - (h) estimated operating costs of vessels by type of vessel. The estimates would indicate the physical quantities on which the cost estimates of each input were based (annual).
  
2. The current GOG production survey has been conducted since September 1974. Data collected in the survey has been analyzed mainly with respect to estimates of total catch. It would be further analyzed retroactively to obtain (where possible) the estimates mentioned above, in order to enable a trend analysis at an early stage of the project.

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GUJARAT FISHERIES PROJECT

Monitoring of Harbor Improvements

The information specified below would be included in each quarterly progress report:

1. Items which are difficult to quantify (e.g. placing of tenders, procurement of plant, establishment of a quarry, construction of cofferdam, etc.)

- (a) data order should have been placed or work started to accord with program;
- (b) date order, etc., was placed;
- (c) date when item should be delivered or work completed to comply with program;
- (d) latest estimated date when item will be delivered or work completed; and
- (e) remarks when (b) differs from (a) or (d) from (c), giving reasons, effects, and proposed remedial action.

2. Principal items which can be quantified

These would include the following: Breakwater rock (quantity of core and secondary armour), breakwater armour units (number made and placed), quay foundation (length prepared), quay walls (length completed), jetties constructed (depth completed), bulk excavation (quantify), rock excavating (quantity), roads and pavings (area), buildings (area), drainage, services etc. (estimated percentage).

The information provided on these items would specify:

- (a) total quantity to be carried out;
- (b) percentage of the total quantity which should have been achieved according to the program during the current quarter and cumulative from the beginning of the project operations;

- (c) actual achievement (quantity and percentage of total); and
- (d) remarks when (c) differs from (b) giving reasons, effects and proposed remedial action.



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GUJARAT FISHERIES PROJECT

Summary of Surveys and Reports

	<u>Agency Responsible</u>	<u>Frequency and Timing</u>
<u>A. Surveys</u>		
Vessels-registration	GOI/GOG	Continuous
Vessels-census	GOI/GOG	First census during the monsoon season 1977; thereafter every second year.
Production	GOG	Continuous; revised survey would start by January 1st, 1978.
Prices	GOG	Continuous
Credit recipients	GOG	Base-line continuous survey based on credit forms. End of project survey during the monsoon season 1981.
Fishermen households	GOG	Baseline survey during year 1; end of project survey during year 5.
ARDC follow up studies	ARDC	Continuous throughout the project duration.
<u>B. Reports</u>		
Quarterly	PSC	One month after the end of the quarter.
Annually	PSC	Three months after the end of the year.
ARDC	ARDC	Quarterly
Technical assistance	GOG	One month after the end of the consultant's assignment or field visit.
Surveys	GOG	Three months after the end of data collection.

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GUJARAT FISHERIES PROJECT

Organization and Management

A. Fisheries Terminal Division

Objectives

1. The Fisheries Terminal Division (FTD), to be established under the Commissioner of Fisheries, GOG, would be set up with the following objectives:
  - (a) ensure that essential shore services are available to both fishermen and processors in the ports of Veraval and Mangrol;
  - (b) ensure that necessary shore facilities are developed to enable fish to be handled and processed efficiently;
  - (c) ensure that services to vessels are operated efficiently to maximize fishing time;
  - (d) operate the auction halls and introduce an auction system for sale of all fish landed in the ports; and
  - (e) ensure that accurate statistical records of catches are maintained.

The Fisheries Terminal Area

2. The fisheries terminal area in Veraval is that part of the Gujarat Ports Directorate (GPD) land lying to the east of the harbor. In Mangrol it would be the whole of the harbor area. These two sites would be leased, or otherwise made available to FTD by GPD, together with all buildings in the terminal area erected under the project and owned by GDP, the exception being those offices required by GDP for port management and maintenance staff.
3. FTD would lease sites to private, cooperative or public bodies for construction and operation of the required shore facilities. Existing processors, who at present lease sites in the fisheries terminal area, would have their facilities to ensure that efficient services were made available.
4. Permanent buildings to be erected directly under the project and to be owned by GOG would include auction halls, offices, workshops, canteens and gear sheds. Except for the auction halls and offices these would be let

to concessionaries. Maintenance of buildings, services and paved areas provided by GPD and major structural changes, or repair of roads would be the responsibility of GPD.

#### Management Structure and Staffing

5. FTD would have a Managing Director with an office in Veraval who would be responsible for overall management of Veraval and Mangrol fisheries terminals. He would be assisted by General Managers in Veraval and Mangrol who would be responsible for all facilities in their terminals and would ensure that leases be granted to provide adequate shore facilities. Technical assistance would be needed to set up FTD; a consultant would be required for two years commencing 6 months before the auction halls are ready for operation in order to introduce the changes (for Terms of Reference see Annex 6). An outline of staff requirements is given in Table 1 but actual details would be established by consultations between FTD and the consultant. Staffing levels are based on landing of fish by crew of vessel and removal of fish from the market by the purchaser after sale.

#### Auction System

6. The consultant would advise FTD on a suitable auctioning system. All fish coming into ports of Veraval and Mangrol would be landed at the fisheries terminal and would be sold through the auction halls. GPD would not permit fish to be landed in the commercial parts of the ports. Repayments of loans for the purchase of project vessels would be recovered through the FTD by way of standing order deductions from the sale of fish.

7. Charges would be levied for provision of facilities and fish auctions. These would be about 1% of sales value and the average revenue at the present time would be Rs 15/ton landed per vessel. Charges would cover use of terminal facilities including boxes for market display, auction fees, and water supply for vessels. Containers for display of fish for sale and movement within the terminal area would be provided by FTD.

#### Statistical Records

8. These would be maintained by FTD in collaboration with the Department of Fisheries (GOG).

#### B. Gujarat Fisheries Central Cooperative Association Ltd. (GFCCA)

9. GFCCA was established in 1956 as an apex fishery cooperative institution. It is registered under the Bombay State Cooperatives Act, 1925, and is engaged in different activities connected with the fishing industry, viz., fish capture, marketing, transportation, fish processing, storage, freezing and exports, fishing gear manufacture, boat building, fresh water fishing development, etc. Its membership comprises 60 cooperative societies (7

of which are defunct) and 950 individuals. As of 30th June 1975, its authorized capital was Rs 5.0 M and paid up capital Rs 1.6 M of which Rs 1.4 M was contributed by GOG, and Rs 0.2 M by societies and individual fishermen. The Board of Directors consists of 19 members, and its Chairman is the Commissioner of Fisheries (Table 2).

#### Organization and Management

10. Day-to-day management of GFCCA is the responsibility of the General Manager. He is assisted by a senior manager at head office (Ahmedabad), who is in charge of administration and accounts, and by senior managers or managers at GFCCA branches. The accounts section is exceptionally weak and urgent priority should be given to the appointment of a qualified chief accountant and supporting staff to assist management with proper budgetary, inventory and financial control. There is also an urgent need for a marketing manager to promote sales of nylon, fish (local and export), boats and engines, and for a qualified engineer to look after the processing units and mechanization program. An organization chart is shown in Table 3.

#### Branch Network

11. GFCCA, whose head office is in Ahmedabad, has the following branch network:

(a) Bombay: a quick freezing plant with freezing capacity of about 4 tons/day and storage capacity of 100 tons. Raw materials are obtained from Veraval or in Bombay open market and are frozen for export. The plant, which is used for processing fish, lobsters, prawns and frogs legs, was purchased second-hand in 1965/66 and for the last four years (except 1971/72) it has sustained losses (Rs 0.37 M, 1974/75). However, due to change of management and pricing policies, the unit expects to show a profit during 1975/76. The main reasons for the losses are: (i) old machinery requiring expensive maintenance and repair; (ii) rise in the cost of stores, particularly packing materials; (iii) fish catch from Veraval containing a high proportion of spoilage; and (iv) poor management.

(b) Veraval:

(i) Ice Plant: a 12 tons ice factory with a 100 tons storage capacity. The factory is continuously incurring losses, the main reason being: (a) under-utilization due to low catches and to competition from other ice factories; (b) old machinery requiring expensive maintenance and repairs; and (c) water scarcity, thus incurring heavy charges for transporting water in tankers. The loss for 1974/75 was Rs 0.08 M.

- (ii) Boat Building Yard: a well equipped boat building yard having a capacity to construct about 90 boats per annum. The boat yard commands a captive market as a result of GOG policy to provide subsidy only for boats constructed there and to loan assistance made available by Gujarat State Financial Corporation for purchase of boats required to be constructed in GFCCA boat yard. Although the boat yard has been making good profits, GFCCA has not increased prices to keep pace with inflation thus there has been a decline in profits from Rs 0.67 M in 1972/73 to Rs 0.45 M 1973/74 and Rs 0.23 M 1974/75.
- (iii) Purchase of Fresh Fish: This is purely a trading activity of GFCCA. GFCCA makes advances to fishermen, not necessarily its members, before commencement of the fishing season and binds fishermen to deliver all their catches to GFCCA. There is no system of periodical returns from branches on advances made and recoveries effected. The system, therefore, is open to abuse and could account for the sizeable bad debts and defaults. Losses during 1974/75 were Rs 0.4 M.
- (iv) Canning Plant: The canning plant, machinery and equipment were purchased in 1964 and the factory operated from 1964/65 to 1968/69, when it was closed. Losses now shown against this unit are on account of interest on capital and other incidental charges for storage and maintenance of idle machinery.
- (v) Supply of Marine Diesel Engines and Diesel Pumps: GFCCA holds the agency for Ashok Leyland marine diesel engines. Outboard motors (together with spare parts) are imported. The boat building yard provides good engine repair facilities. During 1974/75 the unit made a profit of Rs 0.49 M.
- (c) Mangrol: GFCCA ice factory at Mangrol has been closed. The plant has been dismantled and machinery transferred to Bombay and Veraval. Losses now shown against the unit are due to watch and ward charges for equipment still lying idle on the site.
- (d) Palanpur: GFCCA is engaged in fishing operations at Dantivada, Machhu I and II and other reservoirs in Gujarat. GFCCA employs its own fishermen to harvest fish which are marketed in Ahmedabad, Bombay, Calcutta & Delhi. During 1974/75 this unit made a profit of Rs 0.07 M.

- (e) Jafraabad: GFCCA markets dry laminated Bombay ducks as well as shark fins, the fish mauus which are procured from primary cooperatives and fishermen along the coast. The unit had a loss of Rs 0.09 M during 1974/75, mainly due to market price fluctuations.
- (f) Ahmadabad: GFCCA has set up a modern nylon net plant with a capacity of producing 30,000 kgs. of fish nets webbing and 50,000 kgs. of netting twine per annum. The building for housing the plants has been financed from GFCCA's own funds and a loan obtained from GOG for machinery and equipment. Profit during 1974/75 was Rs 0.36 M.

12. A summary of GFCCA branch activities is shown in Table 4.

#### Borrowings:

13. GFCCA borrows term loans and workings capital from GOG, Gujarat State Cooperative Bank and commercial banks--full details are shown in Table 5. Although the exact amount is not identifiable, substantial loans have been recovered from ultimate borrowers but these amounts have, in agreement with GOG, been employed in GFCCA's own business instead of repaying GOG dues. As of 30 June 1975, GFCCA was in arrears towards repayment of principal and interest of Rs 3.64 M and Rs 1.64 M, respectively in respect to instalments due towards GOG loans. In 1971, GOG agreed to convert loans amounting to Rs 2.5 M into equity, the remaining amount of GOG borrowing, together with accrued interest, would be treated as interest-free loan for a period of three years, and, thereafter, interest would start accruing to GOG unless on a review GOG considers it necessary to extend the period. This position was subject to GFCCA fulfilling the following requirements:

- (a) GFCCA by-laws should be amended to provide for a clear majority for GOG nominated members of the board and the executive committee; and
- (b) Any two of GOG nominees jointly shall be given a power of veto under which any resolution passed by the board or its executive committee could be set aside until it is referred to and advice obtained from GOG within one month in that behalf."

The above GOG decisions have not been given effect to so far pending approval of the proposal by the board of GFCCA. GFCCA is well within its maximum borrowing power of up to ten times paid up share capital and reserves minus accumulated losses.

14. A summary showing GFCCA financial progress from 1970-1975 is given in Table 6.

Summary and Conclusions

15. GFCCA has been burdened with accumulated losses for the past several years. In 1973/74 it was, however, able to wipe off those accumulated losses and show a small profit. Although profits and losses tended to fluctuate considerably, the main contributors to profits were: (a) boat building yard; (b) marine engines and outboard motors; (c) nylon net plant; and (d) inland fish trade. The main contributors to losses were: (a) freezing plants; (b) ice plants; (c) fresh fish trade; and (d) dry fish trade.

16. GFCCA suffers from poor management, inadequate staff (particularly accountants), lack of budgetary and inventory control and forward planning. Its financial situation is precarious, particularly if all the bad debts and obsolete fixed assets were to be written off. Clearly, GFCCA must be rehabilitated financially and its organization strengthened before it can be considered a suitable borrower from IDA/Bank funds.

Recommendations

17. Assurances have been given that the report by ECOTECH, the appointed financial and management consultants, approved by ARDC and GOG, would be implemented, and that GFCCA would appoint additional engineers and a marketing manager for this purpose. Inter-alia the proposals should take into consideration the immediate engagement of accountants to set up properly organized accounting, budgeting and inventory control systems, strengthening of top management, the engagement of a qualified engineers and a marketing manager, and a review of the capital structure after writing off bad debts and worthless assets.

C. Gujarat State Cooperative Bank Ltd. (GSCB)

Introduction

18. GSCB was established in May 1960, when a separate State of Gujarat was created by bifurcation of the former State of Bombay. GSCB took over the assets and liabilities of Bombay State Cooperative Bank Ltd. in Gujarat. GSCB is the apex body of the short and medium term cooperative credit structure in the State. This structure consists of primary cooperative societies (PCS) at village level, central cooperative banks (CCB) at district or intermediary level and GSCB at the apex. CCB are federations of PCS in the districts while GSCB is a federation of CCB in the State.

Membership

19. GSCB membership consists of CCB, other state cooperative organizations (such as Gujarat State Cooperative Marketing Society Ltd. and Gujarat State Cooperative Land Development Bank Ltd., (GSLDB), urban cooperative banks, industrial, and other cooperative societies) and covers the entire State of Gujarat. Membership increased from 162 on June 30, 1973, to 208 on June 30, 1975, mainly because of registration of new urban cooperative banks.

Management

20. GSCB affairs are managed by a Board of Directors, the composition of which is as under:

<u>Representatives of:</u>	<u>Number</u>
Central cooperative banks (1 each)	17
Urban cooperative banks and banking unions	2
Industrial and other cooperative societies	1
Gujarat State Cooperative Land Development Bank	1
Gujarat State Cooperative Marketing Society Ltd.	1
Nominees of GOG	3
Managing Director (ex-officio), if appointed	1
Members to be coopted	2
	<u>28</u>

The post of Managing Director has not yet been filled and the current strength of the board is 27. The Board of Directors has delegated most of its powers to different committees (executive committee, staff committee, industrial finance committee, etc.) which meet frequently and as required. The Board generally deals with policy matters and other important items. The Chief Executive Officer of GSCB is the Manager, who is assisted by two Joint Managers, one in charge of accounts and the other finance and development. The accounts section consists of maintenance of books of accounts, banking transactions, investments, etc., while the other section takes care of loans and advances, inspection and supervision, developmental activities, etc. Each section, under a Joint Manager, is in charge of an experienced officer who in turn is supported by necessary staff. An organization chart is shown in Table 7. GSCB, being an apex cooperative institution, has refrained from opening branches so there is no competition between it and member banks in attracting local business. GSCB deals with PCS only through CCB.

Audit

21. The accounts of GSCB are audited by government auditors under the Registrar of Cooperative Societies.

Source of Funds

22. GSCB has three important sources of funds, viz., borrowings from the Reserve Bank of India (RBI), deposits, and share capital. As at the end of June 1975, Rs 808 M of its borrowings represented advances from RBI, while deposits stood at Rs 576 M. Paid up share capital on June 30, 1975, amounted to Rs 39 M. RBI sanctions short term and medium term credit limits for each CCB, that are routed through GSCB, which in turn adds its own resources to those borrowings to meet CCB credit needs. In addition, GSCB also borrows against its securities from RBI to meet its other requirements. Total deposits collected by GSCB are sizeable and most are term deposits. As of



June 30, 1975, out of the total deposits of Rs 576 M, current and savings deposits accounted for only Rs 44 M and Rs 1 M, respectively, while another Rs 5 M were by way of money at call and short notice. Fixed deposits at Rs 526 M contributed nearly 92% of GSCB total deposits. Other sources of funds include Agricultural Refinance and Development Corporation (ARDC) and National Cooperative Development Corporation (NCDC). ARDC has so far approved 3 schemes to GSCB, one for storage and the other two for fisheries. Refinance of Rs 0.2 M has been drawn by GSCB from ARDC under the first scheme, but as regards fisheries schemes GSCB has not yet drawn any refinance.

#### Use of Funds

23. After maintaining the statutory cash reserve and liquid assets, GSCB funds are mostly utilized in loans and advances, which fall in different categories. Short and medium term agricultural loans are advanced to CCB mostly against borrowings from RBI. Out of GSCB total advances of Rs 1,345 M on June 30, 1975, Rs 732 (about 54%) represented short term loans, Rs 610 M (about 45%) medium term loans and Rs 3 M (about 1%) long term loans. Besides CCB, other institutions financed by GSCB include GSLDB to which interim finance is advanced (besides purchase of debentures issued by GSLDB), Gujarat State Cooperative Marketing Society, cooperative sugar and spinning mills. Block capital requirements of cooperative processing units are met by GSCB with the help of financial assistance of NCDC. GSCB has availed itself of refinance facilities from RBI for granting working capital loans to small scale industries through urban cooperative banks and to industrial cooperative societies through CCB. GSCB liquid assets consisting of cash, bank balances and investments in approved securities amounted to Rs 183 M as of June 30, 1975. Investments in fixed assets (premises and dead stock) was Rs 2.6 M.

#### Recovery

24. GSCB deals mostly with institutions and collections have been 100% of demand. There are no overdues.

#### Operating Results

25. Since inception GSCB has been operating at a profit. Annual net profits have been steadily increasing and GSCB declared a dividend of 9% on share capital for the last two years, 1973/74 and 1974/75. The main source of income has been interest on loans and other investments. Cost of establishment for the year 1974/75 constituted about 2.5% of total income for the year.

#### Financial Position

26. GSCB has been treated as a scheduled cooperative bank by RBI from July 1966, when cooperative banks were brought under RBI statutory control. In May 1972, GSCB was issued a license by RBI for carrying on banking business. Its financial position for the last 3 years is summarized in Tables 8 and 9.

INDIA

GUJARAT FISHERIES PROJECT

Proposed Staffing of Fisheries Terminal Division

	<u>Veraval</u>	<u>Mangrol</u>	<u>Cost Rs</u>
Managing Director	1	-	30,000
General Manager	1	1	39,000
Deputy Manager	1	1	27,000
Accountant	1	1	20,400
Market Superintendent	2	1	27,000
Salesmen (Auctioneers)	6	3	81,000
Sales Clerk	6	3	36,000
Cashier	3	1	24,000
Clerk/Typist	4	2	36,000
Peon	3	1	14,400
Foreman	3	2	21,600
Watchmen	4	2	21,600
Driver	4	2	24,000
Temporary Labor	as required		<u>81,925</u>
			<u>483,525</u>

June 20, 1976

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GUJARAT FISHERIES PROJECT

Gujarat Fisheries Central Cooperative Association, Ltd.

Board of Directors

Commissioner of Fisheries (GOG) Chairman

Joint Registrar of Cooperative Societies (GOG)

Managing Director, Gujarat State Financial Corporation

Managing Director, Gujarat Agro Marine Products Ltd.

Managing Director, Gujarat State Cooperative Bank Ltd.

Financial Advisor and Deputy Secretary to Agriculture  
Forest and Cooperative Department (GOG)

Commissioner of Industries (Or his Representative) GOG

General Manager, Gujarat Fisheries Central Cooperative  
Association Ltd.

One Director nominated by GOG

Two members elected from among affiliated cooperatives  
in South Gujarat

One member elected from among affiliated cooperatives  
in Jamnagar and Kutch

Three members elected from among affiliated  
cooperatives in Saurashtra (other than Jamnagar and Kutch)

One member nominated by the Board and approved by the  
Commissioner of Fisheries to represent individual  
members

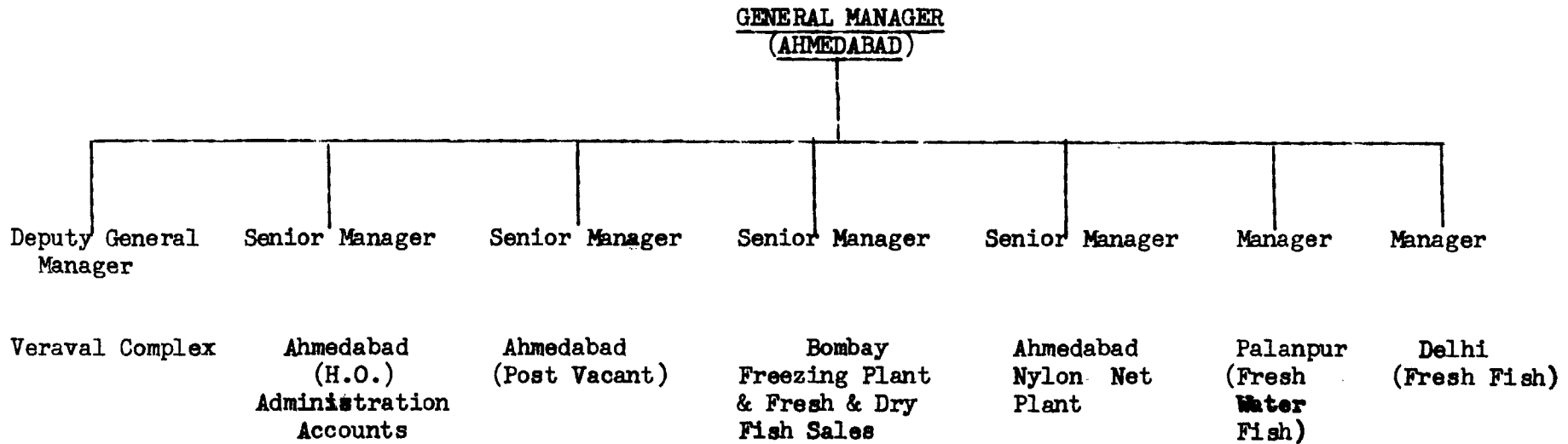
June 20, 1976

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GUJARAT FISHERIES PROJECT

Gujarat Fisheries Central Cooperative Association Ltd.

Organization Chart



June 20, 1976

## INDIA

## GUJARAT FISHERIES PROJECT

Gujarat Fisheries Central Cooperative Association Limited  
Summary of Activities 1970-1975

Item	Profit (+) Loss (-) during the year				
	1970/71	1971/72	1972/73	1973/74	1974/75
	(Rs. '000)				
Freezing plant	- 60	+ 5	- 226	- 329	- 371
Canning plant	- 27	- 25	- 18	- 3	- 3
Veraval ice plant	- 4	- 69	- 50	- 71	- 77
Mangrol ice plant	- 4	- 9	- 4	- 2	- 8
Boat building yard	+ 10	+ 163	+ 670	+ 447	+ 226
Petrol pump	+ 7	+ 12	+ 7	- 5	+ 3
Engines	+ 20	+ 45	+ 253	+ 433	+ 486
Nylon net factory	+ 209	+ 384	+ 290	+ 498	+ 363
Inland fish	-	-	+ 245	+ 88	+ 75
Fresh fish	- 187	- 213	- 43	+ 135	- 393
Dry fish	- 32	- 37	- 8	- 32	- 90
Trawling	-	-	-	-	+ 5
Carrier launches	-	-	-	-	+ 4
	- 68	+ 256	+ 1,116	+ 1,159	+ 220

June 20, 1976

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## GUJARAT FISHERIES PROJECT

Gujarat Fisheries Central Cooperative Association Limited - Borrowings as at June 30, 1975  
(Rs '000)

Nature of borrowings	When borrowed	Amount originally borrowed	Purpose	Rate of Interest %	Term of loan (years)	Amount outstanding as of 6/30/75
1	2	3	4	5	6	7
a) Government loans						
1) Grow more food 1957-58	Feb.1958	300	Distribution of fishery requisites to fishermen	5%	10	83
2) GMF 1960-61	Nov.1960	324	-do-	5%	7	107
3) 7 HP Bukh engine 1	Dec.1960	59	Distribution of 23 Bukh marine engines to fishermen	5%	7	3
4) Nylon net plant	Dec.1960	400	Setting up of nylon net plant	5%	8	210
5) IBM and OBM (engines)	March 1961	67	Loans to fishermen for purchase of in-board and out-board motors for their boats	5%	7	23
6) OBM (engines)	March 1961	128	-do-	5%	7	46
7) Mangrol ice plant	Oct. 1961	226	Transfer of departmental ice plant to GFCCA	5%	15	97
8) Carrier launch	March 1962	75	Purchase of carrier launch by GFCCA	5%	10	43
9) Engine	..	267	Distribution of 33 marine engines to fishermen	5%	7	101
10) Veraval ice factory & cold storage	Oct. 1961	442	Transfer of departmental ice-cum-cold storage plant to GFCCA	5%	15	202
11) Central Govt. development and marketing - I	Sept. 1962	500	Purchase of 4 trucks, 2 insulated vans, 2 autorickshaws, 2 tempo vans 3 refrigerated cabsines, 1 carrier launch and 1 freezing plant at Veraval.1/	4%	10	347
12) Central Govt. development and marketing - II	Jan. 1963	1,000	Short term loan for supply of fishing gear to fishermen, construction of carrier launch for GFCCA, supply of 33 out-board and 43 in-board engines to fishermen, supply of wooden boats to fishermen and 4 /2 go-downs for GFCCA.	4%	10	814
13) -do- III	July & Sept. 1964	1,500	Marketing of fish and fishery products	4%	10	1,492
14) Boat building yard	April & March 1963	133	For GFCCA boat building yard at Veraval	5%	7	101
15) Marketing - I	Sept. 1971	100	Not mentioned	7%	10	70
16) -do- - II	Feb. 1972	100	-do-	7%	10	70
17) -do- - III	Jan. 1973	90	-do-	7%	10	72
18) -do- - IV	June 1973	100	-do-	7%	10	80
19) -do- - V	July 1973	100	-do-	7%	10	90
20) Ashok Leyland engine	Dec. 1972	41	Allotment of 1 marine engine to GFCCA on loan cum-subsidy basis for its own fishing boat	N.A	N.A	24
b) Cash credit from Gujarat State Coop. Bank Ltd.	Dec. 1973 (Limit renewed upto July & Oct. 1975)	1,150	Purchase and sale of dry fish, nylon net plant and for boat yard	12%	S.T.	810
c) Cash credit from Syndicate bank	Dec. 1973	300	Packing credit		S.T.	300

1/ Instead of freezing plant GOG allowed GFCCA to set up a canning plant (cost of Rs 93,000 and Rs 43,000 spent on rented premises which have since been vacated) now closed down. The plant dismantled and now lying in a godown.  
2/ GFCCA has constructed only one godown at Jafrabad for the storage of dry fish at a cost of Rs 75,000.

## INDIA

## GUJARAT FISHERIES PROJECT

Gujarat Fisheries Central Cooperative Association Limited  
Financial Position 1970-1975

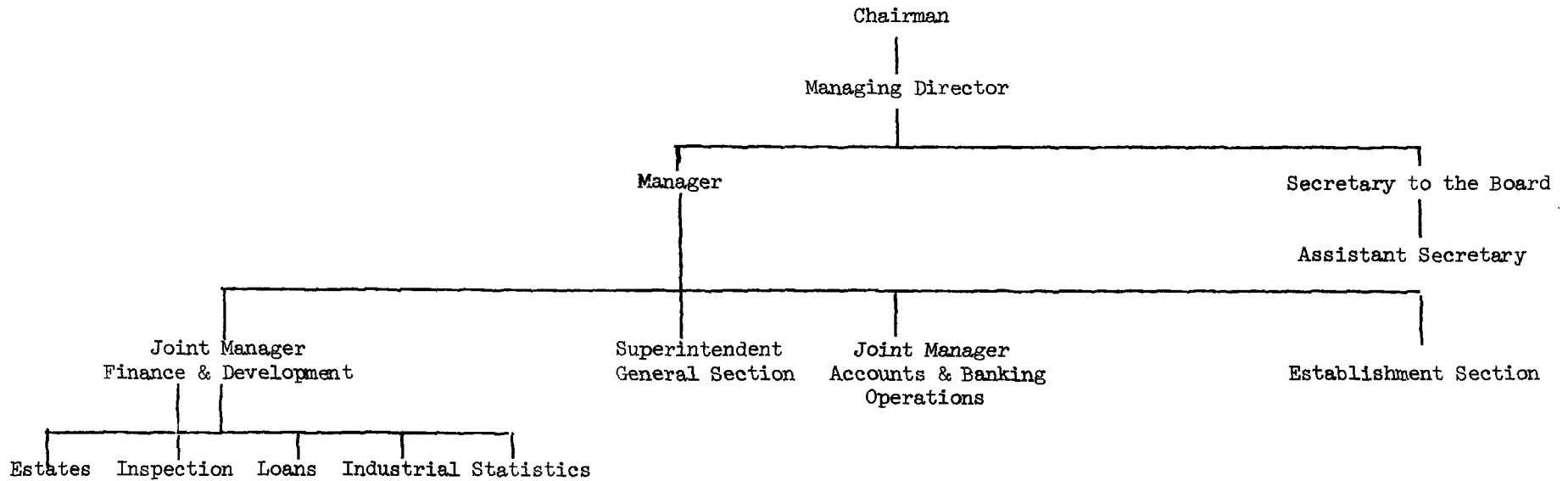
Item	1970/71	1971/72	1972/73	1973/74	1974/75
	(Rs. M.)				
Paid up capital	0.98	0.98	0.99	0.99	1.59
Reserves and other funds	0.78	0.92	1.16	1.66	1.67
Borrowings	5.12	5.65	6.33	6.40	6.84
Other liabilities	0.78	0.99	1.48	3.01	4.99
Fixed assets	3.40	3.67	3.50	3.33	3.21
Other investments	0.01	0.01	0.01	0.01	0.01
Bank balances & deposits	0.65	0.25	0.36	0.39	1.06
Loans & advances	0.82	0.91	1.36	1.56	1.90
Sundry debtors, staff advances, etc.	0.79	1.00	1.85	2.79	2.30
Closing stock & current assets	0.98	1.89	2.33	3.86	6.45
Profit & Loss:					
(a) Profit (+) Loss (-) during the year	-0.24	+0.16	+0.34	+0.46	+0.02
(b) Accumulated profit (+) or loss (-)	-0.93	-0.77	-0.43	+0.03	+0.05
Defaults under borrowings:					
(a) Principal	NA	2.90	3.25	3.72	3.64
(b) Interest	NA	1.47	1.47	1.47	1.64

August 23, 1976

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GUJARAT FISHERIES PROJECT

Gujarat State Cooperative Bank Ltd. - Organization Chart



June 20, 1976



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GUJARAT FISHERIES PROJECT

Gujarat State Cooperative Bank Ltd. - Financial Statement 1973-75  
(Rs M)

	30.6.73	30.6.74	30.6.75
<b>Membership</b>			
Cooperative Societies (Members)	161	174	207
Individual and Others (Members)	1	1	1
Total	<u>162</u>	<u>175</u>	<u>208</u>
<b>LIABILITIES</b>			
<b>1. Paid-up Share Capital</b>			
State Government	12	17	17
Cooperative Societies	17	17	22
Individual and others	-	-	-
Total	<u>29</u>	<u>34</u>	<u>39</u>
<b>2. Reserves</b>			
Statutory Reserve Fund	9	10	12
Agricultural Credit Stabilization Fund	33	38	45
Bad Debt Reserve	5	8	9
Other Reserves	8	8	9
Total	<u>55</u>	<u>64</u>	<u>75</u>
<b>3. Deposits</b>			
Current	39	44	44
Savings	1	1	1
Fixed	419	495	526
Others	9	10	5
Total	<u>468</u>	<u>550</u>	<u>576</u>
<b>4. Other Borrowings</b>			
<b>(i) Reserve Bank of India</b>			
Short Term	110	301	284
Medium Term	240	244	524
Total	<u>350</u>	<u>545</u>	<u>808</u>
<b>(ii) Others</b>			
	1	3	2
<b>(iii) Total Other Borrowings</b>			
	<u>351</u>	<u>548</u>	<u>810</u>
<b>5. Other Liabilities</b>			
	9	53	67
<b>6. Profit and Loss Account</b>			
	4	7	7
Total Liabilities	<u>916</u>	<u>1,256</u>	<u>1,574</u>
<b>ASSETS</b>			
<b>1. Cash on Hand</b>			
	-	-	-
<b>2. Balance with Banks</b>			
	22	22	37
<b>3. Investments</b>			
Government Securities	119	120	84
Other Trustees Securities	56	58	59
Others	2	3	3
Total	<u>177</u>	<u>181</u>	<u>146</u>
<b>4. Loans and Advances</b>			
Short Term	409	706	732
Medium Term	302	299	610
Long Term	-	3	3
Total	<u>711</u>	<u>1,008</u>	<u>1,345</u>
<b>5. Other Assets</b>			
	6	45	46
Total Assets	<u>916</u>	<u>1,256</u>	<u>1,574</u>

INDIA

GUJARAT FISHERIES PROJECT

Gujarat State Cooperative Bank Ltd. - Profit & Loss Account 1973-75  
( Rs'000 )

	YEAR ENDING		
	<u>30.6.73</u>	<u>30.6.74</u>	<u>30.6.75</u>
<u>Expenditure</u>			
Interest on deposits, borrowings, etc.	40,178	61,178	89,428
Salaries, allowances & provident fund	1,374	1,728	2,399
Directors and local committee members fees, etc.	55	98	126
Other establishment expenses	122	198	314
Auditors' fees	15	22	23
Depreciation and repairs	95	98	148
Other expenditure	221	3,000	12,112
Net Profit	<u>4,126</u>	<u>7,030</u>	<u>7,242</u>
Total	<u>46,186</u>	<u>73,352</u>	<u>111,792</u>
<u>Income</u>			
Interest and discount	45,729	70,371	111,476
Commission, exchange & brokerage	140	171	166
Other receipts	<u>317</u>	<u>2,810</u>	<u>150</u>
Total	<u>46,186</u>	<u>73,352</u>	<u>111,792</u>
Dividend declared (%)	6½ %	9%	9%

August 24, 1976

INDIA

GUJARAT FISHERIES PROJECT

Marketing and Prices

Domestic Market

1. During the last decade, India's total fish production increased at a compound rate of about 4% per annum, and by 1975 reached 2.4 million tons of which 1.6 million tons were marine and 800,000 tons were fresh water fish. During the same period per capita availability 1/ of fish increased from about 2.7 to about 3.9 kg. GOI estimates that 30% of India's population is vegetarian and that per capita consumption of the fish eating population was about 6.5 kg in 1975. Actual per capita consumption varies widely, depending primarily upon dietary (religious) preference and, to a lesser extent, upon availability of fish in a given market. However, there is little supporting data on fish consumption habits, market size, marketing channels, and market potential.

2. Marketing of marine fish is dominated by market forces in Bombay, which is the largest depository of fresh and dried marine fish for consumption, transshipment and for export. Fish prices throughout India are determined at Bombay's Crawford Market by a small group of traders who set prices based on daily volume of fish landed and orders for transshipment through Bombay to other market centers. This also applies to the separate dried fish market.

3. In Gujarat, fish production is 200,000 tons of which 190,000 tons is marine fish. This gives a per capita availability of 44.4 kg. However, as about 85% of Gujarat's population is vegetarian, less than 15% of the fish is consumed locally; about 80% of the fish is shipped to Bombay and 5% to Delhi and other inland markets.

Landings

4. In Gujarat, there are two main landing periods; early morning for gill netters and late afternoon for trawlers. Gill netters tend to catch relatively more expensive table fish, while trawlers catch relatively more trash fish and shrimp (Table 1); thus there are differences in landing and handling procedures during mornings and afternoons. Landings are either: (a) consumed fresh; (b) frozen; (c) dried; or (d) converted to fish meal. On one day (or night) trips, which produce the bulk of landings, no ice is used. Fish which can be "exported" fresh, primarily to Bombay, are iced (crushed

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1/ Total production divided by population.

block ice) after unloading. Fish to be marketed fresh in Veraval go directly to the fish market, where they may be iced. Shrimp, plus some fish such as cuttlefish and squid, for foreign export go directly to the processing plants in Veraval, where they are iced pending processing and freezing, or are iced for shipment to Bombay for processing and freezing. Dried fish intended for direct human consumption is gutted, slashed, slightly salted and sun-dried on wire, wooden racks or unpaved ground before "export". Other fish - trash fish - is frequently dried on the ground before conversion to fish powder for use in stock feed. Often insects and rodents mix freely with dried fish while it is on the ground. Trash fish intended for conversion to fish meal for export goes directly to the fish meal plant and is iced only in the event of a surplus of fish or a plant breakdown.

### Marketing

5. Marketing channels are varied, depending upon the product, but are largely in the private sector. The three Gujarat cooperatives involved in marketing handle less than 10% of total production. Both marketing channels and prices are affected by advances made to fishermen (a process known locally as "binding") when there is little or no fishing for three months during the south west monsoon. Advances from traders and cooperatives during this season range from Rs 3,000 to Rs 8,000 per boat. In exchange for this advance, fishermen agree to sell the coming season's catch to the trader generally below market prices. This agreement usually covers the entire season, but in some cases prices are fixed every 15 days. In any case, fishermen are "bound" to sell their catch to the person or organization making the advance. No interest is charged as such and the advance is repaid from landings.

6. Fresh fish in Gujarat are usually taken to the local market and sold by the fishermen's wives. Fresh fish for export out of Gujarat are shipped in ice by sea, road or rail. Shipments by sea are decreasing and the bulk of the fish is now moved by road. About 75,000 tons go to Bombay annually, largely by road. Rail shipments are primarily to Delhi (15,000 tons), Calcutta, Ajmer, Jaipur and Kanpur (10,000 tons). In Bombay, trucked fish go directly to Crawford Market where they are auctioned under a maximum price ceiling set by fish merchants. From Crawford Market fish may go directly to a retail outlet or may pass through the hands of one or more additional middlemen before reaching retailers. Fish from vessels fishing out of Bombay are landed at Sassoon dock where they are auctioned to traders. Fish transhipped by sea from Veraval are off-loaded and moved by truck to Crawford Market auction.

7. Although some fish frozen in Veraval are held in Bombay and sold when landings are low or non-existent (south west monsoon period), most of the frozen fish (largely pomfret) are exported to west Asia (Bahrain, Kuwait) and south east Asia (Singapore). These fish are transhipped from Bombay. Frozen shrimps are largely exported from Veraval, although some are frozen in Bombay and shipped from there or frozen in Veraval and transhipped from Bombay, directly to Japan (over 40%) or USA (over 30%). Similarly, frozen

cuttlefish goes directly to Japan. International marketing channels for shrimp are well established and may be through direct sales or on consignment to brokers.

8. Traders in Veraval buying fish for drying usually have agents in Bombay or are themselves agents of Bombay traders. Dried fish are moved to Bombay mostly by road, with perhaps one-third moving by ship. A substantial proportion - perhaps as much as 50% - is exported from Bombay to Ceylon, Mauritius and Indonesia. The bulk of the remaining dried fish is consumed in Maharashtra, and some goes to Assam, Andhra Pradesh, Karnataka and West Bengal. Buyers from other States come to Bombay and Bombay merchants also have representatives in other States. Fish meal made in Veraval, 65% protein, is almost entirely exported. There is only one plant and sales are through one of the owners in Bangkok.

9. Marketing channels for fresh fish sold in Veraval and for export products such as shrimp are easily traced. Marketing channels for fresh and dried fish sold in India are not clear after they pass through the hands of the initial traders in Bombay. There is need for a marketing study which would, among other things, identify marketing channels, record prices at successive marketing levels, measure demand and per capita consumption in various areas and socio-economic groups, examine adequacy of infrastructure including identification of bottlenecks, determine the need for cold store chains, etc.

#### Prices

10. There is a world market for export items such as shrimp, and the prices for such items are set outside of India. For items consumed within India, the prices for marine products are largely determined in Bombay and the prices for fresh water fish are determined in Calcutta. Information on fish and shrimp prices is given in Table 2. According to the fish wholesale price index, the price of fish in 1975 was 413% of the price of fish in 1966. However, the price of pomfret and rohu (a species of carp) in 1975 were only 174% and 338%, respectively, of the 1966 prices; the corresponding value for export shrimp was 253%. Prices of shrimp which stagnated in 1974, are continuing upward and are expected to increase.

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Relative Importance of Catch Components, by Quantity and Value, for Four Types of Boats, Veraval 1975.  
(Four largest Values in each Column Underlined.)

<u>Species</u>	<u>Gill Netter</u>		<u>Trawler</u>		<u>Canoe W OBM<sup>1</sup></u>		<u>Canoe <sup>1</sup></u>	
	<u>% Q</u>	<u>% V</u>	<u>% Q</u>	<u>% V</u>	<u>% Q</u>	<u>% V</u>	<u>% Q</u>	<u>% V</u>
1. White pomfret	2.91	<u>5.30</u>	0.10	0.24	6.01	<u>16.66</u>	4.94	<u>16.78</u>
2. Black pomfret	1.06	0.39	0.04	0.08	3.04	<u>8.44</u>	1.72	<u>5.84</u>
3. Silver bar	7.18	2.61	3.85	1.07	4.19	1.39	3.82	1.56
4. Prawns	3.72	<u>45.25</u>	4.76	<u>72.57</u>	0.78	<u>14.31</u>	-	-
5. Jew Fish	<u>13.62</u>	<u>14.85</u>	<u>4.96</u>	<u>6.87</u>	7.92	<u>13.17</u>	8.68	<u>17.68</u>
6. Thread fin	8.86	<u>12.08</u>	3.16	<u>5.48</u>	5.30	<u>11.01</u>	6.16	<u>15.71</u>
7. Indian shad ( <u>H. toli</u> )	3.78	4.82	0.36	0.59	4.44	8.62	4.82	<u>11.49</u>
8. Indian shad ( <u>H. ilisha</u> )	1.77	2.74	0.15	0.29	2.55	6.01	3.04	8.77
9. Eel	5.14	3.36	2.57	2.14	5.01	5.00	4.89	5.98
10. Cat fish	<u>11.56</u>	2.10	<u>10.90</u>	2.52	<u>10.10</u>	2.80	<u>10.07</u>	3.43
11. Seer fish	1.24	3.28	0.14	0.27	3.03	6.72	2.05	5.56
12. Sharks	<u>12.20</u>	1.61	<u>8.99</u>	2.08	<u>10.47</u>	2.90	<u>10.61</u>	3.61
13. Shrimps	1.93	0.88	<u>4.75</u>	2.74	1.23	0.85	0.53	0.45
14. Others	<u>24.97</u>	1.09	<u>55.27</u>	<u>3.07</u>	<u>36.16</u>	2.41	<u>38.69</u>	3.16
Total	99.94	100.36	100.00	100.01	100.23	100.29	100.02	100.02
Q = Quantity (kg)	59,966		121,878		16,477		7,858	
V = Value (Rs)	164,899		263,698		29,724		11,561	
Weighted mean Rs/kg	2.75		2.16		1.80		1.47	

<sup>1/</sup> Primarily fishing gillnets.

Source: GOG Department of Fisheries

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GUJARAT FISHERIES PROJECT

Fish and Shrimp Prices in India, 1962 - 1975

<u>Year</u>	<u>Fish whole- sale price index</u>	<u>Pomfret wholesale price <sup>1/</sup></u> (Rs/kg)	<u>Rohu wholesale price <sup>2/</sup></u> (Rs/kg)	<u>Shrimp wholesale price <sup>3/</sup></u> (Rs/kg)
1962	133.9			
1963	143.5			
1964	174.0			
1965	248.6			5.89
1966	284.9	4.30	3.25	10.11
1967	315.2	5.50	5.50	11.62
1968	327.1	4.50	5.50	10.86
1969	286.9	3.25	5.50	12.26
1970	289.4	5.25	7.00	10.96
1971	343.4	3.00	6.00	12.52
1972	454.5	3.00	7.00	16.66
1973	654.0	5.50	8.00	18.33
1974	999.8	6.00	11.00	18.55
1975	1,176.1	7.50	11.00	23.79
1975 ÷ 1962	878%			
1974 ÷ 1966	351%	140%	338%	183%
1975 ÷ 1966	413%	174%	338%	235%

1/ Wholesale price quarter ending in March, Bombay

2/ Wholesale price quarter ending in March, Calcutta

3/ Average value (FOB) of shrimp exported. Most recent value is for 1975-1976 (April 1 - March 30).

Source: Fish, GOI Ministry Agriculture & Irrigation,; Shrimp, Marine Products Export Development Authority.

(JCM:mbw June 24, 1976)

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GUJARAT FISHERIES PROJECT

Cash Flow Projections \*

14.8 meter Trawler

	----- years -----					
	<u>11/</u>	<u>2-8</u>	<u>9-10</u>	<u>11</u> (Rs '000)	<u>12-14</u>	<u>15</u>
<b>I. INCOME STATEMENT</b>						
Gross Sales	75.9	189.7 <sup>1</sup>	189.7	189.7	189.7	189.7
less commission to FTO 1%	(0.8)	(1.9)	(1.9)	(1.9)	(1.9)	(1.9)
Net sales	75.1	187.8	187.8	187.8	187.8	187.8
<b>Operating Costs</b>						
Fuel and lubricants	17.9 <sup>3</sup>	44.7 <sup>4</sup>				
Maintenance of hull and engine	3.6 <sup>3</sup>	9.1 <sup>2</sup>				
Gear maintenance and replacement	1.0 <sup>5</sup>	4.0 <sup>7</sup>				
Wages	8.6 <sup>8</sup>	22.6 <sup>2</sup>				
Food	1.2 <sup>3</sup>	3.1 <sup>10</sup>				
Ice	0.7 <sup>3</sup>	1.8 <sup>11</sup>				
Insurance	3.0 <sup>3</sup>	7.5 <sup>12</sup>				
Port dues	0.4 <sup>13</sup>	1.9 <sup>14</sup>				
Miscellaneous & overheads (10%)	3.6	9.5				
Total operating costs	<u>40.0</u>	<u>104.2</u>	<u>104.2</u>	<u>104.2</u>	<u>104.2</u>	<u>104.2</u>
Operating Income	<u>35.1</u>	<u>83.6</u>	<u>83.6</u>	<u>83.6</u>	<u>83.6</u>	<u>83.6</u>

\* In all the financial models it is assumed that the enterprise (entrepreneur) being a cooperative (member of cooperative) is exempted from income tax.  
1/ 4 months of fishing during year 1

2/ From year 2 total landing per annum 115 ton of which 11.5 ton shrimp (10%) and 103.5 ton fish. Shrimp: 12% C1, 38% C2, 50% C3; prices per ton Rs 31,000, 10,500 and 2,500 for C1, C2 and C3 respectively, average Rs 8,960/ton. Fish 4% C1, 11% C2, 16% C3, 69% C4-5; prices per ton Rs 3,500, 2,600, 1,100 and 340 for C1, C2, C3 and C4-5 respectively, average per ton Rs 837. In year 1 40% of the landing in year 2 and thereafter.

3/ The cost in year 1 40% of the cost in year 2+

4/ Diesel-205 days, 12 hrs./day, 12 l./hr., @ Rs 1.40; oil 295 l. (1% of diesel) @ Rs 10; grease 30 kg. @ Rs 14.

5/ 5% of capital cost of hull, engine and misc. items (Rs 182,100).

6/ 10% of capital cost.

7/ 40% of capital cost.

8/ Wages for four months

9/ Wages per month during 9 months season (Rs): skipper 500, driver 450, 4 crew 300 each. Wages during 3 months monsoon 50% of the above rates.

10/ Includes fish consumed on boat and fish taken home; estimated value Rs 2.50 day for each crew, 205 days.

11/ 27 tons at Rs 65; based on 1 ton of ice per ton of shrimp and fish of C1 and C2.

12/ 3.75% of investment for vessel, Rs 250 per annum for crew.

13/ 4 months at Rs 100.

14/ Berthing - Rs 1,200; slipping based on an average use of the slipway once every 1.5 years at Rs 1,000.



	years					
	<u>1</u>	<u>2-8</u>	<u>9-10</u> (Rs '000)	<u>11</u>	<u>12-14</u>	<u>15</u>
<b>II. CASH FLOW</b>						
<u>Inflow</u>						
Funds generated	35.1	83.6	83.6	83.6	83.6	83.6
Project loan (87.5%)	168.1					
Borrower's contribution (12.5%)	24.0					
Total inflow	227.2	83.6	83.6	83.6	83.6	83.6
<u>Outflow</u>						
Investment	192.1	-	-	87.7 <sup>1/</sup>	-	(48.5) <sup>2/</sup>
Debt service <sup>3/</sup>	9.2	35.7	-	-	-	-
Total outflow	201.3	35.7	-	87.7	-	(48.5)
Net cash flow	25.9	47.9	83.6	(4.1)	83.6	132.1
<b>III. FINANCIAL BENEFIT/COST</b>						
Benefit <sup>4/</sup>	75.1	187.8	187.8	187.8	187.8	187.8
Cost <sup>5/</sup>	232.1	104.2	104.2	191.9	104.2	55.7
Net benefit	(157.0)	83.6	83.6	(4.1)	83.6	132.1
<b>IV. FINANCIAL INDICATORS</b>						
FRR		53%				
FRR on Equity		over 55%				
Debt Service Coverage		2.34				

<sup>1/</sup> Replacement of engine.

<sup>2/</sup> Salvage values: hull and miscellaneous items 10%, engine 40%, gear 40%.

<sup>3/</sup> In year 1 interest only (on 50% of the loan); the principal is amortized in years 2-8 at 11% annual interest.

<sup>4/</sup> Net sales.

<sup>5/</sup> Operating and investment costs.

July 14, 1976

INDIA

GUJARAT FISHERIES PROJECT

Cash Flow Projections

Canoe with Outboard Motor

I. <u>INCOME STATEMENT</u>	-----Years-----				
	<u>1</u>	<u>2-5</u>	<u>6</u>	<u>7-9</u>	<u>10</u>
	(Rs '000)				
Net Sales <sup>1/</sup>	22.5	25.0	25.0	25.0	25.0
<u>Operating Costs</u>					
Fuel and lubricants <sup>2/</sup>			2.2		
Maintenance of boat <sup>3/</sup>			0.5		
Maintenance of motor <sup>4/</sup>			0.5		
Gear maintenance and replacement <sup>5/</sup>			3.7		
Wages <sup>6/</sup>			7.2		
Food <sup>7/</sup>			1.5		
Miscellaneous <sup>8/</sup>			0.8		
Total operating costs			<u>16.4</u>	<u>16.4</u>	<u>16.4</u>
Operating Income			6.1	8.6	8.6

1/ From year 2, 16 ton fish; 20% C1, 20% C2, 10% C3, 50% C4. Price per ton Rs 3,330, 2,470, 1,050 and 480 for C1, C2, C3 and C4 respectively. Average price Rs 1,500/ton. 50 kg. lobsters @ Rs 20. In year 1, 90% of the value of catch year 2+

2/ 2 hrs. of operation per day, 200 days per year total 400 hrs. per annum;  
35 hrs. on petrol at 2.5 l./hr. total 87.5 l. @ Rs 3.60  
365 hrs. on kerosene at 2.5 l./hr. total 912.5 l. @ Rs 1.25  
Oil 65 l. @ Rs 10; grease 5 kg. @ Rs 14

3/ 3% of capital cost      4/ 9% of capital cost      5/ 40% of basic cost

6/ 3 crew; 1 at Rs 300/month, 2 at Rs 250/month, for 9 months

7/ Includes fish consumed on boat and fish taken home; estimated value based on Rs 2.50/day for each crew, 200 days.

8/ 5% of operating costs.

	-----Years-----						
	<u>1</u>	<u>2-5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
	(Rs '000)						
<b>II. CASH FLOW</b>							
<u>Inflow</u>							
Funds generated	6.1	8.6	8.6	8.6	8.6	8.6	8.6
Subsidy <sup>1/</sup>	2.7						
Project loan	26.3						
Borrower's contribution (7.5%)	2.4						
Capitalised interest <sup>2/</sup>	2.9						
<b>Total inflow</b>	<b>40.4</b>	<b>8.6</b>	<b>8.6</b>	<b>8.6</b>	<b>8.6</b>	<b>8.6</b>	<b>8.6</b>
<u>Outflow</u>							
Investment	31.4	-	5.6 <sup>3/</sup>	-	-	-	(8.7) <sup>4/</sup>
Debt service <sup>5/</sup>	2.9	6.2	6.2	6.2	6.2	-	-
<b>Total outflow</b>	<b>34.3</b>	<b>6.2</b>	<b>11.8</b>	<b>6.2</b>	<b>6.2</b>	<b>-</b>	<b>(8.7)</b>
<b>Net Cash Flow</b>	<b>6.1</b>	<b>2.4</b>	<b>3.2</b>	<b>2.4</b>	<b>2.4</b>	<b>8.6</b>	<b>17.3</b>
<b>III. FINANCIAL BENEFIT/COST</b>							
Benefit	22.5	25.0	25.0	25.0	25.0	25.0	25.0
Cost	47.8	16.4	22.0	16.4	16.4	16.4	7.7
<b>Net Benefit</b>	<b>(25.3)</b>	<b>8.6</b>	<b>3.0</b>	<b>8.6</b>	<b>8.6</b>	<b>8.6</b>	<b>17.3</b>
<b>IV. FINANCIAL INDICATORS</b>							
FRR	30%						
FRR on Equity	over 55%						
Debt Service Coverage:	1.39 (years 2-8)						

<sup>1/</sup> 7.5% of cost of boat, 15% of the cost of sale and equipment, 10% of cost of nets and Rs 400 for out-board motor.

<sup>2/</sup> 11% of loan.

<sup>3/</sup> Replacement of engine.

<sup>4/</sup> Salvage value of canoe (33%) and nets (40%).

<sup>5/</sup> The principal and capitalized interest are amortized in years 2-8 at 11% annual interest.

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INDIA  
GUJARAT FISHERIES PROJECT  
Cash Flow Projection

Outboard Motor (for existing canoe)

	-----Years-----			
	<u>0<sup>1/</sup></u>	<u>1</u>	<u>2-3</u>	<u>4-5</u>
	(Rs '000)			
<b>I. <u>INCOME STATEMENT</u></b>				
Net Sales	17.9 <sup>2/</sup>	25.0	25.0	25.0
<u>Operating Costs</u> <sup>3/</sup>				
Fuel and lubricants	-	2.2		
Maintenance of boat	0.5	0.5		
Maintenance of motor	-	0.5		
Gear maintenance and replacement	3.7	3.7		
Wages	7.2	7.2		
Food	1.5	1.5		
Miscellaneous	0.6	0.8		
Total Operating Costs	<u>13.5</u>	<u>16.4</u>	<u>16.4</u>	<u>16.4</u>
Operating Income	<u>4.4</u>	<u>8.6</u>	<u>8.6</u>	<u>8.6</u>
Incremental Operating Income		4.2	4.2	4.2

1/ Without outboard motor

2/ It is assumed that the value of catch of canoe with OEM is 40% higher than the value of catch of canoe without motor.

3/ Assumptions are identical to those made in table 2. (canoe with outboard motor).

	-----Years-----		
	<u>1</u>	<u>2-3</u>	<u>4-5</u>
	(Rs '000)		
<b>II. <u>CASH FLOW</u></b>			
<u>Inflow</u>			
Funds generated	4.2	4.2	4.2
Subsidy	0.4		
Project loan	4.6		
Borrower's contribution (10%)	0.6		
Total inflow	<u>9.8</u>	<u>4.2</u>	<u>4.2</u>
<u>Outflow</u>			
Investment <sup>1/</sup>	5.6	-	-
Debt Service <sup>2/</sup>	<u>1.9</u>	<u>1.9</u>	<u>-</u>
Total outflow	<u>7.5</u>	<u>1.9</u>	<u>-</u>
<u>Net cash flow</u>	2.3	2.3	4.2
<b>III. <u>FINANCIAL BENEFIT/COST</u></b>			
Benefit <sup>3/</sup>	7.1	7.1	7.1
Cost <sup>4/</sup>	<u>8.5</u>	<u>2.9</u>	<u>2.9</u>
Net Benefit	(1.4)	4.2	4.2
<b>IV. <u>FINANCIAL INDICATORS</u></b>			
FRR	over 55%		
FRR on equity	over 55%		
Debt Service Coverage	2.21		

<sup>1/</sup> Details in Annex 8 .

<sup>2/</sup> The principal is amortized in years 1-3 at 11% annual interest .

<sup>3/</sup> Incremental net sales .

<sup>4/</sup> Incremental operating costs and investment.

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GUJARAT FISHERIES PROJECT

Cash Flow Projections

Ice Plant 200 ton - Veraval

	years -----			
	<u>1</u>	<u>2-8</u>	<u>9-10</u>	<u>11</u>
	(Rs '000)			
<b>I. <u>INCOME STATEMENT</u></b>				
Gross sales <sup>1/</sup>	-	2,484	2,484	2,484
Less tax 12%	-	( 298 )	( 298 )	( 298 )
<u>Net Sales</u>	-	<u>2,186</u>	<u>2,186</u>	<u>2,186</u>
<u>Operating Costs</u>				
Water <sup>2/</sup>		69		
Electricity <sup>3/</sup>		211		
Wages and overheads <sup>4/</sup>		147		
Maintenance <sup>5/</sup>		71		
Insurance <sup>6/</sup>		36		
Rent <sup>7/</sup>		48		
Miscellaneous <sup>8/</sup>		58		
<u>Total Operating Costs</u>	-	<u>640</u>	<u>640</u>	<u>640</u>
<u>Operating Income</u>	-	<u>1,546</u>	<u>1,546</u>	<u>1,546</u>

<sup>1/</sup> 38,220 ton at Rs 65.

<sup>2/</sup> 1.2 times the production of ice at Rs 1.50/ton (100gl).

<sup>3/</sup> 92 kwh/ton ice at Rs 0.06 kwh.

<sup>4/</sup> Wages per annum (Rs '000): manager 18.0, engineer 7.2, 24 laborers 86.4, 2 clerks 10.8; additional 20% of the above for overheads.

<sup>5/</sup> 2% of investment.

<sup>6/</sup> 1% of investment.

<sup>7/</sup> 4,400 m<sup>2</sup> at Rs 11/m<sup>2</sup>.

<sup>8/</sup> 10% of operating costs: includes refrigerant salt, interest on working capital, etc.

	years			
	<u>1</u>	<u>2-8</u>	<u>9-10</u>	<u>11</u>
	(Rs '000)			
<b>II. CASH FLOW</b>				
<u>Inflow</u>				
Funds generated	-	1,546	1,546	1,546
Project loan (80%)	2,856			
Borrower's contribution (20%)	714			
Capitalized interest	157			
Total inflow	<u>3,727</u>	<u>1,546</u>	<u>1,546</u>	<u>1,546</u>
<u>Outflow</u>				
Investment <sup>3/</sup>	3,570	-	-	(357) <sup>2/</sup>
Debt service	157	639	-	-
Total outflow	<u>3,727</u>	<u>639</u>	<u>-</u>	<u>(357)</u>
<u>Net Cash Flow</u>	0	907	1,546	1,903
<b>III. FINANCIAL BENEFIT/COST</b>				
Benefit	-	2,186	2,186	2,186
Cost	3,570	640	640	283
Net Benefit	<u>(3,570)</u>	<u>1,546</u>	<u>1,546</u>	<u>1,903</u>
<b>IV. FINANCIAL INDICATORS</b>				
FRR		42%		
FRR on Equity		55%		
Debt Service Coverage	over	2.42		

<sup>1/</sup> 11% on 50% of the loan.

<sup>2/</sup> Salvage value 10%.

<sup>3/</sup> The principal and capitalized interest are amortized in years 2-8 at 11% annual interest.

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INDIA

GUJARAT FISHERIES PROJECT

Cash Flow Projections

Ice Plant 75 ton - Mangrol

	years			
	1	2-8	9-10	11
	(Rs '000)			
<b>I. INCOME STATEMENT</b>				
Gross sales <sup>1/</sup>	-	930	930	930
Less tax 12%	-	(112)	(112)	(112)
<u>Net Sales</u>	-	<u>818</u>	<u>818</u>	<u>818</u>
 <u>Operating Costs</u>				
Water <sup>2/</sup>		26		
Electricity <sup>3/</sup>		79		
Wages and overheads <sup>4/</sup>		73		
Maintenance <sup>5/</sup>		33		
Insurance <sup>6/</sup>		16		
Rent <sup>7/</sup>		22		
Miscellaneous <sup>8/</sup>		25		
<u>Total Operating Costs</u>	<u>-</u>	<u>274</u>	<u>274</u>	<u>274</u>
Operating Income	-	544	544	544

<sup>1/</sup> 14,300 ton @ Rs 65.

<sup>2/</sup> 1.2 times the production of ice at Rs 1.50/ton .

<sup>3/</sup> 92 kwh/ton ice at Rs 0.06/kwh .

<sup>4/</sup> Wages per annum (Rs '000): manager 12.0, engineer 7.2, 10 laborers 36.0, clerk 5.4; additional 20% of the above for overheads .

<sup>5/</sup> 2% of investment .

<sup>6/</sup> 1% of investment .

<sup>7/</sup> 2,000 m<sup>2</sup> at Rs 11/m<sup>2</sup> .

<sup>8/</sup> 10% of operating costs: includes refrigerant salt, interest on working capital, etc.



	years			
	<u>1</u>	<u>2-8</u>	<u>9-10</u>	<u>11</u>
	(Rs '000)			
<b>II. CASH FLOW</b>				
<u>Inflow</u>				
Funds generated	-	544	544	544
Project loan (80%)	1,302			
Borrower's contribution (20%)	325			
Capitalized interest <sup>1/</sup>	<u>72</u>			
Total Inflow	<u>1,699</u>	<u>544</u>	<u>544</u>	<u>544</u>
<u>Outflow</u>				
Investment <sup>3/</sup>	1,627	-	-	(163) <sup>2/</sup>
Debt service	<u>72</u>	<u>292</u>	<u>-</u>	<u>(163)</u>
Total Outflow	<u>1,699</u>	<u>292</u>	<u>-</u>	<u>(163)</u>
<u>Net Cash Flow</u>	0	252	544	707
<b>III. FINANCIAL BENEFIT/COST</b>				
Benefit	-	818	818	818
Cost	<u>1,627</u>	<u>274</u>	<u>274</u>	<u>111</u>
Net Benefit	<u>(1,627)</u>	<u>544</u>	<u>544</u>	<u>707</u>
<b>IV. FINANCIAL INDICATORS</b>				
FRR		31%		
FRR on equity		over 55%		
Debt service coverage		1.86		

<sup>1/</sup> 11% on 50% of the loan.

<sup>2/</sup> Salvage value 10% of investment.

<sup>3/</sup> The principal and capitalized interest are amortized in years 2-8 at 11% annual interest.

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GUJARAT FISHERIES PROJECT

Cash Flow Projections

Freezing Complex 18 ton - Veraval

	----- years -----			
	1	2-8	9-10	11
	(Rs' 000)			
<b>I. <u>INCOME STATEMENT</u></b>				
<u>Net Sales</u> <sup>1/</sup>	-	38,668	38,668	38,668
<u>Operating Costs</u>				
Raw material <sup>2/</sup>		28,633		
Water <sup>3/</sup>		30		
Electricity <sup>4/</sup>		30		
Ice <sup>5/</sup>		116		
Wages and overheads <sup>6/</sup>		847		
Transport <sup>7/</sup>		374		
Materials <sup>8/</sup>		215		
Maintenance <sup>9/</sup>		78		
Insurance <sup>10/</sup>		39		
Rent <sup>11/</sup>		88		
Miscellaneous (10%) <sup>12/</sup>		182		
Interest on working capital <sup>13/</sup>		842		
<u>Total operating costs</u>	-	<u>31,474</u>	<u>31,474</u>	<u>31,474</u>
<u>Operating Income</u>	-	7,194	7,194	7,194

<sup>1/</sup> 934 tons at Rs 41,400/ton f.o.b..

Price based on 27.5% C1 and 72.5% C2 at price f.o.b. per kg of Rs 53 and 37 for C1 and C2 respectively.

<sup>2/</sup> 1732 ton. 24% C1 (60% conversion), 76% C2 (50% conversion), average conversion 52.4%, cost per ton Rs 31,000 and 10,500 for C1 and C2 respectively plus 4.2% tax. Average cost of raw material Rs 16,068/ton including tax.

<sup>3/</sup> 11.25 m<sup>3</sup> (1000 l) per ton of raw material, at Rs 1.50/m<sup>3</sup>.

<sup>4/</sup> 507.6 thousand kwh @ Rs 60.

<sup>5/</sup> 1 ton per ton of raw material; total 1,782 ton @ Rs 65.

<sup>6/</sup> Wages per annum (Rs'000): 1 manager 18.0, 3 engineers, 21.6, 4 clerks 21.6, 12 laborers 43.2, 144 women and supervisors 601.2; additional 20% of the above for overheads.

<sup>7/</sup> Rs 400/ton frozen.

<sup>8/</sup> Rs 230/ton frozen, for packing materials, chemicals, etc.

<sup>9/</sup> 2% of investment.

<sup>10/</sup> 1% of investment .

<sup>11/</sup> Groundrent 8,000 m<sup>2</sup> @ Rs 11. <sup>12/</sup> On operating costs excluding raw material.

<sup>13/</sup> 1/3 of operating costs for 9 months 11% annual interest.

	years -----			
	<u>1</u>	<u>2-8</u>	<u>9-10</u>	<u>11</u>
	(Rs' 000)			
<b>II. CASH FLOW</b>				
<u>Inflow</u>				
Funds generated	-	7,194	7,194	7,194
Project loan (80%)	3,136			
Borrower's contribution (20%)	784			
Capitalized interest <sup>1/</sup>	172			
<u>Total Inflow</u>	<u>4,092</u>	<u>7,194</u>	<u>7,194</u>	<u>7,194</u>
<u>Outflow</u>				
Investment	3,920	-	-	(392) <sup>2/</sup>
Debt service <sup>3/</sup>	172	702	-	-
<u>Total Outflow</u>	<u>4,092</u>	<u>702</u>	<u>-</u>	<u>(392)</u>
<u>Net Cash Flow</u>	<u>0</u>	<u>0,492</u>	<u>7,194</u>	<u>7,586</u>
<b>III. FINANCIAL BENEFIT/COST</b>				
Benefit	-	38,668	38,668	38,668
Cost	3,920	31,474	31,474	31,082
Net Benefit	( 3,920 )	7,194	7,194	7,586
<b>IV. FINANCIAL INDICATORS</b>				
FRR		Over 55%		
FRR on Equity		Over 55%		
Debt Service Coverage		10.25		

<sup>1/</sup> 11% of 50% of the loan .

<sup>2/</sup> Salvage value 10% of investment.

<sup>3/</sup> The principal and capitalized interest are amortized in years 2-8 at 11% annual interest.

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INDIA  
GUJARAT FISHERIES PROJECT  
Cash Flow Projections  
Freezing Complex 10 ton - Mangrol

	----- years -----			
	1	2-8 (Rs '000)	9-10	11
<b>I. <u>INCOME STATEMENT</u></b>				
Net sales <sup>1/</sup>	-	21,487	21,487	21,487
<u>Operating Costs</u> <sup>2/</sup>				
Raw material <sup>3/</sup>		15,907		
Water <sup>4/</sup>		17		
Electricity <sup>5/</sup>		17		
Ice <sup>6/</sup>		64		
Wages and overheads <sup>7/</sup>		476		
Transport <sup>8/</sup>		208		
Materials <sup>9/</sup>		119		
Maintenance <sup>10/</sup>		45		
Insurance <sup>11/</sup>		23		
Rent <sup>12/</sup>		48		
Miscellaneous <sup>13/</sup>		102		
Interest on working capital <sup>14/</sup>		468		
Total operating costs	-	<u>17,494</u>	<u>17,494</u>	<u>17,494</u>
<u>Operating Income</u>	-	3,993	3,993	3,993

1/ 519 ton @ Rs 41,400.

Price assumptions as in Table 6 .

2/ Wherever the detailed assumptions are not specified they are the same as in Table 6 .

3/ 990 ton @ Rs 16,068.

4/ 11,138 m<sup>3</sup> @ Rs 1.5.

5/ 283.7 thousand kwh @ Rs 60 .

6/ 990 ton @ Rs 65.

7/ Wages per annum (Rs'000): 1 manager 12.0, 2 engineers 14.4, 2 clerks 10.8, 7 laborers 25.2, 80 women and supervisors 334.0 ; **additional 20% of the above for overheads.**

8/ 519 tons @ Rs 400 .

9/ 519 ton @ Rs 230 .

10/ 2% of investment .

11/ 1% of investment .

12/ Ground rent 4,400 m<sup>2</sup> @ Rs 11 .

13/ 10% of operating costs **excluding raw material.**

14/ 1/3 of operating costs for 9 months at 11% annual interest .

	years -----			
	<u>1</u>	<u>2-8</u>	<u>9-10</u>	<u>11</u>
		Rs '000		
<b>II. CASH FLOW</b>				
<u>Inflow</u>				
Funds generated	-	3,993	3,993	3,993
Project loan (80%)	1,816			
Borrower's contribution (20%)	454			
Capitalized interest <sup>1/</sup>	100			
Total inflow	<u>2,370</u>	<u>3,993</u>	<u>3,993</u>	<u>3,993</u>
<u>Outflow</u>				
Investment	2,270	-	-	(227) <sup>2/</sup>
Debt service <sup>3/</sup>	100	407	-	-
Total outflow	<u>2,370</u>	<u>407</u>	<u>-</u>	<u>(227)</u>
Net Cash Flow	0	3,586	3,993	4,220
<b>III. FINANCIAL BENEFIT/COST</b>				
Benefit	-	21,487	21,487	21,487
Cost	2,270	17,494	17,494	17,267
Net Benefit	<u>(2,270)</u>	<u>3,993</u>	<u>3,993</u>	<u>4,220</u>
<b>IV. FINANCIAL INDICATORS</b>				
FRR		Over 55%		
FRR on Equity		Over 55%		
Debt service coverage		9.81		

<sup>1/</sup> 11% on 50% of the loan.

<sup>2/</sup> Salvage value 10% of investment.

<sup>3/</sup> The principal and capitalized interest are amortized in years 2-8 at 11% annual interest.

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GUJARAT FISHERIES PROJECT

Cash Flow Projections

Fish Meal Plant - 75 tons

	-----Years-----			
	<u>1</u>	<u>2-8</u>	<u>9-10</u>	<u>11</u>
		(Rs '000)		
<u>I. Income Statement</u>				
Net Sales <u>1/</u>	-	6,000	6,000	6,000
<u>Operating Costs</u>				
Raw material <u>2/</u>		2,305		
Water and electricity <u>3/</u>		34		
Fuel <u>4/</u>		794		
Wages and overheads <u>5/</u>		145		
Bags <u>6/</u>		165		
Maintenance <u>7/</u>		354		
Insurance <u>8/</u>		71		
Rent <u>9/</u>		13		
Miscellaneous <u>10/</u>		158		
Interest on working capital <u>11/</u>		75		
<u>Total operating costs</u>	<u>-</u>	<u>4,154</u>	<u>4,154</u>	<u>4,154</u>
<u>Operating Income</u>	<u>-</u>	<u>1,846</u>	<u>1,846</u>	<u>1,846</u>

- 
- 1/ 2,500 tons at Rs 2,400; based on 80% export at Rs 2,500/ton and 20% local sales at Rs 2,000/ton.
- 2/ 12,500 tons at Rs 180, plus 4.2% tax.
- 3/ Water 0.4 m<sup>3</sup>/ton raw at Rs 1.50/m<sup>3</sup>; electricity 35 kwh/ton raw at Rs 0.06.
- 4/ Light diesel oil 50 kg/ton raw at Rs 1.27/kg.
- 5/ Wages per annum (Rs '000): Manager 18.0, engineer 7.2, clerk 5.4, 25 laborers 90.0; additional 20% of the above for overheads.
- 6/ 4 bags per ton raw at Rs 3.30/bag.
- 7/ 5% of investment
- 8/ 1% of investment.
- 9/ 1,200 m<sup>2</sup> at Rs 11/m<sup>2</sup>.
- 10/ 10% of operating costs excluding raw material.
- 11/ 2/9 operating costs for 9 months at 11% annual interest.

II. CASH FLOW

Inflow

Funds generated	-	1,846	1,846	1,846
Project loan (80%)	5,664			
Borrower's contributions (20%)	1,416			
Capitalized interest <u>1/</u>	<u>312</u>	<u>      </u>	<u>      </u>	<u>      </u>
<u>Total Inflow</u>	<u>7,392</u>	<u>1,846</u>	<u>1,846</u>	<u>1,846</u>

Outflow

Investment	7,080	-	-	(708) <u>2/</u>
Debt service <u>3/</u>	<u>312</u>	<u>1,268</u>	<u>-</u>	<u>-</u>
<u>Total outflow</u>	<u>7,392</u>	<u>1,268</u>	<u>-</u>	<u>(708)</u>
Net Cash Flow	0	578	1,846	2,554

III. FINANCIAL BENEFIT/COST

Benefit	-	6,000	6,000	6,000
Cost	7,080	4,154	4,154	3,446
Net Benefit	(7,080)	1,846	1,846	2,554

IV. FINANCIAL INDICATORS

FRR	23%
FRR on equity	45%
Debt service coverage	1.46

1/ 11% of 50% of the loan.

2/ Salvage value 10% of investment.

3/ The principal and capitalized interest are amortized in years 2-8 at 11% annual interest.

INDIA

GUJARAT FISHERIES PROJECT

Financial Rates of Return Sensitivity Tests  
(%)

<u>Model</u>	<u>Estimated</u>	<u>Investment</u>		<u>Operating Costs</u>		<u>Net Sales</u>	
	<u>FRR</u>	<u>-10%</u>	<u>+15%</u>	<u>-10%</u>	<u>+15%</u>	<u>-10%</u>	<u>-15%</u>
14.8 m MFV	53	47	44	45	41	38	31
Canoe with Outboard Motor	30	26	24	21	16	16	10
Outboard Motor	over 55	over 55	over 55	over 55	over 55	over 55	over 55
Ice Plant - 200 tons	42	38	36	40	39	36	32
Ice Plant - 75 tons	31	28	27	30	29	26	23
Freezing Complex - 10 tons	over 55	over 55	over 55	over 55	over 55	Over 55	32
Freezing Complex - 18 tons	over 55	over 55	over 55	over 55	over 55	Over 55	34
Fish Meal Plant	23	20	19	16	12	13	7

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GUJARAT FISHERIES PROJECT

Economic Analysis

Production

1. Production estimates are based on the following assumptions:
  - (a) Incremental fish (and shrimp) would be produced by the following:
    - (i) 320 14.8 m MFV of which:

Financed by the project, Veraval	200
Financed by other sources (private sector), Veraval	50
Financed by the project, Mangrol	70
Total	<u>320</u>
    - (ii) 350 9 m motorized canoes.
    - (iii) 475 outboard motors which would be installed in 475 existing non-motorized canoes.
  - (b) Unit catch estimates would be as shown in Annex 13.
  - (c) The catch from the fish testing surveys (Annex 6) would be excluded from the production estimates.

Economic Rates of Return

2. In calculating the economic rate of return of the main project components the following assumptions have been used;

General Assumptions

- (a) current prices for fish reflect the economic value of such fish.
- (b) shadow pricing is not appropriate for labor component was costed at going wage rates.
- (c) As investments in test fishing surveys and related technical assistance, the marketing survey and net manufacturing machines play no part in generating project benefits. It is appropriate to exclude both the costs and benefits of these project components from the calculation.

Assumptions related to both Veraval and Mangrol

- (d) a 15% increase in catch per vessel was assumed, resulting from the possibility to partially fish during the monsoon season and the gain in fishing hours per trip resulting from shorter loading and unloading time. This increase would, however, be offset by an estimated 15% decrease in the average catch per vessel resulting from the greater density of vessels, so that the actual catch per vessel with and without the project would remain unchanged. The effort required for obtaining the present catch rates would therefore increase. Operational costs of new vessels were based on increased effort and incremental operating costs of the existing fleet were included in the calculations.
- (e) the economic rate of return was estimated with and without shadow pricing of foreign exchange. Accounting price used was US\$1 = Rs 10.50 as compared with the prevailing rate of about US\$1 = Rs 9.00.

Assumptions related to Veraval

- (f) the incremental number of 14.8 m MFV includes, in addition to the 200 MFV financed by the project, also 50 trawlers financed by other sources. Benefits and costs were adjusted accordingly.
- (g) benefits from future use of the port by 23 m MFV were not included. Accordingly, the incremental cost of making the port accessible to 23m MFV was subtracted from the investment in marine works.

Assumptions related to Mangrol

- (h) incremental fishing fleet includes 70 14.8m MFV as well as 70 new canoes and 73 outboard motors which would be installed in existing non-motorized canoes. The canoes and the outboard motors are included in cost estimates of the traditional fishermen sub-project. The reason for this inclusion, for economic rate of return calculation, in the Mangrol component, is that they would operate from a protected beach which would be constructed in Mangrol as a part of the marine works. Construction cost of that beach cannot be separated from other costs.

Assumptions related to the traditional fishermen Component

- (i) landing prices were assumed to be 5% lower than in Veraval and Mangrol due to additional handling and transport costs to the buyers.

(j) the following adjustments to investment costs were made:

- trucks were excluded as the calculation is based on landing prices.
- 40% of the investment in sheds was included as incremental fishing capacity as a result of the project is estimated at 40% of the total capacity.
- 20% of the investment in roads and water supply was included. This is based on the assumption that these components do not serve fishing boats only and the proportion charged to them should not exceed 50% of which 40% should be charged to the sub-project.

3. Estimated economic rates of return based on these assumptions are summarized below:

<u>Component</u>	<u>Rate of Return</u> %
Veraval	16
Mangrol	18
Mechanized Fishing Vessels (MFV)	48
Traditional Fishermen Component	53
Canoe with Outboard Motor	31
Outboard Motor (for existing canoe)	over 60
Ice Plants	45-59
Freezing Complexes	over 60
Fishmeal Plant	33
Whole Project	24

The rate of return of all the project components is acceptable. The relatively high rate of return of the traditional fishermen sub-project is a result of high proportion of sunk costs (non-motorized canoes) incurred before the project. The high rate of return of freezing plants reflects the present high risk of rejection of the frozen product at export market due to infestation by salmonella. Detailed calculations are provided in Tables 1 and 2. Sensitivity analysis was carried out for all project components and the results are shown in Table 3.

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Economic Analysis  
A. Harbor Improvements and Vessels

	-----Years-----														
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>
	(Rs '000)														
<u>1. Mangrol</u>															
Benefits 1/	822	2,464	5,634	9,477	13,271	15,547	15,547	15,547	15,547	15,547	15,547	15,547	15,547	15,547	15,547
Operating costs 2/	482	1,306	2,848	5,338	7,473	8,796	9,005	9,005	9,005	9,005	9,005	9,005	9,005	9,005	9,005
Investment costs 3/	2,221	9,038	15,381	6,350	3,556	372	595	76	138	-	1,153	1,657	1,638	1,562	(22,184)
Net Benefits	(1,881)	(7,880)	(12,595)	(2,211)	2,242	6,379	5,947	6,466	6,404	6,542	5,389	4,885	4,904	4,980	28,726
Economic Rate of Return		16%													
<u>2. Veraval</u>															
Benefits 4/	3,795	13,280	22,765	32,250	41,735	47,425	47,425	47,425	47,425	47,425	47,425	47,425	47,425	47,425	47,425
Operating costs 5/	1,705	6,130	10,555	14,980	22,948	27,022	28,374	28,374	28,374	28,374	28,374	28,374	28,374	28,374	28,374
Investment costs 6/	18,494	34,813	33,997	16,575	8,855	-	-	-	273	-	3,905	3,905	3,905	3,905	(61,815)
Net Benefits	(16,404)	(27,663)	(21,787)	695	9,932	20,403	19,051	19,051	18,778	19,051	15,146	15,146	15,146	15,146	80,866
Economic Rate of Return		18%													
<u>3. Traditional Fishermen</u>															
<u>Sub-Project</u>															
Benefits 7/	3,902	7,764	9,669	9,853	9,853	9,853	9,853	9,853	9,853	9,853	9,853	9,853	9,853	9,853	9,853
Operating costs 8/	2,159	4,126	5,324	5,354	5,360	5,360	5,360	5,360	5,360	5,360	5,360	5,360	5,360	5,360	5,360
Investment costs 9/	5,000	3,111	2,493	2,256	2,200	1,947	365	281	2,200	2,200	1,947	365	281	-	(6,660)
Net Benefits	(3,257)	527	1,852	2,243	2,293	2,546	4,128	4,212	2,293	2,293	2,546	4,128	4,212	4,493	11,153
Economic Rate of Return		53%													

- 1/ Benefits from incremental catch of 70 new 14.8 trawlers, 70 new canoes with out-board motors and 73 out-board motors installed in existing non motorized canoes.
- 2/ Operating costs, adjusted for taxes and subsidies, of new trawlers, new canoes, Fisheries Terminal Organization (FTO), incremental operating costs of existing canoes, existing mechanized vessels, and port.
- 3/ Investment costs adjusted for taxes and subsidies of: marine works and shore services (excluding workshop, canteen, gear shed, water supply and electricity), new trawlers, canoes and out-board motors, equipment for FTO, value of land and a part of technical assistance for marine works and shore facilities (the total cost of technical assistance was divided between Mangrol and Veraval). Residual values were subtracted in year 15.
- 4/ Benefits from incremental catch of 250 trawlers (200 financed by the project and 50 financed from other sources.)
- 5/ Operating costs adjusted for taxes and subsidies of 250 new trawlers and FTO, and incremental operating costs of existing mechanized fleet and port.
- 6/ Investment costs, adjusted for taxes and subsidies of: marine works and shore services (excluding workshop, canteen, gear shed, water supply and electricity), 250 trawlers, equipment for FTO, value of land and a part of the technical assistance. Residual values were subtracted in years 4 (dredger) and 15.
- 7/ Benefits from 280 new canoes and 402 out-board motors installed in existing canoes.
- 8/ Operating costs adjusted for taxes and subsidies of new-canoes and out-board motors and maintenance cost of sheds, roads and water supply systems.
- 9/ Investment costs in canoes and outboard motors, a part of the investment in sheds (40%), roads (20%) and water supply systems (20%).

INDIA

GUJARAT FISHERIES PROJECT

Economic Analysis

B. Vessels<sup>1/</sup>

	-----Years-----									
	<u>1</u>	<u>2-4</u>	<u>5</u>	<u>6</u>	<u>7-8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12-14</u>	<u>15</u>
<u>1. 14.8 in Trawler</u>										
Benefits	75.9	189.7	189.7	189.7	189.7	189.7	189.7	189.7	189.7	189.7
Operating Costs <sup>2/</sup>	36.2	90.5	90.5	90.5	90.5	90.5	90.5	90.5	90.5	90.5
Investment Costs <sup>2/</sup>	242.3	-	-	-	-	-	-	78.1	-	(77.6)
Net Economic Benefits	(202.6)	99.2	99.2	99.2	99.2	99.2	99.2	20.7	99.2	176.8
Economic Rate of Return	48%									
<u>2. Canoe with Outboard Motor</u>										
Benefits	22.5	25.0	25.0	25.0	25.0	25.0	25.0	25.0		
Operating Costs <sup>3/</sup>	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0		
Investment Costs <sup>3/</sup>	30.0	-	-	3.8	-	-	-	(7.9)		
Net Economic Benefits	(23.5)	9.0	9.0	5.2	9.0	9.0	16.9			
Economic Rate of Return	31%									
<u>3. Outboard Motor (for existing canoe)</u>										
Benefits	7.1	7.1	7.1							
Operating Costs <sup>3/</sup>	2.5	2.5	2.5							
Investment Costs <sup>3/</sup>	4.3	-	(0.3)							
Net Economic Benefits	0.3	4.6	4.9							
Economic Rate of Return	over 60%									

- 1/ Economic benefits equal Financial benefits (Annex 13); economic operating and investment costs equal the corresponding financial costs adjusted for duties and taxes.
- 2/ Includes a proportional share of incremental operating costs, part operating costs and investment in harbour improvement.
- 3/ Includes a proportional share of investment in shore services and their operating costs.

INDIAGUJARAT FISHERIES PROJECTEconomic AnalysisC. Shore Facilities<sup>1/</sup>

	-----Years-----		
	<u>1</u>	<u>2-10</u> (Rs '000)	<u>11</u>
<b>1. <u>Ice Plant 200 tons</u></b>			
Benefits (gross sales, Annex 13 table 4)	—	2,484	2,484
Operating costs	—	640	640
Investment cost	3,096	—	(310)
Net Economic Benefits	(3,096)	1,844	2,154
Economic Rate of Return		59%	
<b>2. <u>Ice Plant 75 tons</u></b>			
Benefits (gross sales, Annex 13 table 5)	—	930	930
Operating Costs	—	274	274
Investment Cost	1,413	—	(141)
Net Economic Benefits	(1,413)	656	797
Economic Rate of Return		45%	
<b>3. <u>Freezing Plant 18 tons</u></b>			
Benefits	—	38,668	38,668
Operating Costs	—	30,297	30,297
Investment Costs	3,475	—	(348)
Net Economic Benefits	(3,475)	8,371	8,719
Economic Rate of Return		Over 60%	
<b>4. <u>Freezing Plant 10 tons</u></b>			
Benefits	—	21,487	21,487
Operating Costs	—	16,840	16,840
Investment Costs	2,002	—	(200)
Net Economic Benefits	(2,002)	4,647	4,847
Economic Rate of Return		Over 60%	
<b>5. <u>Fish Meal Plant</u></b>			
Benefits	—	6,000	6,000
Operating Costs	—	3,870	3,870
Investment Costs	6,042	—	(604)
Net Economic Benefits	(6,042)	2,130	2,734
Economic Rate of Return		33%	

<sup>1/</sup> Unless otherwise indicated:

- Economic benefits equal financial benefits (Annex 13)
- Economic operating and investment costs equal the corresponding financial costs less estimated duties and taxes.

INDIA

GUJARAT FISHERIES PROJECT

Economic Rate of Return Sensitivity Tests  
(%)

<u>Component</u>	<u>Estimated ERR</u>	<u>Accounting Price for Foreign Exchange 1/</u>	<u>Sensitivity Investment</u>		<u>Operating Costs</u>		<u>Benefits</u>	
			<u>+10%</u>	<u>+15%</u>	<u>+10%</u>	<u>+15%</u>	<u>-10%</u>	<u>-15%</u>
Mangrol	16	19	14	14	14	12	11	9
Veraval	18	21	15	14	15	13	12	9
Traditional Fishermen Sub-project	53	50	44	40	41	36	32	23
14.8 M Trawler	48	56	43	41	43	40	37	32
Canoe with Outboard Motor	35	36	30	28	25	21	20	14
Outboard Motor	Over 60	Over 60	Over 60	Over 60	Over 60	Over 60	Over 60	Over 60
Ice plant 200 tons	59	55	53	51	57	56	51	47
Ice plant 75 tons	45	42	41	39	43	42	38	35
Freezing complex 18 tons	Over 60	Over 60	Over 60	Over 60	Over 60	Over 60	Over 60	Over 60
Freezing complex 10 tons	Over 60	Over 60	Over 60	Over 60	Over 60	Over 60	Over 60	Over 60
Fish meal plant	33	31	30	28	26	23	22	16
All project	24	-	-	-	-	-	-	-

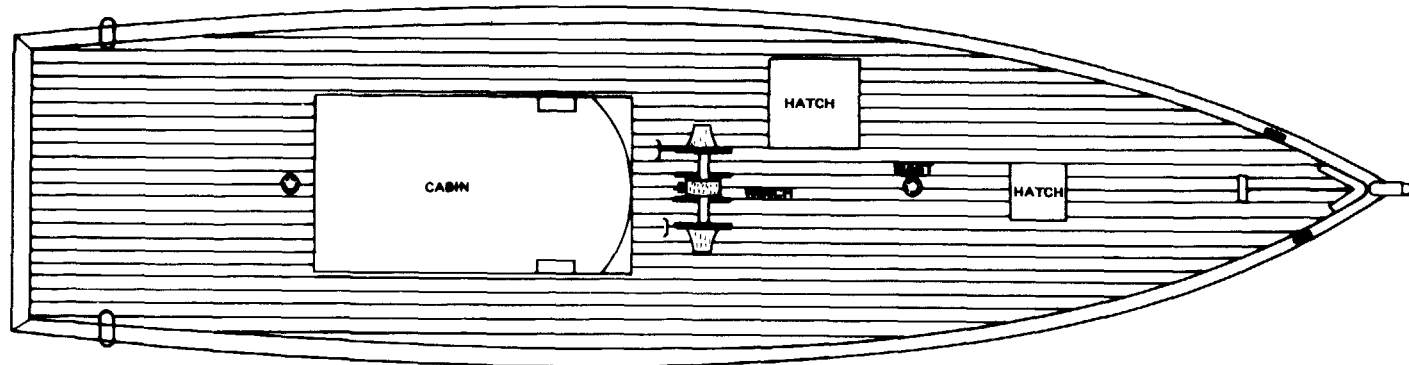
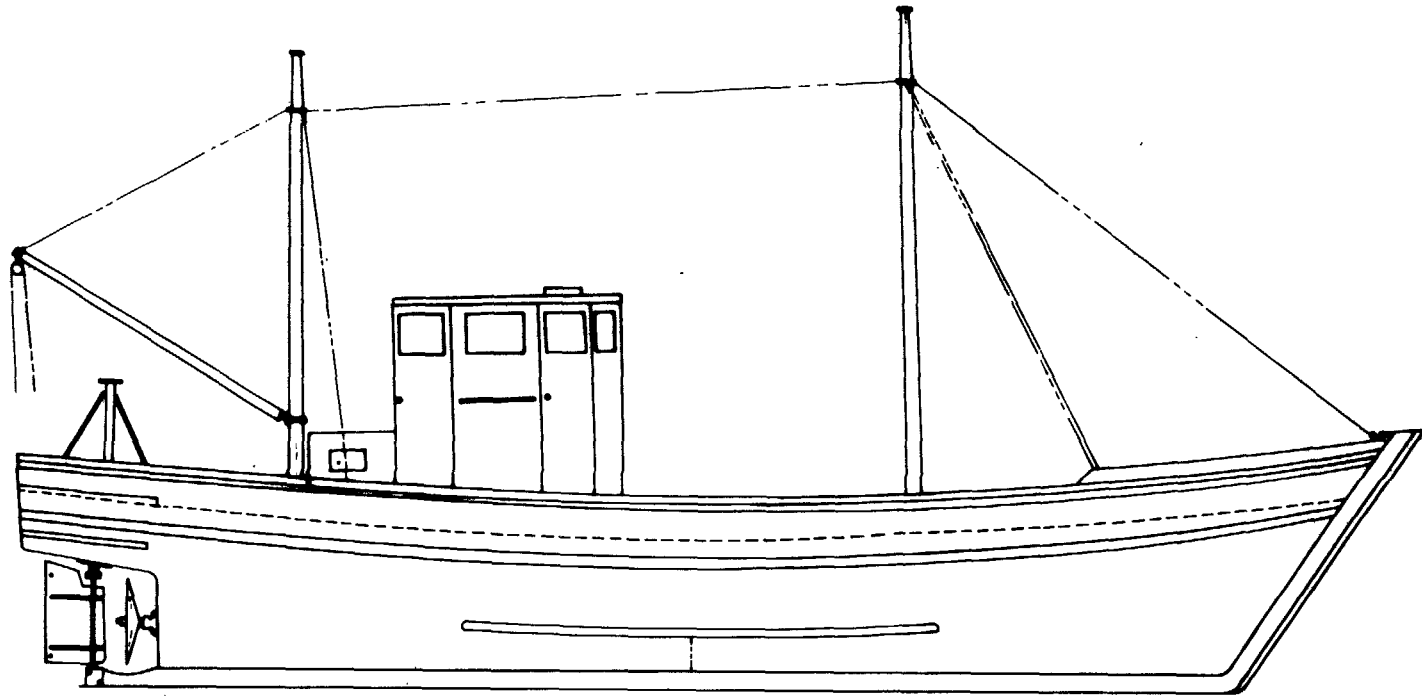
1/ The accounting price used was US\$ 1.00 = Rs 10.50 as compared with the official exchange rate of about US\$ 1.00 = Rs 9.00 (+16.7%)

July 14, 1976





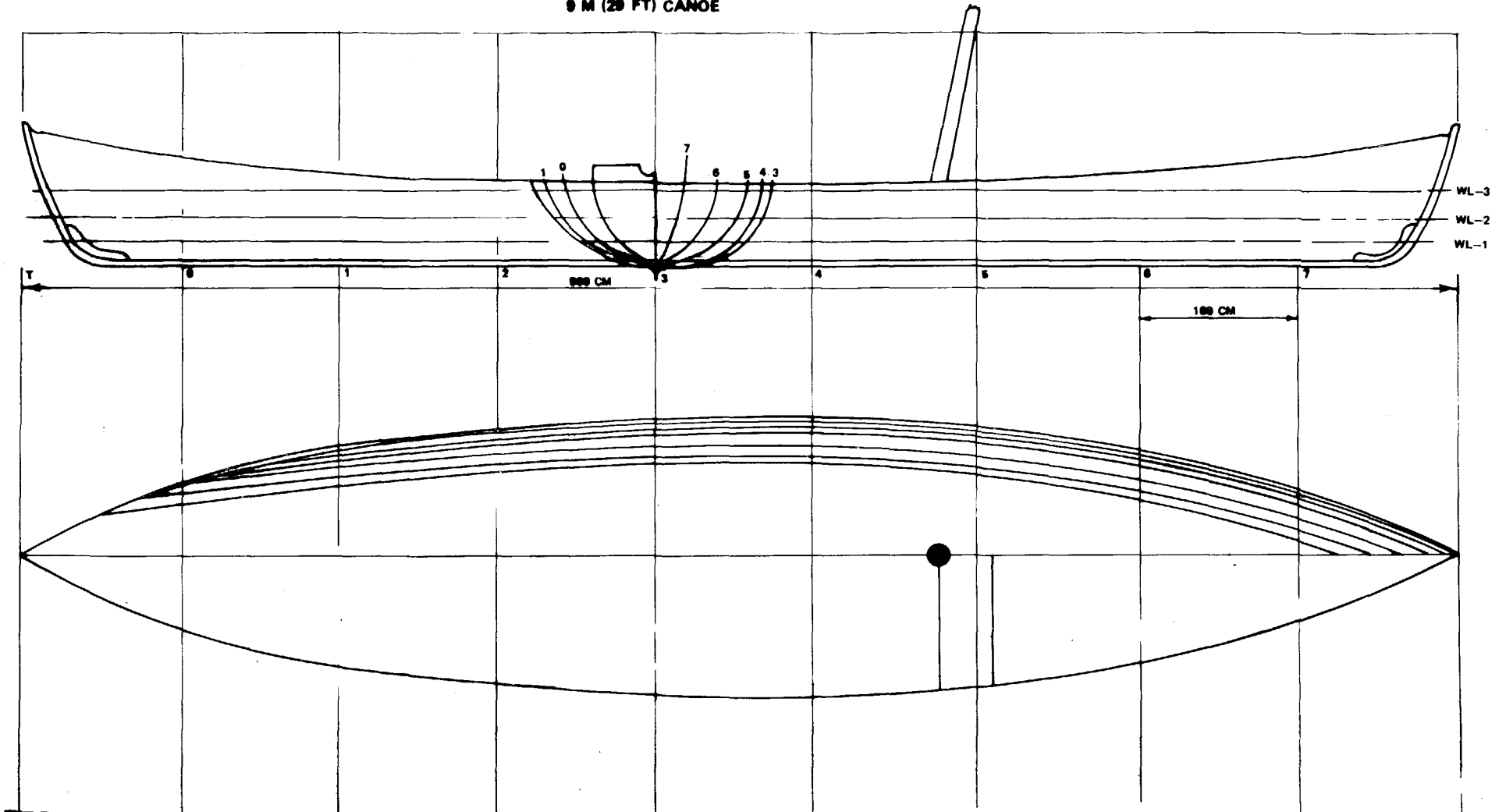
INDIA  
GUJARAT FISHERIES PROJECT.  
14.8 M. (48 FT.) TRAWLER/GILL NETTER



MAIN DIMENSIONS  
OAL ..... 48' - 0"  
BEAM ..... 12' - 0"  
DEPTH ..... 5' - 9"  
DISPLACEMENT ..... 21 TONS  
ENGINE ..... 88 HP

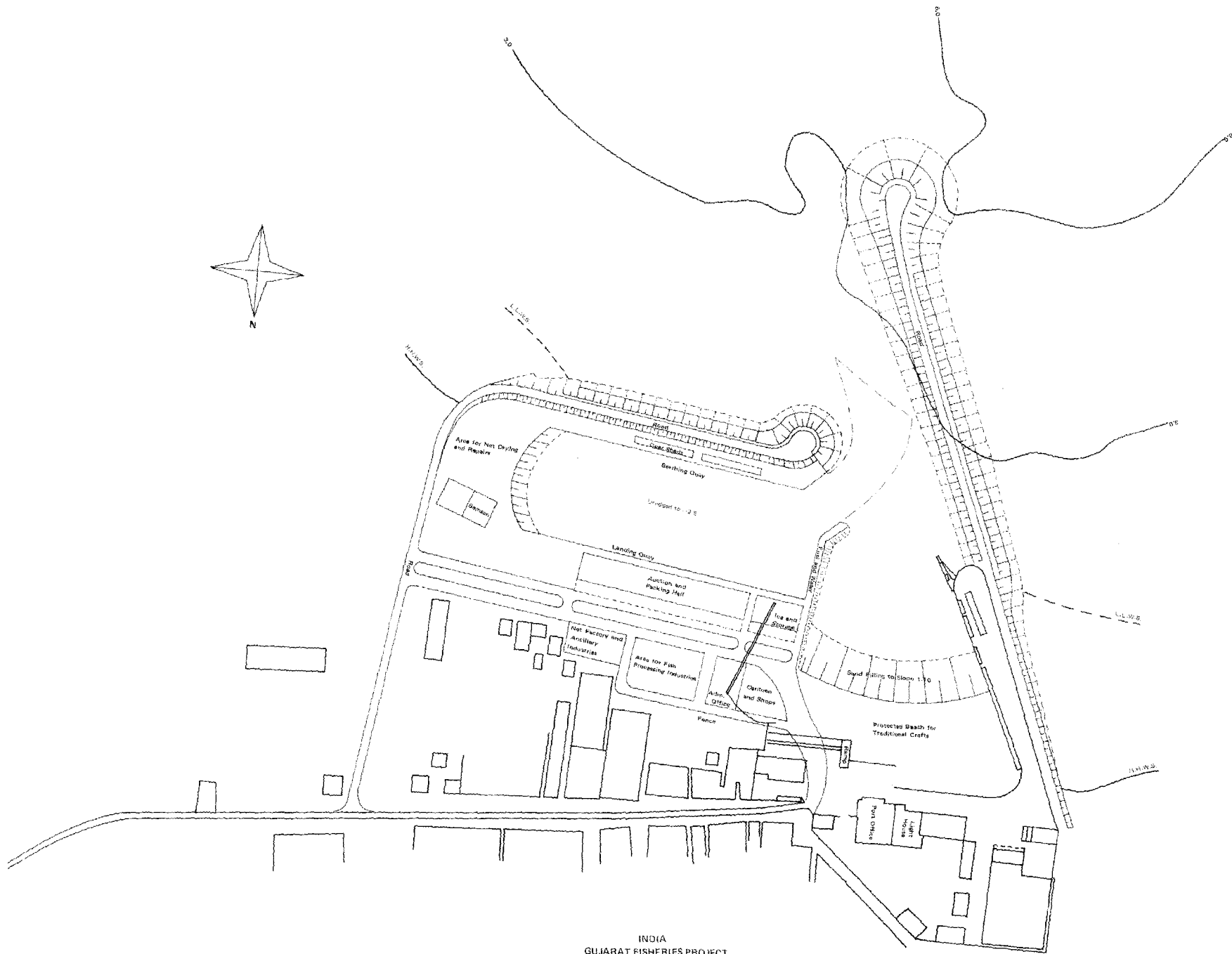


INDIA  
GUJARAT FISHERIES PROJECT  
9 M (29 FT) CANOE



MAIN DIMENSIONS	
OAL	9.0 M
BEAM	1.4 M
DEPTH	0.5 M
DRAFT AFT	0.3 M
ENGINE	8 HP

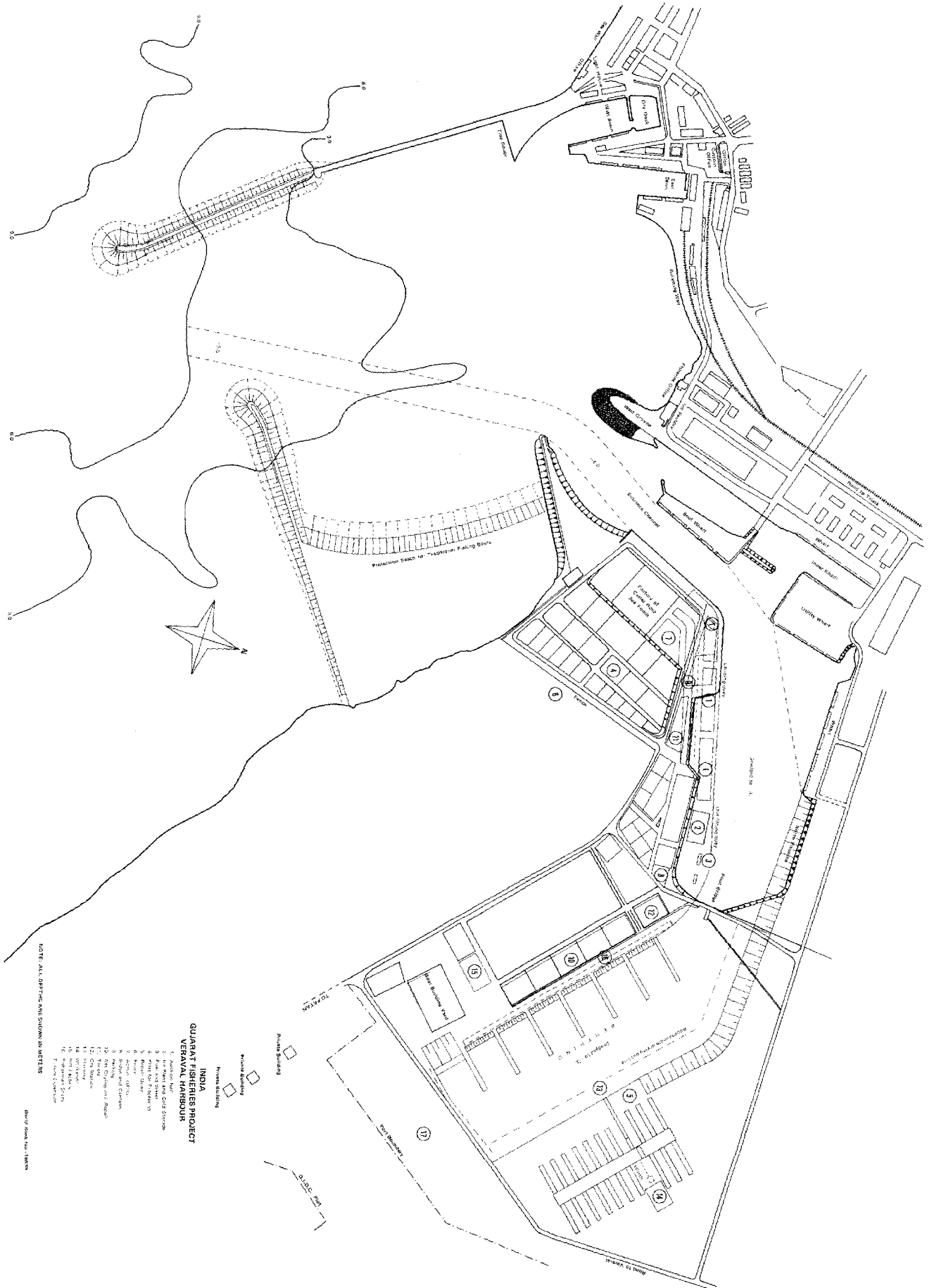




INDIA  
GUJARAT FISHERIES PROJECT  
MANGROL HARBOUR

NOTE: ALL DEPTHS ARE SHOWN IN METERS





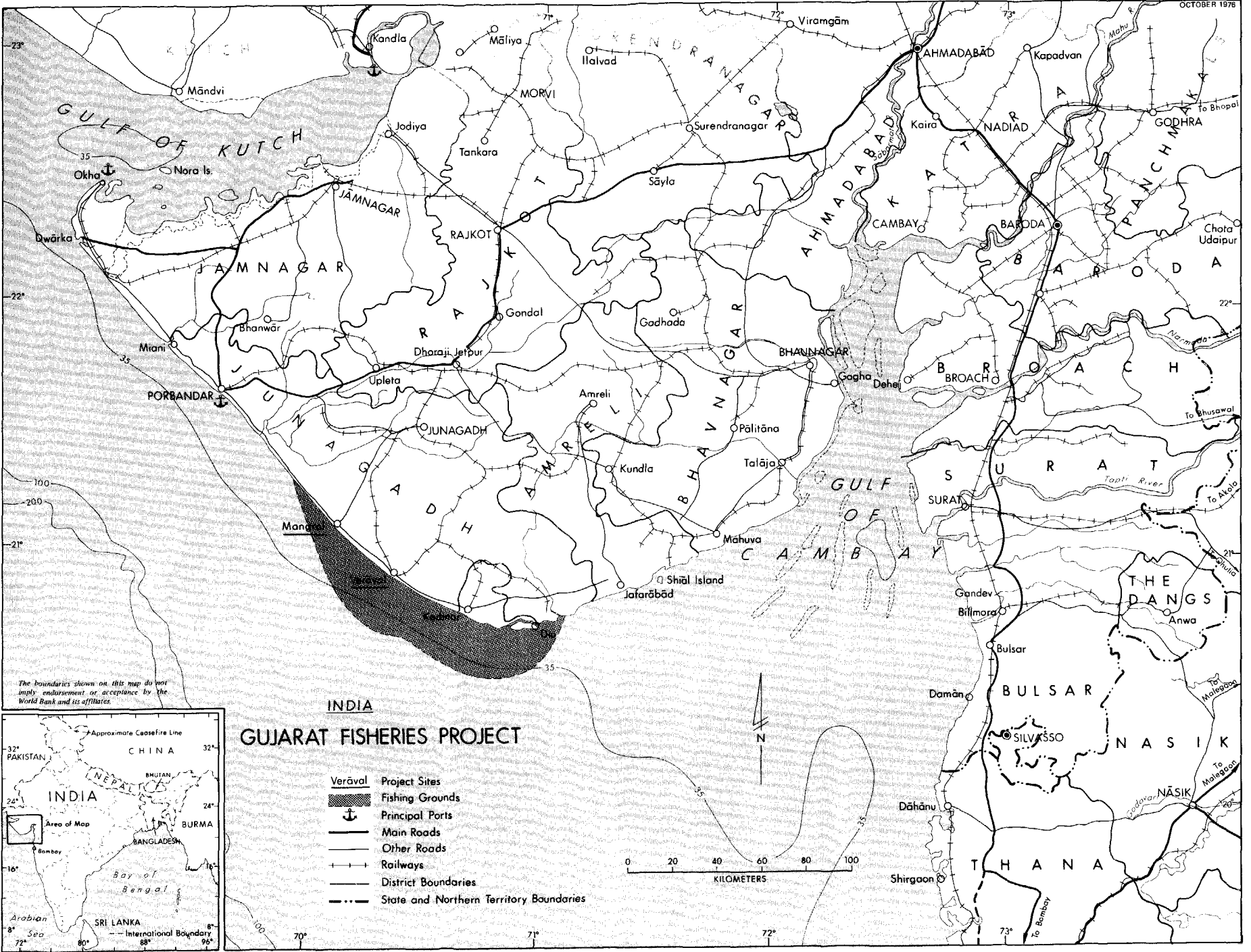
NOTE: ALL OFFING MEASUREMENTS IN METERS

- GUJARAT FISHERIES PROJECT**  
**VERAVAL HARBOUR**  
**INDIA**
- 1. Aeration Tank
  - 2. Fish and Shell Storage
  - 3. Fish and Shell Storage
  - 4. Fish and Shell Storage
  - 5. Fish and Shell Storage
  - 6. Storage
  - 7. Storage
  - 8. Storage
  - 9. Storage
  - 10. Storage
  - 11. Storage
  - 12. Storage
  - 13. Storage
  - 14. Storage
  - 15. Storage
  - 16. Storage
  - 17. Storage

Scale: 1:1000







The boundaries shown on this map do not imply endorsement or acceptance by the World Bank and its affiliates

**INDIA**  
**GUJARAT FISHERIES PROJECT**

- Veraval Project Sites
- Fishing Grounds
- Principal Ports
- Main Roads
- Other Roads
- Railways
- District Boundaries
- State and Northern Territory Boundaries

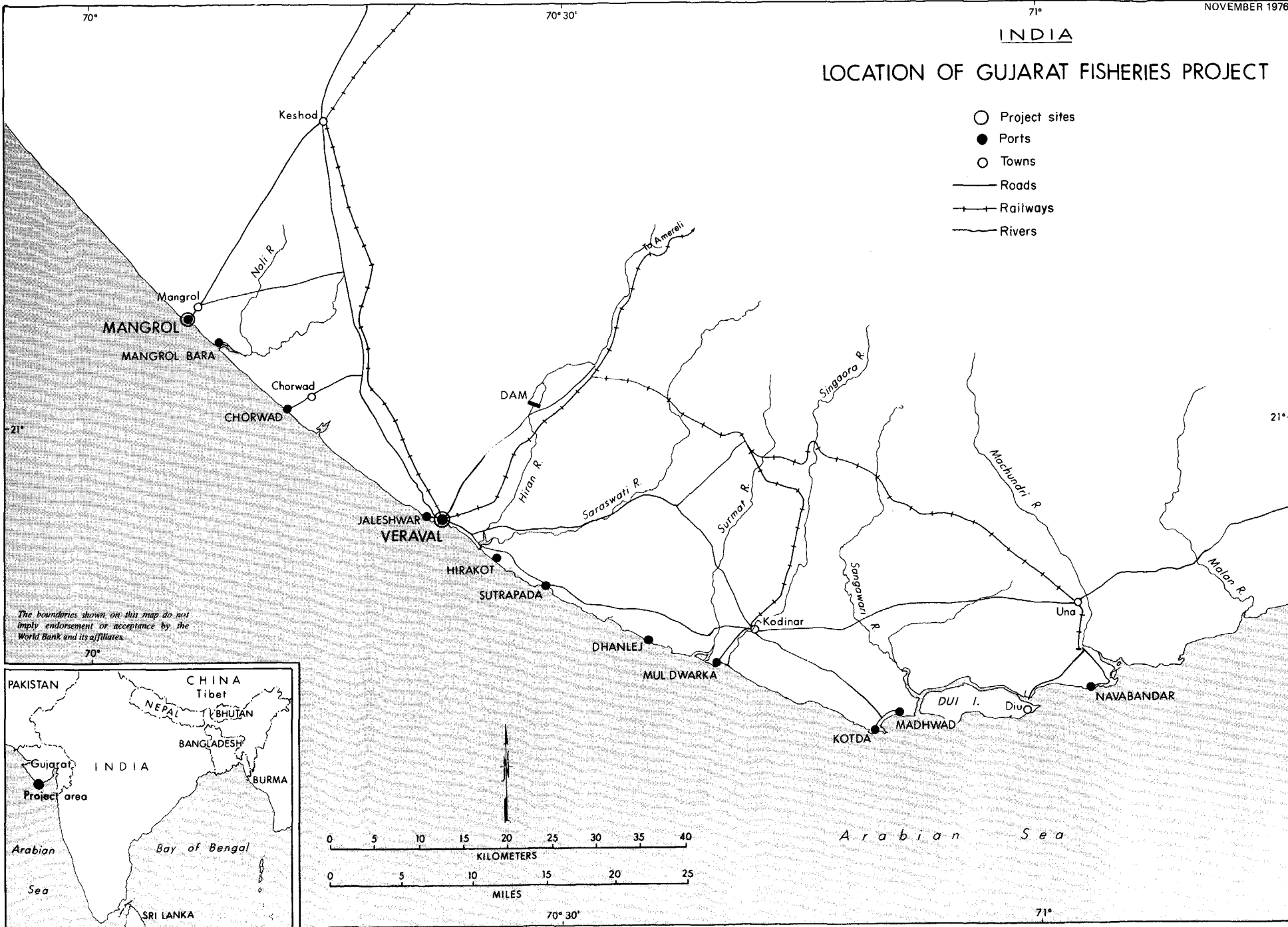
0 20 40 60 80 100  
KILOMETERS



# INDIA

## LOCATION OF GUJARAT FISHERIES PROJECT

- Project sites
- Ports
- Towns
- Roads
- +— Railways
- Rivers



*The boundaries shown on this map do not imply endorsement or acceptance by the World Bank and its affiliates.*

