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NATIONAL FISHERY POLICY AND PLANNING

Paper 1

MARINE FISHERIES DEVELOPMENT - AN OUTLOOK FOR 21ST CENTURY AND KEY POLICY ISSUES

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ABSTRACT

Marine fisheries will have to play a crucial role in augmenting supplies both in the domestic as well as export markets. Thrust of the development will be on deepsea and brackishwater resources. The exploitation of these resources, particularly deepsea, will require a rapid transition from charter of vessels to joint ventures and owned fleet with modern and sophisticated technology. Creation of sizeable owned fleet would require massive credit and fiscal support. This thrust for exploitation of deepsea resources can be sustained with concerted attempts to formulate and implement strategies for product development and marketing in both domestic as well as export markets. This will also require the attention to develop the necessary infrastructure to handle such vessels, onshore processing facilities, better management of fishing harbours, cold chain grid in the domestic markets, development of transit and terminal markets at wholesale and retail levels. Boatbuilding yards will have to take up new challenges. This also throws up challenges for net-marketing industry in this country. All these developments would also require massive efforts for training and development of manpower. This paper deals with all these areas in a systems framework and suggests appropriate policy support measures for strengthening various elements of the system.

The country has made remarkable progress in the sea food exports particularly in the recent years when the export has crossed Rs. 400 crores. In this sense the strategy for marine fisheries development in India may be considered successful. But a critical review of the performance indicates some of the weaknesses:

1) Shrimp has dominated the exports in all the years in value terms (Table-1). About 82% of the total sea food exports in 1986 were shrimps.

2) The exports have been basically confined to Japan and U. S. A. The other markets (western Europe and elsewhere) have accounted for not more than 15% of the total value of the sea food exports.

3) The supplies to domestic market have been mainly as a residual factor from the mechanized boats (except from the motorized traditional crafts in Kerala and Gujarat). There has been a growing demand-supply gap for edible fish in the domestic market resulting in a more rapid rise in fish prices than all other commodities (Table-2). It may also be noted that although inland fish production was only one-third of the

TABLE 1.

Shrimp exports from India

Quantity in tonnes
Value in Rs. in lakhs

Year		Total Exports	Frozen Shrimp	Share Percentage
1980	Q	74542	47762	64.07
	V	21887.56	18336.61	83.78
1981	Q	75375	54538	72.36
	V	28671.28	24852.10	86.68
1982	Q	75136	54625	72.70
	V	34225.29	30097.83	87.94
1983	Q	86169	53608	62.21
	V	36232.31	31037.24	85.06
1984	Q	89912	55194	61.39
	V	38549.83	32728.48	84.90
1985	Q	80588	49544	61.48
	V	37566.83	31450.38	83.72
1986	Q	89283	52113	58.39
	V	46270.93	37997.89	82.12

Source: Marine Products Export Development Authority, Cochin.

TABLE - 2

Wholesale price indices

Year	Price indices			
	All commodities	Food items	Meat	Fish
1953	46.7	43.9	38.3	27.0
1960	54.2	48.3	44.3	34.4
1965	71.2	70.0	74.0	84.0
1970	99.0	100.4	93.1	97.7
1975	176.3	170.0	202.5	157.9
1976	172.4	152.2	191.7	172.7
1977	185.4	170.8	215.9	192.4
1978	184.9	173.4	225.9	228.9
1979	206.0	181.3	255.8	253.4
1980	248.0	207.3	306.4	267.0
1981	278.4	230.3	330.4	346.6
1982	286.3	244.7	358.0	429.8
1983	308.1	275.7	376.5	451.6
1984	334.0	276.9	409.5	433.9
1985	353.3	294.6	489.9	484.6

Source: Economic Adviser, Ministry of Industry.

total production in India, it contributed 57% of the total edible domestic fish supplies.

4) In terms of deep sea resource exploitation, there has been very little effort to provide conducive infrastructure facilities at other than Visakhapatnam Fishing Harbour. Therefore deep sea fishing vessels belonging to Tamil Nadu, Gujarat, Kerala and Andhra Pradesh are all operating from Visakhapatnam only.

5) Introduction of deep sea trawlers has also been geared towards shrimp resources primarily operating in the northern Bay of Bengal with Visakhapatnam as base

6) The catches per unit effort and per vessel have gone down in recent years, yet the introduction of trawlers for shrimping has continued because the average unit value realisation of shrimp has been going up and it stood at Rs. 72.86 per kg in the year 1986 as compared to Rs. 33.90 in 1976. This increase in unit value realisation has taken place despite the fact that our export of shrimps has continued to be mostly in frozen block form.

This paper briefly reviews tne strategy of marine fisheries development in a systems

framework and indicates the major changes in the exploitation of deep sea and brackish water resources for meeting the projected export level of Rs. 700 crores by 1990 and Rs. 1200 crores by the year 2000 A. D., and also the domestic supplies to meet the growing demand. Before the review of the strategy for marine fisheries development, a systems perspective for marine and brackish water fisheries is presented

I. A SYSTEM FRAMEWORK OF MARINE AND BRACKISH WATER FISHERIES

The total fisheries system can be broadly classified into:

i) Resource sub-system
ii) Input sub-system
iii) Processing sub-system, and
iv) Marketing sub-system.

All the sub-systems have interlinkages with each other. Unless all the sub-systems are developed properly, nothing can be achieved because they all are interdependent. The linkage of major sub-systems in the industry are presented in Fig. 1 and resource-wise linkages are given in Figures 2, 3 and 4.

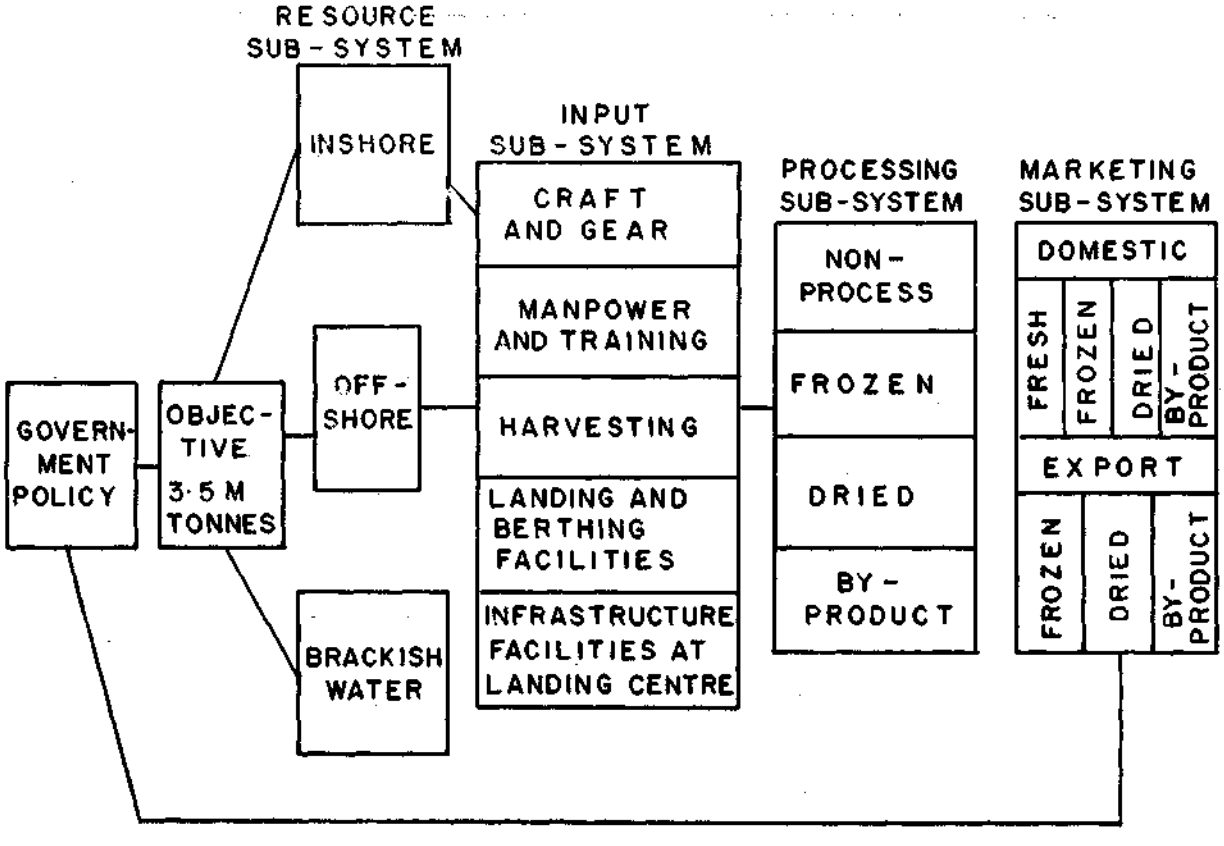
A. RESOURCE SUB-SYSTEM

The resource sub-system defines the limits of growth and where actual fishing operation takes place. The resources can be broadly classified into three categories:

a) Inshore resources,
b) Off-shore resources, and
c) Brackish water resources.

Inshore Resources

The Indian inshore region (upto 50 metres depth) is highly exploited and sometimes over exploited also, because the majority of fishermen operate country crafts in areas very near to shore. Therefore, the major thrust of the development is to be off-shore resources especially deep sea resources and brackish water resources.



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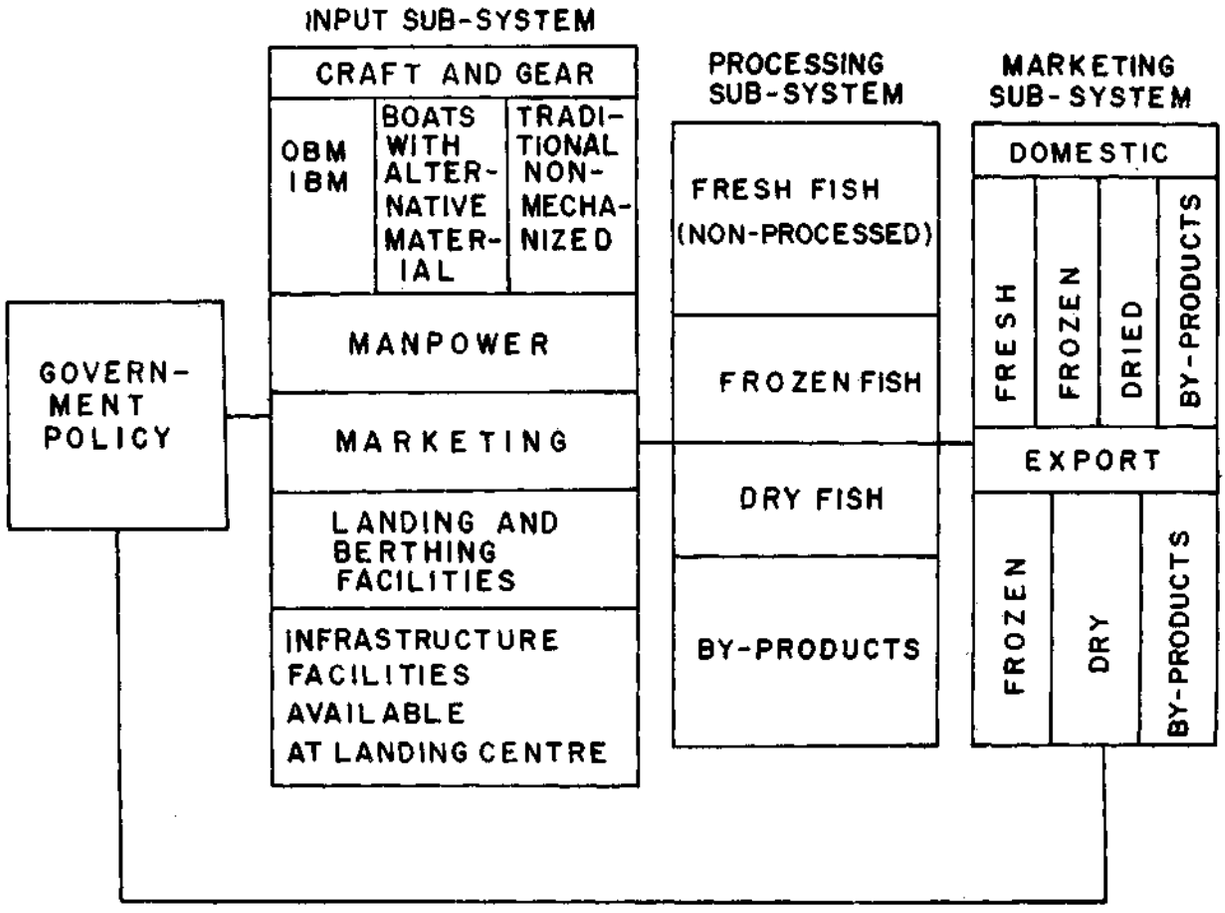
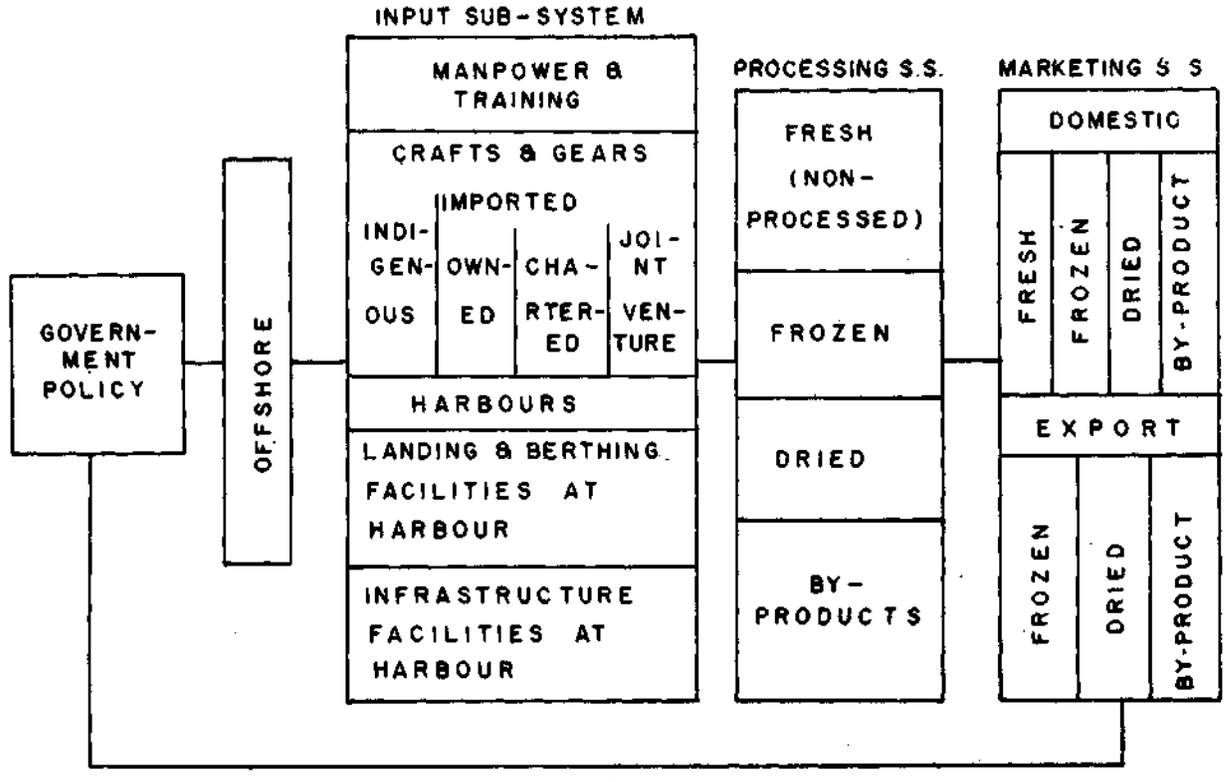

INPUT SUB-SYSTEM
CRAFT AND GEAR
OBM IBM
BOATS WITH ALTER-NATIVE MATER-IAL
TRADI-TIONAL NON-MECHA-NIZED
MANPOWER
MARKETING
LANDING AND BERTHING FACILITIES
INFRASTRUCTURE FACILITIES AVAILABLE AT LANDING CENTRE
GOVERN-MENT POLICY
PROCESSING SUB-SYSTEM
FRESH FISH (NON-PROCESSED)
FROZEN FISH
DRY FISH
BY-PRODUCTS
MARKETING SUB-SYSTEM
DOMESTIC
FRESH
FROZEN
DRIED
BY-PRODUCTS
EXPORT
FROZEN
DRY
BY-PRODUCTS

Fig. 2


INPUT SUB-SYSTEM
MANPOWER & TRAINING
CRAFTS & GEARS
IMPORTED
INDI-GEN-OUS
OWN-ED
CHA-RTER-ED
JOI-NT VEN-TURE
HARBOURS
LANDING & BERTHING FACILITIES AT HARBOUR
INFRASTRUCTURE FACILITIES AT HARBOUR
GOVERN-MENT POLICY
OFFSHORE
PROCESSING S.S.
FRESH (NON-PROCESSED)
FROZEN
DRIED
BY-PRODUCTS
MARKETING S S
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EXPORT
FROZEN
DRIED
BY-PRODUCT

Fig. 3

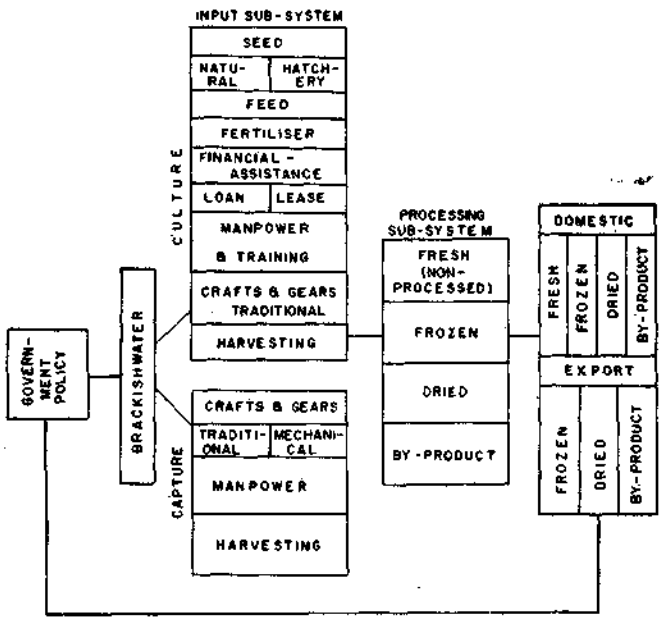

Fig. 4

Off-shore Resources

The declaration of EEZ has opened up new potentials for fisheries development. The deep sea zone (beyond 50 metres depth) contains 38.3% of total marine potential, while 11.1% of total potential is in the depth beyond 200 metres. It is estimated that our EEZ resources are capable of producing 4.5 million tonnes of fish and prawn, if developed and exploited properly. However, the contribution of the deep sea resources to present catch is hardly one percent.

Brackish water Resources

The importances of brackish water culture lies in its capacity to supply of exportable prawns. Of the total 182,000 tonnes of prawn production in India, the share of brackish water was about 30%. According to IIMA study, the estimated culturable area of brackish water in India is about 0.95 million hectares. The area utilized so far is not more than 3% of the potential which accounted production of about 10,000 tonnes.

B. INPUT SUB-SYSTEM

The importance of the input sub-system lies in involvement of its interlinked sub-systems in increasing the production. It covers the components from actual fishing to fish landing.

Inshore Resources

Nearly two lakh traditional crafts and more than 16,000 mechanized crafts have been operating in inshore areas. The mechanised craft operating are mainly the small size ranging from 9 to 12 metres and the majority of them are outboard motors (OBM) or inboard engines (IBE) type. However, the operation of these mechanized boats is becoming non-viable due to hike in fuel prices and cost of its spare parts as well as cost of wood itself. To overcome the increased cost of wood, efforts are being made to construct boat from materials like FRP/Ferro Cement which are cheaper in cost compared to wood, better in strength and easy to handle.

It has been estimated that introduction of 3,500 improved traditional fishing crafts in FRP with outboard drives and 5,000 mechanized boats in FRP/Ferro Cement for fishing in different regions of the country would be needed for exploitation of our marine resources in coming decades.

Off-shore Resources

For the development of off-shore resources requires big mecnanized boats (17 metres and above) with onboard freezing facilities. Creation of sizeable owned fleet requires massive credit and fiscal support. Credit is an important input in case of deep sea exploitation.

Brackish water Resources

Development of brackish water ponds for fish/prawn culture is highly capital and technology intensive operation. Prawn seed is the most critical input for brackish water culture development. One should not rely on natural seed resources. Fertilizer and feed are the other important inputs for brackish water culture. The culture of prawn requires knowledge of their nutrient requirements in order to provide adequate food for their growth and survival.

Most of the brackish water areas suitable for culture are owned by government agencies. Looking at the high investment and the risk involved in the business, it has been suggested that these lands be leased to fishermen on long term basis, which would be helpful in obtaining credit from the financial institutions and facilitate improvements of pond for intensive production.

Infrastructure for Landing and Berthing

Fishing harbours or fish landing centres are an important link between freshness of fishing operation and delivery of fishes to consumers. Establishment of fishing harbours with facilities like landing quay, berthing jetty, fuel, fresh water, etc. are essential. Boat and net repairing facilities are essential at fishing harbours. Facilities like cold storage, approach roads and transportation are prime requirements at landing centres. At every fishing port, auction and packing hall is required and sufficient land for processors needs be earmarked.

Manpower Training and Education

When deep sea and brackish water resources are to be exploited, the need for training and education for the complex operation has become more intensive. In case of deep sea operations, the education of fishing grounds and fisheries science are needed along with the training of operations of deep sea craft and gears, whereas in case of brackish water culture the system is totally different. Prawn culture in brackish water fields has emerged as a multidisciplinary science, which involves many aspects from fishery biology to engineering and processing.

C. PROCESSING SUB-SYSTEM

Fish is of highly perishable nature, the fresh fish can't be stored overnight in normal temperature. Hence, fish has to be either kept in ice or chilled store to keep its freshness until it is consumed or processed. Ice is used at different stages of operation. Hence, the country needs to have sufficient number of ice plants and cold storage in order to extend the shelf-life of fish and avoid wastage. Development of edible products from by-catch is a prime area in the market development.

D. MARKETING SUB-SYSTEM

Fish marketing can be broadly classified into two categories: (a) Domestic market and (b) Export market.

In the domestic market fish is mainly consumed in fresh form. Only due to non-availability of fresh fish the consumer is forced to have fish in other form viz. dry and by-products. In the domestic market the movement of fresh fish is arrested by inadequacy of proper marketing infrastructure. In the domestic fish market there are many traders performing different functions or multiple functions. The share of fishermen in the consumer rupee depends on the number of intermediaries and the distance moved between the landing centre and consumer centre. The standardization in quality and weighing will improve the fishermen's realization which otherwise leave both fishermen and consumer at the mercy of traders. Licensing traders is also helpful to regulate the market.

Another important aspect in the marketing system is the involvement of cooperatives in the fish market which is considered to be a suitable organization for increasing fishermen's realisation and looking after his daily needs. The cooperatives have to provide an integrated service covering the supply of input, working capital requirements and marketing as the traders have been doing.

Export market development provides the valuable foreign exchange earnings. This sub-system consists of all the infrastructure which prepares products or facilitates for export markets. This infrastructure includes organizations and processing units. The strength of the export marketing sub-system is evaluated on how diversified are the products and markets.

II. STRATEGY FOR MARINE FISHERIES DEVELOPMENT IN INDIA

INSHORE RESOURCES

A major impetus of mechanization of fishing crafts came from export potential for shrimps. Therefore, since the inception of planned development, the mechanization of fishing crafts has been geared towards enhancing the power of boats to haul the trawl nets to catch the shrimp resources.

Most of mechanized boats operate in inshore waters and edible table fish supplies to domestic market account for only 15 to 20% of the catches. Despite the mechanization, traditional boats still account for 65% of the total catches. It is in the Seventh Plan that

Illustrative Financial Analysis of a 23.85 metres Shrimp Trawler Operating from Vishagapatnam

	Rs. in lakhs
1. Capital Cost:	
— Cost of trawler inclusive of CST @ 4 %	70.14
— Cost of outrigger, nets and accessories	1.10
— Cost of providing shore facilities	1.00
— Working capital requirements	2.48
Total including contingency @ 5%)	78.49
2. Annual Operating Expenditure	23.16
3. Total Revenues (Sum of flows for 20 years)	298.09
4. Net Revenues (,,)	221.63 + 7.03 (salvage value)
5. IRR	20.54%

Notes: 1. 8 voyages (average of 25 days duration each).

2. Catch per voyage:

PRAWNS			
1. Tiger	400	200	0.80
2. White	800	160	1.28
3. Brown	2800	85	2.38
	4000		
FISH			
1. Quality Fishes	5000	7	0.35
2. Misc. Fishes	1000	3	0.03
		Total	4.84
Total income (8 voyages each)			38.72

Source: NABARD, Bombay.

emphasis has been laid on motorization of the traditional crafts (mainly dugout canoes and plank built boats) with a view to enhance the edible fish supplies from the inshore regions and improve the income level of traditional fishermen.

DEEP-SEA RESOURCES

Our long coastal line of about 6,500 kilometres, having an Exclusive Economic Zone of about 2 million square kms, has most of the vessels which are mainly engaged only in shrimping operations. A very rich potential of other species of fish to an extent of around 2.5 million tonnes are available in the tropical continental shelf around India, which are to be harvested annually. In view of the potential of the marine fishing industry, the Seventh Plan proposes to induce 500 large fishing vessels of OAL ranging between 24 metres and 60 metres by 1990. Presently most of these vessels work on the following kind of typical financial calculations:

PROCESSING SUB-SYSTEM

Since most of the trawlers are geared to shrimp resources the processing has been also geared to make it into frozen block form. It is known that there could be approximately 25% higher unit value realisation by value addition if we can convert our shrimp in value added form, like individually quick frozen (IQF shrimp).

Similarly there are large by-catches of fish but no effort has been made to convert it into edible products for the domestic market and exports. Even there have been instances when large trawlers attempted to discard into sea anything other than shrimp. No specialised fishery for exploitation of squids, cuttle fish, tuna and lobsters has been developed.

No thought has been given about the resource depletion effort of the continued introduction of shrimp trawlers in the same north Bay of Bengal fishing grounds. The preliminary evidence indicated that the catch per boat is declining in this area.

BRACKISH WATER RESOURCES

It has been estimated that 1.4 million hectares of brackish water area (with 0.9 million ha. of culturable area) is available for exploitation for shrimp and other fish production. This area is spread all over our coastal districts largely in the states of Andhra Pradesh, Karnataka, Kerala, Maharashtra, Orissa and West Bengal and has so far been practically lying unutilized. The volume of exports of shrimp in future would largely depend upon the exploitation of this brackish water area. Even one lakh hectares of area with one tonne potential yield 100,000 tonnes of exportable prawns. Yields in Taiwan, Equador and Panama have crossed 20 tonnes per hectare. Thus the potential for us to augment the supply of shrimp from brackish water supply is immense.

III. OUTLOOK AT THE TURN OF THE CENTURY AND POLICY IMPERATIVES

It is now becoming clear that production from inshore resources and shrimp landing from capture fisheries can't be main stay for marine fisheries growth in the 21st century. The marine fisheries growth for export as well as domestic market would have to come from brackish water culture for shrimp and deep sea fisheries for non-shrimp resources. The elements of strategy to promote the new resources of growth should be again seen in the systems frame-work as indicated above. It is briefly summarised below:

INPUT SUB-SYSTEM

Deep Sea: Perhaps we will have to put a limit to the introduction of shrimp based trawlers in the name of deep sea resources exploitation Instead we will have to encourage larger but specialized vessel for non-shrimp resources. These vessels again would require different types of gear and manpower training that has been traditionally imparted. Similarly the landing and berthing facilities for such vessels would have to be diversified at several places like Andamans and Lakshadweep islands on the pattern of Visakhapatnam. These fishing harbours would have to be equipped with modern landing and berthing and processing facilities, which make it attractive for large vessels to land their catches for processing and exports from these harbours.

Brackish Water: In case of brackish water the biggest problem is the availability of long term leasing systems along with feed seed and manpower training. The perpetual conflict between growth and equity observed in recent years in case of government policy, research at technical institute and funding institutions need to be resolved We would have to promote intensive culture of prawns on the pattern of our competitors and the equity objectives will have to be met at best through the organizational mechanisms (for example, through industrial state of brackish water fish farmers where farmers with limited means and financial background can also participate in the highly capital intensive culture operation).

PROCESSING SUB-SYSTEM

Deep sea: As we encourage more trawlers for non-shrimp catch, it will be necessary to augment the processing sub-system not only for exportable variety like tuna and cuttlefish but also edible products out of by-catch for the domestic market. The thrust on development of deep sea resources calls for product development out of unconventional varieties. The product development should aim at:

i) making convenience food out of fish available for direct consumption with a large shelflife, and

ii) converting low value fish into high value products with consumer acceptance.

It is in this area that a close coordination between the Ministry of Agriculture, Ministries of Commerce and Industry have to be effected. Although technology exists at experimental stage (for example, at Integrated Fisheries Project, Cochin) the role of private sector units involved in food processing will be crucial for the by-catch processing. In this context the emerging trend towards processed food industry is notable and these units should be encouraged to take up fish processing for domestic markets also.

In case of shrimp, the policy support should be moved to IQF, so that unit value realisation can be further increased. Funding institutions (Commercial Banks, NABARD, IDBI and ICICI which is going to operate shipping development fund) need to reorient themselves for financing various elements of the system.

Brackish water: In case of brackish water shrimp production we may have to encourage the well known processing houses to open their procurement centres at the pond site. The remaining task can be handled by the processing facilities development for the landings from capture system.

MARKETING

Deep sea catches : As indicated above 82% of the export had been mainly of shrimp. There has been traditionally established markets. Now with the emergence of Taiwan and Equador for the supply of shrimp, even in case of shrimp we will have to go for more aggressive marketing efforts and enforce more strengthened quality control measures. In case of other varieties of fish we have not learned the process of international marketing mainly because of our pre-occupation with chartering of vessels where the foreign charter party undertakes a function of marketing of all the catches. We shall now have to make vigorous efforts to promote joint ventures and own fleet and this will entail international marketing effort of different order not experienced so far.

In case of domestic markets several steps will have to be taken to augment the supply from marine resources. This include development of infrastructure of fish market, cold chain grips to move the fish and products from by-catches to far away demand centres in the country and making the quality fish available to the consumers at convenient places. The domestic market will have to act as a cushion for fluctuations in the international markets. The strategy of treating the domestic market as a residual would have to change and this will make the deep sea trawlers with non-shrimp resources also financially viable.

Brackish water production: Exploitation of brackish water resources would yield shrimp for export and some fish for domestic market. While shrimp has to be processed and marketed as in the case of capture fisheries, the fish production from brackish water resources may have to process to enhance the shelf-life and transported to higher demand centres. For example, in Philippines,, milk fish is smoked and sold to the consumers all over the place. In case of some other fishes market development effort would be necessary.

While in the past, major impetus for marine fisheries development came from growing demand and rapid rise in the unit value realization from shrimp in the international markets, the strategy by the turn of this century will have to be diverted towards the culture of prawns and also processing as exports of other fish for export market.

Since there was a pre-occupation with the export market no special attention was made for the development of domestic market. With the result, per capita consumption of fish in our country has been around 3.5 kg and there has been rapid increase in the prices of edible varieties. There is an urgent need to augment the supply in domestic market from marine sources and this requires strengthening of inshore catches from traditional crafts, motorized traditional crafts and small trawlers; in addition there is a need for processing and marketing of edible products from by-catch on a much larger commercial scale.

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