

PRE-INVESTMENT SURVEY
OF FISHING HARBOURS

INDIA

MALPE
ECONOMIC
EVALUATION

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PREFACE

The Pre-Investment Survey of Fishing Harbours is being conducted by the Food and Agriculture Organization of the United Nations in cooperation with the Government of India. The Food and Agriculture Organization of the United Nations, on this Project, is acting as the Executing and Participating Agency for the United Nations Development Programme.

The Project has its Headquarters at Bangalore, India. This Technical Report constitutes one of a number of reports which will be issued during the life of the Project. The contents of this Report are based on the work of professional and technical staff provided by the Government of India and the Food and Agriculture Organization of the United Nations.

This report is in two volumes. The first volume contains the text and the second volume appendices nos 1-34.

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A. SUMMARY

Extensive marine fishing is done in the estuaries and off the shorelines of the coastal districts of Mysore State. About 45 000 tonnes of fish and prawns are landed through traditional fishing methods.

During the past 10 to 15 years, mechanized vessels have been introduced and, generally, these vessels have operated profitably. About 600 vessels are working and these land about 24.000 tonnes of fish and crustaceans.

Oil sardines and mackerels account for the largest part of catches. Revenue from the export of prawn and shrimp products constitute the largest part of income.

Within the coastal zone, and in particular in the south, there are freezing, cold storage and other industrial plants to process and hold the fishermen's catch. The limited harbour facilities, at present available, are insufficient to cope with the mechanized fleet and for any expansion of it in the near future.

Malpe is a major fishing base. Landings and processing of fish and crustaceans at this site constitute an important part of Mysore fisheries. There is no fishing harbour at Malpe and further development cannot occur without the construction of a harbour.

About 180 mechanized boats use Malpe as a base and their catches are either processed for export or sold in local or interior markets.

Malpe is well located from the point of view of communications and transport. Some shore-based facilities are available in Malpe and nearby areas. The experience gained in running these establishments and also that gained by fishermen operating mechanized boats will serve as a foundation for future development of this port.

Any further development at Malpe will increase substantially the demand for skilled fishermen and labour to work in shore-based enterprises. It is essential that every endeavour be made to ensure that this skilled labour is available when and where required.

The prospects of marketing products resulting from the further development of Malpe are encouraging. At present, the export market for frozen prawn

is the main item contributing to profits and it is likely that this dependence on overseas markets will continue notwithstanding expansion of Indian markets.

The natural advantages of Malpe as a harbour site and how best certain of these advantages may be incorporated or modified in a harbour proposal are described in the accompanying Engineering Reports (Technical Report 2).

The harbour has been designed to accommodate probable fishing developments over the next two decades and to cater for vessels up to LOA 28 metres.

The resources involved in the construction and running of the harbour are not of great significance when compared to the overall requirement of resources needed to construct and operate boats, shore-based industries, transport units, and generally the distribution and marketing of fishermen's catches.

Investment in the harbour is expected to total about Rs. 2.9 crores over a three year period. Investments in boats, shore-based industries and transport needed to cope with fish landings in the harbour may vary from about Rs. 18 crores to Rs. 35 crores over a period of two decades, depending on the nature of fisheries development in Malpe.

A fishing effort yielding only about 28 500 tonnes would be sufficient to justify the harbour, provided that an internal rate of return of 20% on the resources used, is sufficient to attract investment.

B. MARINE FISHERIES IN MYSORE STATE

Introduction

(1)

In 1969 the population of Mysore State was estimated at 27.3 million and of this number approximately ten percent or 2.6 million lived in the State's coastal area. The coastal plain is about 250 km long and narrow in width being bordered to the east by the Western Ghats which rise sharply from the plain. The coastal area is divided into two dist-

RICTS namely South and North Kanara, the former is slightly larger than the latter. With regard to population and industry, South Kanara clearly predominates with a population of about 1.8 million as against .8 million in North Kanara.

(2)

Education, banking, commerce, agriculture and industry are all developing fairly rapidly in the coastal region and communication and transport facilities are good, especially in South Kanara. A considerable amount of money has been invested in roads and bridges and, with the completion during 1970 of a major bridge in North Kanara, the whole of the coastal region will be served by an all weather National Highway.

(3)

Mangalore, the largest city in the region, is connected to the main southern railway network. It has a civil airport and, with construction of a commercial deep-sea port, is expected to become a major import-export centre on the Indian coastline.

(4)

The coastal region, because of natural advantages, has an appearance of relative prosperity and this appearance is partly born out by a comparison of per capita bank deposits with other districts in Mysore State. At the end of December 1967, South Kanara ranked second among the 19 districts of the State and North Kanara fourth.

(5)

The fishermen of North and South Kanara live in small and large villages built on the shorelines of estuaries and the coast. With few exceptions, most of the villages are readily accessible from the main highway system. Without a large-scale census it would be impossible to say precisely how many persons in South and North Kanara are either totally or partially dependent on fishing for their livelihood.

(6)

The majority of fishermen in the State use traditional fishing methods and produce the bulk of the marine fish landings. It is only during the past 12-15 years that mechanized boats have been introduced in South and North Kanara. Most of these vessels commenced operations during the past five years.

Traditional Fishing

(7)

The traditional type of marine fishing takes place mainly in in-shore waters. Almost all fishing is done with nets. However, some fish are taken with hand lines. The common nets used are beach-seines, boat-seines, gill-nets and cast-nets. The ordinary type of boat is the dug-out canoe.

(8)

During the past few years, the landings achieved by fishermen engaged in traditional fishing ranged from 40 to 50 thousand metric tons per season. The main catches are mackerels and sardines taken mostly in the post-monsoon months. These species are caught almost exclusively by beach-seines and accounted for as much as 80% of total marine fish landings in the State during the period 1965-1967. Traditional fishing also contributes a part of the landings of sharks, catfish, seer and various demersal fishes. Sharks, catfish and seer are caught mostly by gill-nets operated from small canoes. During the monsoon season, there is a substantial decline on total fishing effort as well as catch of traditional fisheries.

Mechanized Fishing

(9)

At the beginning of the season 1969/70, about 600 mechanized boats (20 to 45 feet) were operating off the Mysore coast. Most of these boats were built in local boat-yards. The mechanized fleet gives direct employment to about 3 000 fishermen. The boats which have an engine of 30 H.P. or more usually trawl for shrimp. The trawling is done close to shore, possible to the 20 metre contour line. The largest part of the catch consists of a mixture of small bottom-dwelling fishes. During the 1968/69 season, the average catch per boat was approximately 40 tonnes of which about 6 tonnes were shrimps. The average number of days spent fishing was 150.

(10)

The most common boat in the fleet has the following characteristics:-

Length	30 feet
Draft	4 feet
Material of hull	jackwood
Sheeting of hull	copper plates

Engine	marine diesel of Indian or foreign manufacture
H.P. of engine	30 to 37
Number of crew- members	5
Principal fishing gear	70 foot cotton trawl

(11)

Average sale proceeds per kilo of landings achieved during 1968/69 was of the order of 600 rupees per tonne. However, this average conceals an immense difference in price between shrimps on the one hand and fish on the other. Although no precise information was obtained concerning prices paid for shrimps and fish during the season 1968/69, it seems likely that as much as 75% of the total sale proceeds for the average boat came from sales of prawns and shrimps. This in turn indicates that the price per kg of prawn on the average was at least 15 times that for fish.

(12)

The owner of a boat usually receives 50% of the sales proceeds. The other 50% is split among the crew members. The crew members pay for fuel and the owner contributes fishing gear and is also responsible for the maintenance of the vessel. A 30 foot boat with a 30/37 H.P. engine normally requires fuel worth about Rs. 35 per day of operation. The crew members on the average earn about 10 rupees per day of actual fishing.

Fresh Fish

(13)

The fresh fish trade is mainly in the hands of women. In most instances, the women who buy the fish from the fishermen later also offer it for sale in the retail markets. The methods used for transporting and preserving the fish are those of "traditional fishing". The fresh fish is packed in baskets and transported to the local markets either as headloads or, for up to three baskets, on a bicycle. Occasionally trucks and taxis are used.

(14)

Fish vendors usually sell the fish the same day that they buy it, which, in most instances, is the same day the fish is caught and landed. The vendors seldom use ice to preserve the fish, either during the transport of the commodity to the markets or during its display there.

(15)

The retailing of fish takes place in many different places; in specially constructed markets for fish retailing, along the roads and on a door to door basis. The bicycle-merchants take their fish further inland than the women who carry head-loads. The retailing methods of the women and the bicycle-merchants are the same. Where specially constructed markets or stalls exist, the fish is usually spread on large leaves placed on the ground, a concrete floor or benches.

(16)

About 160 persons are needed to distribute and market 1 000 tons of fish in fresh form, in the manner described, over a period of one year. The estimate is based on observations of fresh fish marketing in the Malpe-Udipi area. The methods of retailing fresh fish involve only limited investment. The capital costs incurred by the retailers are negligible. When fish is sold in specific markets, erected and administered by the community, the rise in price due to the charge levied on the retailers for the use of the premises is only about one or two percent of the price of the fish in the market.

(17)

The fresh fish storage and ice available in the State are used mainly by the merchants who trade and process shrimps and prawns. There are limited fresh fish storage facilities available in the State. In South Kanara there are fresh fish storage facilities for 60 tonnes owned by private parties. Private enterprise also owns storage capacity for 130 tonnes of ice. Spread over a number of small units, the Mysore Government owns another 200 tonnes storage space for fresh fish and ice, located mostly in the South Kanara District. In total, there is already installed capacity for the production of at least 175 tonnes of ice per day. Plants for the production of 110 tonnes are owned by private enterprise. There are plans for the construction of more ice factories. These will be located mostly in the southern part of the State's coastal area.

Drying of Fish

(18)

Fish is cured all along the coast of Mysore. The materials for drying and salting, namely salt, coir mats, palm-leaves for packing, are easily obtainable in the area. The larger fish are gutted and split open before being dried. The fish is then placed on a coir-mat or directly on the sand, and left to dry in the sun; drying may take up to three days.

(19)

There is little retail trade in dried fish in the coastal areas. The bulk of the dried fish is sent by trucks to commission agents in Mangalore, who, in turn, send the fish to interior markets or export it.

Canning of Fish and Prawns

(20)

Canning of fish was begun in the State more than a decade ago. The industry has grown since then and, during the season 1968/69, there were four canneries operating in the South Kanara District. In the beginning of the 1969/70 season, two more plants, also located in the South Kanara District, were ready to start production. The existing factories do not rely upon landings from one port or river mouth. At present the factories have buyers in most of the important landing centres. Some processors even obtain prawns from North Kanara. Rupees 2 million (inclusive of land and working capital) is a rough estimate of the total investment in the fish-canning plants of the area. The six canneries provide permanent employment for about 150 persons. Approximately 900 women are employed on a daily basis to prepare shrimps, sardines or mackerel for canning.

(21)

Shrimps are the most important product of the canning industry. The export prices for processed frozen shrimps and prawns are high. Therefore, prices for medium and large grades in the beach-markets have reached levels which make it difficult for the canneries to compete for them. Shrimps are canned from November to the middle of May. Mackerels and sardines are canned mainly during the months of October and November.

(22)

Mackerels are packed in 16 oz. cans, sardines in 12 and 8 oz. cans and shrimps in 8 oz. cans. The machinery used in the factories is manufactured mainly in India. The tin-plate used in the cans is imported.

(23)

During the season 1968/69, the factories had a combined capacity of almost 30 000 cans per day. The two new factories will increase capacity to approximately 40 000 cans per day. A project survey indicated that the machinery installed in the canneries was far from fully utilized.

The live weight of the fish and shrimps canned during the 1968/69 season was about 1 000 tonnes. The three canning factories then in operation produced less than half the number of cans that could have been produced with their installed capacity. This shortfall in production may have been due to lack of finance or shortage of skilled female labour but most probably was because of shortage of raw material.

(24)

If the supply of raw-material was constant, the machinery in the six existing plants could possibly be used to can as much as 6 500 tonnes of shrimp (live weight) during 1969/70. Considering that during the season 1968/69, the live weight of the canned production of shrimps only came to about 500 tonnes in the State, it is clear that there is ample room for an increase in raw material supply to the factories. This assumes, of course, that adequate finance and labour are available.

Freezing of Fish and Prawns

(25)

Since the middle of the 1950's, frozen prawns have been exported from Mysore. There are four privately-owned freezing plants in the South Kanara District. One plant is in Mangalore, two are close to that city and one is at Malpe. Two more units are planned in the private sector and these may be built near Mangalore. In North Kanara two plants are being built in Karwar. Their facilities should be available during 1970. The companies which are planning to build two more units in South Kanara have to date been renting freezing space from the State Government.

(26)

The largest freezing complex in the State is owned and run by the Mysore Government. The plant is located at Mangalore and has a capacity of 11 tonnes of frozen products per day. There are two more Government-owned units close to Mangalore. The Mysore Government recently constructed one large unit at Gangoli, South Kanara. One of the units under construction in Karwar belongs to the Government.

(27)

At the end of 1969, the freezing capacity available along the Mysore coast was approximately 50 tonnes per day. Of this capacity, 17.5 tonnes was owned by the private sector.

(28)

Most of the freezing plants also have frozen storage space for their products. At the end of 1969, about 1300 tonnes of storage capacity existed in the coastal districts of the State. Capacity for storage of 450 tonnes of frozen products was owned by private enterprise. Karwar is the only landing centre for mechanized boats in North Kanara where frozen storage is available; 80 tonnes can be stored there. Of the 1220 tonnes of storage capacity located in South Kanara, about 60% is found in or adjacent to Mangalore. The remainder is found in Malpe and Gangoli.

(29)

Prawns are the only species of marine fish landings which are frozen in substantial commercial quantities. Nevertheless, utilization of freezing capacity has been low and it is likely that it will remain so until more suitable species are available for freezing and diversification becomes a practice rather than an ideal. This does not mean that there are no species available for processing and freezing at present. However, very little attention appears to have been given to the possibility of freezing fish for sale in inland markets.

(30)

Assuming that plants are run for 8 months of the year and that the throughput is 85% of stated capacity, 8 500 tonnes of frozen products could have been produced in the freezing plants of the coastal districts during the season 1968/69. During 1969/70, the installed capacity for freezing increased to 11 000 tonnes. When the State Government completes units in Karwar, Kulai and Ullal, the annual capacity in the Mysore coast will be approximately 15 000 tonnes of finished products. It is clear that it will be difficult, if not impossible, to realize such a high degree of utilization of capacity due to the fluctuations in the quantities of prawns landed over the season. Utilization of installed capacity has been low. In 1968, exports of fresh, frozen and canned marine products from Mysore amounted to 901 tonnes. If this quantity can be taken to indicate total production in the State, utilization of capacity would only have been of the order of 15% during that year. There is ample scope for a substantial increase in the output of frozen products.

(31)

The freezing facilities owned by the Mysore Government and administered by the State Fisheries Department are usually rented to private entrepreneurs. There are a number of firms taking advantage of this, especially

these firms which trade relatively small quantities of frozen prawns. It is quite apparent that the provision of facilities by the Government has helped considerably in the development of the fishing industry in the State.

Reduction

(32)

A privately owned plant at Malpe produces fish meal. The capacity of this plant is 35 tonnes of raw material per day. Another plant, between Malpe and Mangalore, is scheduled to commence operation during 1970. This second plant will have a raw material intake of about 15 tonnes per day. Therefore, these plants together will have an intake capacity of about 50 tonnes per day and a finished product output of about 10 tonnes. Another fish meal plant is proposed at Karwar. On the basis of information available, it is obvious that lack of raw material is the main obstacle to large-scale production of fish meal.

MARINE FISHERIES AT MALPE

Introduction

(33)

Malpe is a large village situated on the north bank of the Udiyavara river. The western limits of the village are very close to the mouth of the river. The village is connected by an all-weather road to Udipi (5 km) the second major town in South Kanara.

(34)

The Malpe Panchayat has an area of 2279 acres. At the 1961 census, 10 400 individuals lived within the boundaries of the Panchayat. The population is now estimated to be about 15 000. During the fishing season, the population is boosted by a large number of additional workers.

(35)

There are 9 schools in the Panchayat. The State Government runs a Fisheries High School and also a Higher Elementary School. There are 7 Lower Elementary Schools of which 6 are run by Local Government. About 2 500 children are being educated.

(36)

The villagers have easy access to medical facilities and these include a major hospital at Manipal, about 10 km from Malpe and another at Udipi.

(37)

The fishing industry is extremely important for Malpe. Apart from fish processing and canning, net and rope manufacturing and boat building, the only other industrial activity is the manufacture of roof tiles.

Traditional Fishing

(38)

Most of the traditional methods used in Mysore are in operation in Malpe and a major part of all landing are made with small and large beach seines.

(39)

During the non-monsoon period, that is from the end of September through to the beginning of June, the most important commercial species landed are:-

Mackerels and sardines	-	Large beach seines
Sharks, catfish and seer	-	Gillnets and hand lines
Pomfrets	-	Gillnets

On the basis of fishing effort displayed in the first part of the 1969/70 season, the annual catch by traditional fishing in the Malpe locality would be about 4 000 tonnes.

(40)

The traditional fishermen is keen to catch prawns right through the year and especially during the monsoon period when supplies are low. The fish and prawn catch during the monsoon is of the order of 600 tonnes of which about 60 tonnes are prawns. The sales of these prawns make a valuable contribution to the income of traditional fishermen. During the monsoon prices for fish are high because of short supply. Earnings of the traditional fishermen were estimated to range between Rupees 8-10 per man per day. It is likely that the income earned during the monsoon is a critical factor in their livelihood, particularly as alternative employment opportunity is small.

(41)

During the 1969 monsoon about 1400 persons were earning a living from catching, processing or distributing fish that passed through the Malpe

beach auction system. Approximately a quarter of these people were women and the rest men and boys. During the non-monsoon period, the mechanized fleet employs 800-900 fishermen. The investment per man in traditional fishing is of the order of Rs. 500 and in mechanized fishing the amount per man is about Rs. 10 000. During the monsoon, some deckhands from mechanized boats take part in traditional fishing.

(42)

Malpe is an old fishing centre. Fishermen and fish merchants come to the village to work during the non-monsoon period. This temporary immigration of labour boosts the manpower of traditional as well as mechanized fishing. The dried fish trade provides the incentive for most of the traditional fishing during the non-monsoon period whilst during the monsoon period the emphasis is more on the sale of fresh fish and prawns.

Mechanized Fishing

(43)

The mechanized boats in Malpe generally have a length of 30-32 feet. There were six vessels above this size in the 1969/70 season and the total fleet was about 180 vessels. The small mechanized boats usually have a marine diesel engine with 30 to 37 B.H.P. capacity and a crew of 5 persons per boat. Boats of 30 feet and above usually fish for prawns and the trawl is made of cotton with a length of about 70 feet. Trawling is done relatively close to the shore and only occasionally do the vessels venture out to fish in waters deeper than 20 metres. About 15 of the small mechanized vessels with engines less than 30 B.H.P. capacity concentrate on gillnet fishing.

(44)

In Malpe, the trawling season starts in October or even as late as early November. Gillnet fishing which is undertaken very close to the shore is started earlier. The mechanized boats stop fishing towards the end of May or beginning of June. During the 7-8 months of the fishing season, the average number of days spent fishing is about 150. Gillnet fishing is usually done at night. The vessels engaged in trawling usually leave port about dawn and continue fishing until mid-day or early in the afternoon.

(45)

The first months of the season (November/December) are usually the best fishing months if measured in terms of weight of total landings. The boats from Malpe had, on the average, a total catch of 40 tonnes per vessel during the 1968/69 season. Of the 40 tonnes landed, about 6 tonnes were crustaceans.

(46)

As a result of examination of fishing records for South Kanara District, it was clear that the catch per mechanized vessel at Malpe was slightly less than that for vessels operating from other centres. However, this shortfall in catch was compensated for by higher average prices per kilo of landings. This difference was recorded notwithstanding the fact that other mechanized vessels in the South Kanara District usually recorded a higher percentage of prawns in their catches. Throughout the South Kanara District, there are good transport and communication facilities combined with excess capacity in processing plants and, as these facilities are available almost uniformly throughout the District, the lack of sale opportunity cannot be the reason for the lower earnings for vessels outside the Malpe area. The difference in earnings is explained by the fact that a higher price for trawl fish is paid at Malpe than elsewhere along the coast. This applies particularly to "trash fish" which forms an important part of dried fish production at Malpe.

(47)

The costs and earnings of 40 vessels for the 1968/69 season were carefully examined and this survey showed that most of the vessels made a profit. Losses were few and never large. Sale proceeds usually covered cash outlays for the boats which incurred a loss during the season. On the basis of an economic life for hull and engine of 10 years and a straightline depreciation of the full initial value of the vessel, the return on invested capital was about 6% for the average boat operating during the 1968/69 season.

Disposal of Fish and Prawns

(48)

The mechanized boats working from Malpe land their catches in the mouth of the Udiyavara River. The boats are taken close to a small sandy cove on the northern shore of the river outlet about 100 metres from the mouth of the river. There are no market buildings other than a few kiosks sel-

ling tea, cigarettes and food. The fish is spread out on the beach and the auctioneers and buyers circulate amongst the piles of fish. Fish taken by traditional methods is also sold in this market area and during the peak selling periods of the day, the cove and the beach are very congested. There are no permanent facilities for the receipt, sale and despatch of fish. Prawns are usually handled in baskets and often sorted in temporary huts erected to offer some protection from the sun. The larger vessels have difficulty in landing their catches because of the shallow waters in the cove.

(49)

As previously indicated in this report, most of the fresh fish sales originating from Malpe are either made in the nearby town of Udipi or in the villages within the Malpe/Udipi region. At present, there are no facilities for the storage of fresh fish at Malpe. Ice is produced at Malpe but is seldom used in the local fresh fish trade.

(50)

Malpe is an important centre for the production of cured and dried fish and trade in these products has certainly been important for the area for a long time past. Local expertise and good transportation facilities are likely to have been the major factors causing this development.

(51)

Curing is done either in metal basins or concrete tanks. These are usually sunk into sand or earth and generally are sheltered by a roof of some kind. Some of these tanks are in the area immediately adjacent to where fish sales occur. Most of the tanks and basins are located in the settlements to the north and south of the river mouth.

(52)

Fish drying is done on the beach or adjacent sandy areas as close to the point of landing as practicable but some fish is dried on the beaches which stretch to the north and south of the Udiyavara River entrance.

(53)

After drying, the fish is packed in baskets made out of dried palm leaves. These are sent out of the area in trucks. Previously most of the dried fish intended for export and for consumption in centres in India far away from Malpe was shipped by country craft (coastal freighters).

(54)

Canning of fish and prawns was commenced at Malpe during the mid 1960's. There is one large canning factory in Malpe and two smaller factories close by. The two small factories can shrimps. None of the factories in the Malpe area operated at maximum capacity during the 1968/69 season. The main reason was lack of raw material and in the case of the small canneries lack of market opportunity with regard to canned fish. Shortages of operating capital and skilled female labour were also mentioned by the operators as impeding full operation. It would appear that the rather intermittent nature of canning operations acts as a restraint on the recruitment of skilled labour. If the factories could be assured of a regular supply of raw material, then production could be increased to 3 to 4 million cans over a season. A large throughput would undoubtedly tend to reduce overheads and other operating costs which, in turn would assist in the marketing of canned fish. Certainly, with regard to prawns, the only limitation appears to be the shortage of raw material. In this connection, it must be noted that canneries are competing for raw material with the processors of frozen prawns for export.

(55)

Frozen prawn products have been produced at Malpe since the 1950's and recently there has been some activity with regard to frozen fish products. One privately owned plant has a plate freezer with a capacity of about 4.5 tonnes per 24 hours. In 1968/69, on the basis of records available, it is obvious that this plant was far from fully utilized. It would have been possible to freeze 600 tonnes (product weight) more shrimps than was actually done. This private company also has a storage capacity for about 200 tonnes of frozen products.

(56)

The same company owns and operates a fish meal and oil plant. The machinery in this plant was designed and manufactured in Denmark and the daily input capacity is about 35 tonnes of raw material. On an annual basis, this plant has never worked anywhere near full capacity. It operates principally during the peak part of the season (September to January) and during this period, most of the raw material intake consists of offal from the company's canning plant.

D. MARKETS FOR MARINE PRODUCTS PRODUCED IN MYSOREIntroduction

(57)

A large number of fish consumers dwell in the coastal plain of Mysore. However, the average purchasing power per consumer is relatively low. From field observations of retail marketing in the Malpe/Udipi area, it is reasonable to say that the average annual consumption of fish is about 20 kg per person in the South Kanara District. This rate of consumption is about 10 times the average for India.

(58)

Because of the high rates of consumption and usage in the coastal area, only about 20% of the State's landings, that is 12 000 tonnes, is available to inland markets. The figure of 12 000 tonnes has been determined on the basis of an examination of disposition of catch over the period 1965-1968. In interior Mysore sales are mainly dried or cured fish. Because of the lack of storage and transport facilities only a small quantity of fresh fish is sold in the hinterland.

(59)

The demand for fish products will increase during the next decade or so as a result of both population growth and the expected increase in disposable real income per person. Furthermore, demand could be stimulated if a price reduction occurs as a result of introduction of modern transportation and distribution facilities. Such a reduction in price may tend to shift consumption from dried fish and animal meats to fresh fish products.

(60)

Based on assumptions of a population increase of 2.6 percent per year and an increase in disposable real income per inhabitant of 2 percent per year and assuming furthermore that income elasticity of demand for fish is unitary, the consumption of fish products will rise at a rate of not less than 4.6 percent per year.

Fresh Products

(61)

Whilst the methods of distribution of fish in fresh form within the coastal markets are somewhat primitive, it must be noted that the fish is

moved rather quickly from the landing point to the consumer and project surveys did not show any substantial evidence that there are critical losses due to spoilage.

(62)

Any action to increase sales in interior Mysore, that is outside the range of the present vendors who use bicycles and headloads, will necessitate the use of more modern transportation facilities. In addition, it will be necessary to establish distribution chains which will lead primarily to main centres in the hinterland from where fish can be conveyed to the surrounding towns and villages. These changes will certainly require vehicles, the use of ice and, for some markets, the use of refrigerated road transport. At strategic points, it will be necessary to build storage rooms so that retail sales will not be subject to fluctuations involved in the delivery of fish from the coast to inland centres.

Dried Fish and Prawns

(63)

Within the coastal belt, dried and cured fish is sold as a supplement to fresh fish. With regard to the local market, it is the practice for fish to be dried and cured only when it cannot be sold in fresh form. The main selling period within the coastal region for such products is the monsoon and post-monsoon months. During these times, when fresh fish is in short supply, demand can be met from the stocks of dried and cured fish. The most important market area in the hinterland is the Ghat region. Dried and cured fish sells in competition with relatively high priced fresh fish.

(64)

The larger species, for example, catfish, shark and seer are dried and cured mostly for export to Ceylon or sale in traditional markets established in Southern India. The trade in cured and dried fish, both for export and for the traditional markets mentioned in the previous sentence is mostly in the hands of commission agents in Mangalore and Calicut.

(65)

Formerly, dried fish was an important export item for India. In recent years, exports have been less than 10% of the total dried fish production, and have fluctuated between 4500 to 7000 tons per year. About 90% of each year's exports have gone to Ceylon. It is possible that the

unfavourable trend in exports of dried fish could be checked by export promotion in other areas. This is a question which requires further investigation. To a large extent, the success of an export drive would depend upon the maintenance of supplies of an acceptable product for the areas concerned.

Canned Products

(66)

In 1969, about 11 000 tons of fish and crustaceans were canned in India. The tonnage refers to the live weight of raw materials. Of the products produced, about a third was exported overseas. Assuming that the rest of the products were bought by consumers living in the 16 largest cities in India, the per-capita consumption would have been about 0.3 kg (live weight) per person. The population of the cities concerned was 23.7 million in 1967. It is evident that the market for canned fish in India is small in relation to population and the reason for this is that the product is too costly for the average consumer. In fact, canned fish and canned prawns are luxury items.

(67)

Unless there is marked change in the price structure for canned fish and prawn products, it is unlikely that there will be any substantial departure from the present marketing pattern. The total number of city dwellers are expected to increase substantially and the rate of increase is likely to exceed considerably that of rural areas. Assuming that the urban population growth is 3.5% per year, the increase in disposable real income is about 2% per year, and the income elasticity of demand for canned marine products is 0.75, the increase in demand for canned products will amount to about 5.6% per year. Such a growth rate would mean that the market could absorb, on a live weight basis, about 12 000 tonnes in 1977 and about 22 000 tonnes in the year 1990.

(68)

Canned shrimps from India are at present exported to a large number of countries. In 1968/69 slightly over 50% of production was disposed of within Europe. There is no indication that the existing overseas markets for canned shrimps cannot be maintained. As far as canned fish is concerned, large quantities have been sold to the Armed Forces and the balance has been mainly sold in the major cities. At present, there is no established export market for canned fish from Mysore.

Frozen Products

(69)

The production of frozen fish products is a relatively new venture in India, and the amounts produced are somewhat insignificant at present. Some trial exports have been undertaken. From the longterm point of view, there does not seem to be any reason why the volume of frozen fish products cannot be increased substantially and advantage taken of domestic and export markets. On the other hand, there are critical limiting factors in relation to the domestic market.

(70)

Firstly, because of processing and freezing costs, transportation costs and storage costs whilst awaiting sale, the frozen product is usually more costly than the fresh. Secondly the purchasing power of the average citizen is low and in the initial stages the frozen fish product would certainly be a luxury item. Therefore, in the early development stages, sales of frozen fish products would depend on demand from the high income group of consumers, from hotels, restaurants and similar institutions.

(71)

It would appear, because of certain cost advantages that India could well participate in the world trade on frozen fish products. The experience gained in relation to shrimp and prawn exports would be useful.

(72)

Most of the prawns, shrimps and lobsters landed in India are now exported. In fact, the price paid to fishermen for these items is determined by export prices. Only prawns, etc. which are either not of export quality or not readily available for processing, are sold locally. If quality and packaging standards for export products are maintained and improved when required by overseas buyers, there is no reason to believe that India's important position in world markets will not be maintained.

Fish Meal and Fish Oil

(73)

Production is low and the markets relatively undeveloped in India. The fish meal produced in Mysore has been sold mainly in interior markets. The world trade in "meals, solubles and similar animal feeding stuffs of aquatic animal origin" amounts to very large quantities. If Indian

manufacturers can produce according to international quality, specifications and price levels, there is no reason why the product could not be sold overseas. With regard to the local market, here again the relative low purchasing power of the user will be a deciding factor. Under existing economic conditions, it may be that the cost to the farmer or other user may be so high that the product has little or no attraction.

E. MARINE FISHERY RESOURCES OF MYSORE

(74)

Marine fish landings in Mysore averaged about 64 000 tonnes from 1965 to 1968; approximately 7% of all India landings. Almost all of this catch was obtained inside the 20 m depth contour line.

(75)

Studies have been made in India of the organic production in waters of the continental shelf. These studies indicate that in waters extending up to the 50 metre contour line the maximum sustainable yield is about double the present catch on the West Coast. Mysore could thus expect an increase of marine fish landings from this depth zone of about 64 000 tonnes.

(76)

Organic production in waters from the 50 metre to the 200 metre contour line show that India can expect a maximum sustainable yield of about 500 000 tonnes from fishing in these waters. Assuming that present landings can indicate the size of future landings, that is that Mysore can expect to obtain 7% of those 500 000 tonnes with a suitable fishing effort, the State's landings may increase by 35 000 tonnes per season.

(77)

Little is known about the pelagic resources outside the continental shelf. Fishing with drift-nets in these waters has yielded two species of frigate mackerel, *Auxis thazard* and *Auxis rochei*. Both species seem to occur in fair abundance. *Auxis thazard* as well as *Euthynnus a. affinis* have been taken by purse seines. A species of oceanic squid, *Symplectoteuthis oualaniensis*, has also been found in abundance. This species is of commercial importance in the Pacific area.

(78)

Research has also suggested that trawling is depth between 180 metres

and 450 metres on the slope of the continental shelf could yield another 26 000 tonnes along the coast from Goa to south of Cape Comorin. The bulk of the species available in this depth zone are thought to be suitable for fish meal or fish paste industry. Lobster, penaeid and non-penaeid prawns have also been landed.

(79)

It is estimated that about 30% of the maximum sustainable yield of the continental shelf area consist of demersal species; the remaining 70% being pelagic. At present, the pelagic species constitute more than 70% of the marine fish landings in Mysore.

(80)

As outlined above, it seems possible that the marine fish landings from fishing up to the 200 metre contour line could be increased by 100 000 tonnes per season in Mysore State. In this report, it is assumed that about half of this increase could be harvested from Malpe. The remaining half would be divided between Karwar and Honavar to the north and Mangalore to the south. Consequently, landings at Malpe could increase from about 10 000 tonnes at present to some 60 000 tonnes. This estimate does not include landings from fishing outside the 200 metre contour line.

(81)

However, as most of these additional landings will be taken further from the shore than at present and possibly from stocks of fish which are not so concentrated as the ones occurring inshore, the fishing effort will have to change. Larger boats with more effective gear will have to be used, both for trawling and purse-seining.

(82)

The foregoing information is based upon a paper "Marine Fishery Resources of India" presented by the Central Marine Fisheries Research Institute to the Symposium on Deep Sea Fishing held in Cochin, February 1970.

PROPOSED HARBOUR PROJECT FOR MALPE

Introduction

(83)

The harbour has been designed to cater for vessels up to the 28 metre class. A comprehensive description of the harbour works is contained in the three Engineering Volumes of this Report.

(84)

Appendices 1-33 give a detailed description of the nature and extent of industrial activities which may result if a harbour is built. It should be noted that not all of these activities are required to ensure the profitable utilization of the harbour. This subject is discussed in detail in "Section G - Evaluation".

(85)

The data contained in Appendices 1-33 are based on the assumptions and facts given in Appendix 34. To facilitate reference to Appendix 34 it is suggested that the table of contents prefacing that Appendix be consulted.

(86)

The following summary outlines the salient features of potential industrial activities at this site.

Facility	Unit	1970-71	1978-79	1984-85	1991-92
<u>Fishing Fleet and Catch</u>					
Number in 10 metre class		210	150	70	-
Catch	Tonne	8400	6000	2800	-
Number in 14 metre class		4	71	90	90
Catch	"	560	9940	12600	12600
Number in 18 metre class		2	28	62	75
Catch		732	10248	22692	27450
Number in 23 metre class		-	20	38	40
Catch	"	-	15660	29754	31320
Number in 28 metre class		-	10	20	20
Catch	"		12770	25540	25540
Total Fleet		216	279	280	225
Total Catch	"	9692	54618	93386	96910
<u>Manpower - Fishing Vessels</u>	Men	1090	1710	1986	1760
<u>Industrial Capacities</u>					
Canning - Daily capacity	Tonne	9	17	24	48
Reduction " "	"	35	150	250	200
Ice manufacture " "	"	20	250	350	350
Freezing " "	"	25	30	50	55
Storage - Ice " "	"	50	650	950	950
Storage - Cold " "	"	-	200	400	500
Storage - Frozen " "	"	600	1100	1100	1100
<u>Fish Boxes Required</u>	No	9200	27900	46100	65700
<u>Transport</u>					
Refrigerated trucks	"	5	20	31	43
Other trucks	"	6	11	17	19

Fishing and Other Industrial Activities

Traditional Fishing

(87)

The proposed project for Malpe will not directly interfere with traditional fishing. On the other hand, the canoes must be barred from using the port area and if the traditional fishermen wish to market their catches through the Government-controlled auction hall, special transport arrangements will have to be made. From the long term point of view, it is obvious that the introduction of a large number of fishing vessels and industrial plants will create employment opportunities for the traditional fishermen.

Mechanized Fishing Vessels

(88)

Appendix 1 shows a proposed fleet size, employment and catch by vessel class for the period 1971-92. It will be noted that 5 sizes of vessels are suggested ranging from 10 metres to 28 metres. The costs and earnings of a fishing vessel in each class are shown in Appendix 2 and Appendices 3 to 7 indicate costs and earnings for each class of vessel over the period 1971-92.

(89)

It will be noted in Appendix 1 that the 10 metre class of vessel eventually disappears in the year 1992. These vessels have been gradually phased out and from the year 1982 no further vessels are built. The economies of these vessels from the long-term point of view of development are somewhat questionable particularly as they will have to operate in competition with larger vessels.

(90)

Appendix 2 gives details of days absent from port and fishing trips. The 10 to 14 metre class vessels will generally operate on day trips whereas the other vessels will be engaged on clearly defined trips. In this report, the 18 metre class make trips of 3 days duration, and the 23 metre class trips of 5 days duration and the 28 metre class trips of 6 days duration. It should be noted that these estimates represent an average with regard to vessel operations.

(91)

Manpower requirements for the mechanized fleet are indicated in Appendix 8 and the total number of persons employed will reach a peak in 1986, namely 2012 persons, and stabilise in 1992 at 1760. The reason for the decline between 1986 and 1992 is explained by the phasing out of the 10 metre class vessels.

Disposal of Fish and Prawn Catches

(92)

Appendices 9 and 11 show respectively the allocation of fish catch and prawn catch to various markets. Appendices 10 and 12 indicate the value of the catches. The values are average retail, wholesale, F.O.B. or F.O.R. Mangalore. Appendix 18 indicates the allocation of fish and prawn products to inland markets and this appendix should be read in conjunction with Appendices 9 to 12 inclusive.

(93)

Appendix 13 indicates the disposition of fish and prawn catches from the quay side and the amounts which will pass through the Government auction hall. In this connection, it is obvious that companies owning both processing plants and fishing vessels will not channel their raw material intakes through the auction market. They will by-pass the auction to avoid the costs involved in using the auction hall and its facilities.

Canning, Reduction and Ice Manufacturing

(94)

Appendix 14 shows the installed capacities for canning, reduction and ice manufacturing for the years 1971 - 1992. The appendix also indicates utilization of installed capacity. Appendix 23 shows the annual operating costs for canning, Appendix 24 for reduction and Appendix 21 for ice production and storage. As there is an interrelationship between the ice storage and cold and frozen storage, the annual operating costs shown in Appendix 21 cover all items.

Processing and Freezing

(95)

Appendix 15 indicates the freezing and storage capacity required for fish and prawn products and Appendix 22 shows the costs for processing and freezing on an annual basis for the period 1971 - 1992. Appendix 22 should also be read in conjunction with Appendix 21 which shows the costs for operating cold and frozen storage.

Fish Boxes

(96)

Appendix 16 shows the number of boxes which will be required for the transport and storage of fish and prawns. The costs of operating this service (Appendix 20) include manufacture, repair and storage. The cost of this service is covered by a part of the two or three percent charges levied on fish landings by the Port Authority (see Appendix 26).

Road Transport

(97)

Appendix 17 shows the total distance which will be covered by the transport fleet to move fish and prawn products to market outlets. It also shows the size of this fleet. Appendix 19 shows the annual costs for operating the road transport fleet.

Port Authority

(98)

Appendices 25 and 26 indicate the operating costs and revenue for the Port Authority. Revenue is derived from:-

- a) port dues,
- b) a landing charge of 2% on the actual or proforma value of landings,
- c) an auction hall charge of 3% on the proceeds of all auctions,
- d) rents from land leased to industrial concerns, and
- e) slipway fees.

OrganizationHarbour

(99)

It is recommended that the authority established to operate and maintain the harbour shall be responsible for:-

- a) the control of fishing vessels using the harbour to ensure maximum benefit from space available,
- b) operation and maintenance of the slipway,
- c) the operation of loading and unloading facilities,
- d) the conduct and management of the fish auction hall,
- e) maintenance of all roads and general service units provided within the harbour complex,

- f) the cleanliness of the dock area, the loading and unloading areas, fish auction hall and general service units,
- g) the maintenance and operation of the fish box supply unit,
- h) renting of land for industrial purposes, and
- i) generally, the overall supervision of use of all services provided by the Government.

Mechanized Vessels

(100)

It is generally envisaged that these will be owned and run by fishermen, companies or co-operative organizations. It is likely that the larger vessels will be owned by processing plants or co-operatives since the capital needed may exceed the financial resources of individual fishermen.

Fish Industries

(101)

It is assumed that canning factories, freezing plants, cold storage units, ice plants and reduction units will be built and run by private enterprise or fishermen's co-operatives. Sufficient space has been provided within the harbour complex for building and operating the industrial units planned in this Report.

Road Transport

(102)

There will be sufficient business originating from the trading activities of the harbour to warrant the establishment of a separate unit to provide road transport services. On the other hand, it is likely that each industrial enterprise within the complex will acquire its own transport.

Fish Boxes

(103)

It is recommended that the Port Authority maintain and run the fish box service unit in conjunction with its activities in the unloading area and the auction hall.

Finance

(104)

The harbour scheme, described in detail in Appendices 1 - 34, will need an investment of about Rs. 41 crores over the period 1971 - 1992.

(105)

The investments in harbour works, port office, slipway, internal transport, marketing hall and fish box service will amount to about Rs.3.5 crores; of this investment Rs.2.9 crores are scheduled to be invested during the first three years of the project.

(106)

Investments in fishing vessels account for as much as 75% of the total investment, or about Rs.31 crores (10 m. class - 80 lakhs, 14 m. class - 4.5 crores, 18 m. class - 8.4 crores, 23 m. class - 10.2 crores and the 28 m. class 7.2 crores). The remaining Rs.6.5 crores will be invested in road transport (2.0 crores) and the fish industry (4.5 crores).

(107)

Investments vary from 1.0 crore to 2.6 crores per year (see Appendix 29). In the proposal, investments are at their highest from years 7 - 13, that is from 1977 - 1983.

(108)

Assuming that funds accumulating from depreciation on investments are used to maintain the capital in the scheme, the additional capital requirements are as shown in Appendix 32. These requirements reach a maximum in the second year of the project when Rs.2 crores are needed. Thereafter, the requirements fluctuate between 1.0 crore and 1.5 crores for the next 8 years. This capital may be provided from savings made by the fish industries (including fishing vessels) or from savings made elsewhere in the economy.

(109)

By 1984, depreciation on fishing vessels, buildings, equipment and machinery of the harbour, transport and shore-based plant and buildings will equal or supersede the investment in these items. From 1984 about 15 crores rupees are invested in the fixed capital assets of the scheme.

(110)

Funds to cover operating expenses for boats, harbour, fish industry and transport are estimated to amount to about 20% of the final value of fish

and prawns. Thus, in 1971, approximately Rs. 40 lakhs are required and, in 1979, operating capital will have increased to about 2 crores. In 1985, approximately Rs.3.3 crores are used as operating capital; seven years later requirements increase to about 4.2 crores. Short-term loans for operating purposes are expected to be provided by banks and other financial institutions.

(111)

It is assumed that the capital for the construction of the harbour and the facilities run by the Harbour Authority will come from Government funds. Investments in shore-based fish industries and road transport are phased more evenly over the period under review than are the investments in the harbour. It is assumed that private enterprise and co-operatives will provide the required funds from their own savings and, through long-term loans on normal conditions, from commercial banks and Government financed corporations.

(112)

It seems unlikely that the fisheries industry on its own can provide sufficient capital for investment in fishing vessels. If the Government decides to construct a harbour at Malpe, it must ensure that capital is provided on suitable terms for the acquisition of fishing vessels. If the Government wishes to maintain a policy of ownership of fishing vessels, independent of the shore-based industries, it will need to finance the enterprises directly or guarantee loans.

G. EVALUATION

Introduction

(113)

Except for isolated cases, harbours have been and are today constructed and financed by public agencies. These public agencies will not be the principal beneficiaries of the harbour facilities. In the final analysis, the beneficiary will be the economy of the region, state or country concerned.

(114)

Consequently, when a decision is taken as to whether a harbour is to be

built or not (and where, when and how it is to be built), the evaluation of the relevant benefits and costs must be made from the point of view of the community concerned. By means of a cost/benefit analysis, it is possible to evaluate over a long period of time the repercussions of a fishing harbour on the fishing industry as well as on the economy in general. This long-term evaluation is desirable in order to establish the relative merits of an investment such as a fishing harbour as against other possible development investments.

(115)

The construction of a fishing harbour will provide the local fishing industry with one of the facilities necessary for its industrial expansion. Development growth will only take place if fishermen and other entrepreneurs take advantage of economic opportunities as they arise. Therefore, it is necessary that these persons find it is to their economic benefit to utilize fully the harbour facilities.

Assumptions of a General Nature

(116)

Prices ruling in 1969/70 have been used to calculate the operating results of vessels and industries over the period 1970/71 to 1991/92.

(117)

For the purpose of this analysis, the problem of ownership is not a critical one. In Section "F" of this Report, certain observations have been made about ownership. Firm recommendations in these matters are outside the scope of this Report. Therefore, only a workable framework of ownership has been suggested. However, for the purpose of the cost/benefit analysis, it is essential that the nature and extent of the required commitments of resources in the harbour and ancillary facilities should be clearly indicated. The magnitude of these commitments is clearly set down in the relevant Appendices.

(118)

An examination of the existing operations of both fishing vessels and shore-based enterprises indicates that on the average these activities have been carried on at a reasonable profit. There is no reason to

believe that they will not be able to do so in the future. The continuation of existing profitability serves as an assumption for the development of report proposals.

(119)

A period of 20 years has been chosen to evaluate the cost benefits of the harbour and its associated industries. The period may be seen as a compromise between the wish to take into account a very long working life of the harbour structure and to accept that any lengthy projections of prices and quantities tend to lose their usefulness over a long period of time.

Benefits of the Proposed Harbour at Malpe

(120)

Benefits are understood to be the creation of value as judged by the consumer. In other words, the buyer puts a value on the product when he purchases it in the market. In this particular instance, the gross benefit of the harbour scheme is the value of the "fish" when it is bought by an Indian consumer or exported to an overseas market. Net benefits are the gross benefits minus the value of the resources used in obtaining the gross benefits. Gross benefits are calculated from prices and quantities given in Appendices 34, 9 and 11.

(121)

The harbour is one of the facilities required to make a success of the Malpe Fishing Project. When benefits are enumerated and quantified in this Report, it does not imply that the benefits are not the consequence of a spirited entrepreneurship by both public and private enterprise. The benefits are made possible through the establishment of a harbour in Malpe. These benefits will only be realised if a harbour is constructed.

(122)

The landings of fish and prawns in Malpe have been allocated to various markets for the period 1971 - 1992 (see Appendix 9 and 11). The allocations include the catches made through traditional fishing methods. However, it is assumed that the landings of traditional fishing are not affected by the construction of the harbour. Therefore, the value, or benefits, of these landings from traditional fishing are deducted from the total value

of fish and prawns (see Appendix 10 and 12). Thus the value used in the final evaluation of the scheme under headings for fish and prawns is only that contributed by the mechanized fleet (Appendix 28).

Costs of the Proposed Harbour at Malpe

Capital

(123)

Considering the mobility of capital, it seems reasonable to assume that there are alternate uses for the capital which will be used in the realization of development objectives at Malpe. The profitability of alternative investment opportunities determines the cost of the capital which will be used at Malpe. It is not within the scope of the project to judge the profitability of alternate schemes.

Land

(124)

The land which will be occupied by the harbour and its associated industries has no real significance for agricultural development. A lot of vessels are beached within the area during the monsoon period. Fishermen and others use the area to make nets and ropes and to dry fish. When the harbour is built, the basin will provide shelter during monsoon weather. In the harbour plan, areas have been set aside for net making and fish drying. Therefore, under the heading of "land" the only cost involved is that covering rent to be paid by the owners of processing plants, etc., who lease industrial sites from the Port Authority.

Labour

(125)

Labour costs for the private and public enterprises of the harbour project are shown in the various appendices which deal with operating costs. However, the wages included in the operating costs need not be a true indication of the cost of labour to the economy in general. In the present analysis, the real cost of the labour engaged in the harbour scheme equals the value of production lost due to transfer of labour from one kind of occupation or another to the Malpe harbour scheme. Such a loss will probably occur due to movement of skilled personnel who are likely to hold a job prior to being employed at Malpe. This loss will diminish in the long run as people are trained to fill job opportunities created in Malpe.

(126)

No "social" evaluation of labour cost has been done for the cost/benefit analysis. If this had been done, it would undoubtedly have indicated a lower total labour cost than that used in the cost/benefit analysis.

Marketing Costs

(127)

Appendix 27 has a column relating to marketing costs. The estimates for the various years shown in this column have been arrived at by adding 40% to the costs of the goods at ex-factory or plant price. This percentage does not include costs of ice or transportation which are covered under a separate heading. The 40% is equivalent to 29% of the retail value of all products produced by the Project. No deduction has been made for the marketing of dried and cured fish. This procedure has been adopted in order not to deduct expenses attributable to the marketing of products which result from the operations of traditional fishing.

Other Recurring Expenses

(128)

The processing establishments, ice making plants, canneries, fish meal plants, fishing boats, etc., will use inputs other than fish and labour. These additional inputs include such items as electricity, water, cans, labels, spices, chemicals, packing materials and so on. These inputs must be purchased from other manufacturers or producers. Throughout this Report, the cost of these items has been taken at approx. the rates ruling in 1969/70.

(129)

However, these services and products have another cost connotation, namely the cost to the economy as a whole. If the acquisition of these services and products leads to an increase in their production, then their unit cost will be less than the cash outlay from the point of view of the economy as a whole. It will be zero if the increase in the value of the production of these same goods and services is equal to the cost when purchased from the manufacturer or producer. However, if the fisheries enterprises at Malpe attract services and goods away from some other sector of the economy, then there is a cost.

(130)

Having regard to the types of services and goods required by the fishing industry, it is unlikely that the creation of a fisheries industrial complex in Malpe will jeopardise or substantially reduce production in any other sector of the economy. Realising how difficult it is to assess the cost of these items to the economy as a whole, it has been assumed that their cost in this sense is equal to cost when purchased. This approach has undoubtedly led to inflation of most of the cost items involved under this heading in the cost/benefit evaluation.

Taxes, Tariffs and Excise Duty

(131)

Except for the duty on diesel oil, no deductions have been made from costs to cover taxes, duties and levies imposed by Local, State and Central Governments. The inclusion of taxes, duties and levies inflates the costs in the cost/benefit analysis.

Special Cost Situations

(132)

The bulk of the ice produced within the Malpe harbour area will be used by consumers from the same area. These consumers comprise boat owners, processors and fish buyers. Consequently, the cost of ice production appears twice; firstly as a manufacturing cost and, secondly, as a cost to the user. The effect of double costing has been eliminated by adding the value of ice sales to other values created by the sale of fish and prawn products (Appendix 28).

(133)

Much the same situation exists in relation to cost of services provided by the Port Authority. In the cost/benefit analysis, these costs are included as operating costs of the Port. Furthermore, the revenue which accrues to the Port Authority from the sale of these services is also shown as cost item to the buyers. For example, the Port Authority will collect 3% of the proceeds of fish and prawns auctioned in its hall. This charge is also a debit against the operating account of the fishing boat concerned. The effect of this double costing has been removed by adding the revenue received by the Port Authority for its services to

other values created by the sale of fish and prawn products (Appendix 28).

Profitability of the Harbour Scheme

(134)

In the course of development of fisheries industries at Malpe, it may become evident that development as previously outlined in this report cannot be attained. This may be due to scarcity of any of the inputs which are needed. For example, either capital or fish stocks may not be available to the extent which has been assumed. If this were so, then the fishing effort centred at Malpe will be reduced accordingly, and the rate of fleet expansion may be slower than this Report assumes or a vessel class either partly or wholly eliminated. Investments and production in shore-based industries would then need to be tailored to cope with the reduced landings.

(135)

What would happen to the usefulness or profitability of the capital invested in the harbour scheme if the fishing effort were reduced? To answer this question, changes have been made in the basic assumptions concerning fleet size. Costs and benefits have been calculated for these alternative schemes of fisheries development. The assumptions and definitions used to establish costs and benefits in these calculations are identical with those listed in paragraphs 113 - 133. The size and layout of harbour works are identical in all schemes.

(136)

Various factors could cause development of fisheries in Malpe to follow a course similar to any of the schemes. These factors are mainly outside the control of private enterprise or the Government in India; availability of fish stocks and changes in overseas markets are two such factors.

(137)

Consequently, the schemes at Malpe are not mutually exclusive investment possibilities from which one must be selected for implementation. Instead, the schemes are presented and analysed mainly to show possible developments at Malpe once the harbour has been constructed.

(138) The following summary outlines the nature and implications of each scheme.

Scheme Symbol	Particulars of Scheme	Internal rate of return for period 1970/71 to 1991/92	Number of seasons needed to obtain an internal rate of return of 20% starting 1970/71
A	Scheme as presented in Appendix 33	over 75	
B	10 metre class excluded from Scheme A	39-40	9
C	10 metre and 28 metre classes excluded from Schedule A	37-38	9
D	10 metre and 23 metre classes excluded from Schedule A	37-38	9
E	10, 23 and 28 metre classes excluded from Schedule A	33-34	10
F	10 metre class excluded and 3 year delay in all activities except harbour construction	27-28	15

(139) The following summary indicates the reduction in landings and total investment for Schemes B to F when compared with Scheme A over the period 1971 to 1992.

Scheme Symbol	Vessel class excluded	Reduction in landings	Reduction in fixed assets Unit: Rupees crore		
			Vessels	Shore-based industries & transport	Total
B	10	7%	0.8	0.5	1.3
C	10 and 28	32%	8.0	2.1	10.1
D	10 and 23	36%	11.0	2.3	13.3
E	10, 23 and 28	61%	18.2	3.9	22.1
F	10 plus delay of 3 years	7%	0.8	0.5	1.3

Scheme A

(140) The costs and benefits associated with Scheme A are summarised in Appendix 33. The internal rate of return for this Scheme is more than 75%.

(141) The high rate of return is caused by the inclusion in this Scheme of costs and benefits associated with the 10 metre vessel class. As this type of boat is already well established, it is a doubtful proposition to include costs and benefits for this class of vessel in an evaluation of the harbour project. On the other hand, a case could be argued that this class of vessel could not, in the future, supply fish and prawns of a quality good enough to be processed for overseas markets unless essential harbour facilities are made available.

Scheme B

(142) In this Scheme, the costs and benefits associated with the 10 metre vessel class have been deducted from total costs and benefits of Scheme A. As a result, total investments in fixed assets of Scheme A are reduced by Rs. 1.3 crores over the period 1971 - 1992. An internal rate of return of 20% is obtained for Scheme B after 9 years. The internal rate of return for the Scheme is between 39 and 40% when calculated over the period 1971 - 1992. The following amendments have been made to the data which form the basis of Scheme A. The corrections have been made for each year from 1971 to 1992.

- a) Costs for operating the 10 metre boats (Appendix 3) have been deducted from Total Operating Costs of Scheme A (Appendix 28).
- b) Costs incurred in processing and selling fish landed by the 10 metre vessels have been deducted. These costs included those of processing units and transportation of finished products (Appendix 27). The costs of the 10 metre vessels have been established by applying a percentage, equal to that of the quantity of landings by the 10 metre boats expressed as a part of total landings, to the costs of processing and transporting all the fish and prawns in Malpe during any particular year.

- c) The combined "final value" (that is, retail, F.O.R. or F.O.B.) for fish and prawns contributed by the 10 metre boats to Scheme A (Appendix 33) has been deducted from "Total Benefits" of Appendix 28. This combined "final value" was estimated through the following calculations. Average "final values" for fish and for prawns per tonne and year were calculated from data available in Appendices 9-12 and 34, para 7. These yearly average "final values" were then multiplied by the corresponding quantity of fish and prawns landed by the fleet of 10 metre vessels from 1971 to 1972. The "final values" of fish and prawns were subsequently added to arrive at a combined "final value" for each year for the whole vessel class.
- d) Investments in 10 metre boats have been deducted from total investments in the fishing fleet (Appendix 30).
- e) Investments in shore-based industries and transport have not been re-scheduled to take into account the reduced fish landings.

(143)

When the internal rate of return of Scheme B is compared with that of Scheme A (40% to more than 75%), the importance of the 10 metre class to Scheme A is obvious. If it is contended that, during the period 1971-1972, the operations of the 10 metre vessels are not dependent upon or caused by the construction of a harbour at Malpe, then the internal rate of return for the harbour proposal must also be limited to 40%. If, on the other hand, some, but not all, of the costs and benefits accruing to the 10 metre class are the result of the harbour being built, then the internal rate of return for the Malpe harbour proposal must be assessed at a figure between the internal rate of return of Scheme B and that of Scheme A.

Scheme C

(144)

In this Scheme, the costs and benefits associated with both the 10 and 28 metre class of vessels have been deducted from the total costs and benefits of Scheme A. As a result, total investments in fixed assets in Scheme C are Rs.10.1 crores less than those of Scheme A over the period 1971-1992. An internal rate of return of 20% is obtained for Scheme C after 9 years. The internal rate of return is between 37 and 38% when calculated over the period 1971-1992. The nature of the amendments which have been made to change Scheme A into Scheme C are identical with those outlined in paragraph 142 to change Scheme A into Scheme B.

Scheme D

(145)

In this Scheme, costs and benefits associated with the 10 metre vessel class and the 23 metre vessel class have been excluded from Scheme A. As a result, total investments in fixed assets of Scheme D are Rs.13.3 crores less than those of Scheme A over the period 1971 - 1992. An internal rate of return of 20% is obtained for Scheme D after 9 years. The internal rate of return of the Scheme is between 37 and 38% when calculated over the period 1971 - 1992. The nature of the amendments which have been made to change Scheme A into Scheme D are identical with those outlined in paragraph 142 to change Scheme A into Scheme B.

Scheme E

(146)

In this Scheme, the costs and benefits associated with the 10 metre, 23 metre and 28 metre classes of vessels have been excluded from Scheme A. As a result, total investments in fixed assets of Scheme E are Rs.22.1 crores less than those of Scheme A over the period 1971 - 1992. Investments in Scheme A have been reduced by over 50%. An internal rate of return of 20% is obtained for Scheme E after 10 years. The internal rate of return is between 33 and 34% when calculated over the period 1971 - 1992. The nature of the amendments which have been made to change Scheme A into Scheme E are identical with those outlined in paragraph 142 to change Scheme A into Scheme B.

Scheme F

(147)

In this Scheme, the costs and benefits associated with the 10 metre vessel class have been deducted from total costs and benefits of Scheme A. As a result, total investments in fixed assets of Scheme F are Rs.1.3 crores less than those of Scheme A over the period 1971 - 1992. For this change, the amendments made to arrive at Scheme F starting from Scheme A are identical with these outlined in paragraph 142 to change Scheme A into Scheme B.

(148)

In addition to the elimination of the 10 metre vessel class, Scheme F reflects the assumption that all activities of Scheme B, except the

the construction of the harbour, are delayed for three years. In other words, the costs and benefits associated with the revenues of year 1 (1970/71) are postponed to year 4 (1973/74) and the costs and benefits of year 2 (1971/72) accumulate in year 5 (1975/75). The calculations are taken up to the year 1991/92 and, consequently, the costs and benefits accruing in the last three years of Scheme B have not been included in Scheme F.

(149)

An internal rate of return of 20% is obtained for Scheme F after 15 years. The internal rate of return for the Scheme is between 27 and 28% when calculated over the period 1971 - 1992. The difference (approx. 13%) in the internal rate of return of Scheme B and Scheme F indicates how important it is that the harbour be utilized as soon as it is built.

Comments on the Internal Rate of Return

(150)

Funds to be used as operating capital have not been included in the estimates of investments for any of the Schemes. Had these funds been included in the calculations of internal rate of returns, the resulting rates would have been lower than the ones given in the paragraphs 140 - 149. The internal rate of return of Scheme C is between 33 and 34% and that of Scheme E is between 30 and 31% when operating capital requirements (as given in paragraph 110) are included in the calculations.

(151)

The high internal rate of return of all the Schemes are mainly due to the high export prices of canned and frozen prawns. However, when considered from the point of view of the economy as a whole, these rates could have been even higher as the costs to calculate the internal rate of returns are too high. The reasons for the overevaluations have been set out in the sections on Labour, Other Recurring Expenses, and Taxes, Tariffs and Excise Duty (paragraphs 125, 126, 128 - 131).

(152)

The decrease of the internal rate of returns, obtained when funds for operating capital are included in the calculation of internal rate of return, is eliminated if the operating costs of the various Schemes are reduced by about 10 to 15%.

(153)

Schemes C, D and E show that the usefulness or productivity of resources which have been employed to construct the harbour do not stand and fall with the larger vessels. However, this should not be interpreted to mean that capital invested in larger vessels is badly placed capital from the point of view of the economy as a whole. When the harbour has been constructed, investments in these vessel types are an excellent proposition. The internal rate of returns for the costs and benefits associated with these vessels are higher than the 39 - 40% of Scheme B.

(154)

Sales values in 1992 for fixed assets of the various Schemes have not been included when the internal rate of returns were calculated. When discounted over 22 years, by a yearly rate of interest of over 25%, the present values of these "Benefits" are so small for the various Schemes that the level of the internal rate of return is not significantly affected.

Conclusions

(155)

Two aspects of fisheries development in Malpe stand out as important in relation to the fishing harbour, when the internal rate of returns for the various Schemes A to F are compared.

- a) First, the need to utilize the harbour fully as soon as it is built. If this is done, the construction of the harbour can be justified through fish landings during a comparatively short period of time. Schemes B, C, D and E show an internal rate of return of 20% after 9 to 10 seasons of fishing. What happens after this period, in the various Schemes, is not important if 20% is deemed to be a sufficiently high return for the resources employed. During the 10th season, that is 1979/80, the combined landings of the five boat-classes plus traditional fishing have been projected at 69,400 tonnes.
- b) Second, the resources engaged in the construction and running of the harbour are not of great significance when compared to

the overall engagement of resources needed to construct and operate boats, shore-based industries and transport units. Even a fishing effort yielding only about 28,500 tonnes per season, in 1979/80, could be sufficient to justify the construction of the harbour. The projection of landings for the 10, 14 and 18 metre class of vessels in 1979/80 (see Appendix 1) is 28,500 tonnes.

(156)

The benefits of the harbour scheme are not realized until the landings by the fishing vessels operating from the harbour have been sold in one form or another outside of India or to an Indian consumer. Consequently, all activities of the fishery industry - catching, landing, processing, distributing and selling - must function smoothly and on an integrated basis. To meet this objective, the harbour scheme must be accompanied by active programmes in the following fields:-

- a) Management of fisheries resources;
- b) Maintenance of harbour works and facilities;
- c) Supervision of the sale of fishermen's catches to ensure that they obtain adequate remuneration;
- d) Training of personnel for fishing vessels and shore-based industries;
- e) Quality control of products from fish and prawn processing plants;
- f) Encouragement of distribution and consumption of fisheries products in inland markets; and
- g) Provision of capital to promote and assist industrial expansion.

