CHAPTER - 1

INTRODUCTION:

i. FISH IN THE WORLD ECONOMY -
INLAND FISHING, MARINE FISHING.

ii. PREFERENCE IN INDIA IN INLAND FISHING.

iii. ROLE OF FISHING IN INDIA SPECIALLY RURAL AREAS AS AN AGENT FOR DEVELOPMENT.

1.1 FISH IN THE WORLD ECONOMY — INLAND FISHING, MARINE FISHING:

The wealth of the sea is vast. The sea is the store house of various important resources - food, industrial raw-materials and other valuable products. All the resources have not yet been exploited because of our limited knowledge about the sea. There is a great possibility of deriving energy which is inherent in the movements of the tides, currents and waves. Minerals like salt, bromine, magnesium, pottasium etc and precious stones like corals, perls, etc are exploited from the sea.

The direct economic importance of the ocean as a supplier of food especially fish is extremely great. Fish provides necessary protein element in the diets of millions of people, particularly of the far eastern countries.

There are 1800 variety of fishes. Most of them are unknown to us and many of the fishes are not used as food for man. Fisheries are confined not merely to sea fishing. Fresh water fishing like fishery in rivers, lakes, ponds, tanks and reservoirs etc is also an important area of 'Fisheries'. Fisheries in most of the countries of Asia, Africa and South America are based on subsistence fishing. Subsistence fishing is practised in the fresh water whereas commercial fishing is developed in sea water.

Fisheries

Sea-Fishing	Fresh-water Fishing
Commercial Fishing	Subsistence Fishing

The multifarious activities in industrial development and economic development of man also accounts for the development of fisheries of the world. Big business units invest millions of rupees in the fishery industries of different fishing areas.

The ports like Grimsbi, Hal, London, Yearmouth, Aberdin, Sant james, Halifax, Boston, Vancuver, Los Angeles, San-diago and Burgen have been recognised as organised centres of fishing industry. A good communication through railway and water way have been made to transport the catch to the markets of cities and towns from the said ports. A number of warehouses with cold storage facilities are constructed there and industries using the by-products of fish are being established. Banking facilities, modern appliances, transportation, refrigeration, organisation of industry, the consuming population and the supply of feed stuffs and the price of meat, a close substitute, are the factors which play vital roles in determining the growth of commercial fisheries. As commercial fishing involves large capital outlay, it has become the business of joint stock companies operating large number of vessels and employing a large number of crews in the ventures.

About 2% of the human food in the world are made from sea fish[1]. With the increase in global population the crisis of food seems to have been acute and provided this background, fish could supplement a major portion of food for the Global population.

The significance of fish in the world's food balance and in that of individual countries may be evaluated by computing the acreage required to produce equivalent amounts of animal protein employing agriculture technology in its present state. To produce land - animal protein equivalent to the fish protein harvested in Europe would require 6,00,00000 hectares (15,00,00000 acres) equivalent to 40% of the land area under cultivation. The

Soviet Union would require 10% of its cultivated land and China would require 23% and most dramatic of all Japan would require 38%[2].

Out of around 735 lakh metric tons of fish-catch from all water resources of the world, Asia contributes 44%, Europe (including the Soviet Union) contributes 32%, North America 7% and the rest of the world 17%[3].

Per capita consumption of fish in different countries (1989) are given below:

Countries	Consumption per capita (Kilogram)
Japan	More than 45
Portugal	More than 45
Denmark	27-41
Norway	27-41
Sweden	27-41
Taiwan	36
Malayasia	29
U.K.	13.5
USA	9
Australia	9
Argentina	5
India	3.5

Source: Human and economic Geography, Leong, G.C. and Morgan G.C., p. 314, 1989.

The reasons for increase in per capita consumption of fish are the high price and inadequate supply of meat. For this, people of the under developed and developing countries consume fish more than the meat. Moreover the Asians like fish as a main item of their food stuff. The people of the countries like Portugal, Spain and Sweden of the continent of Europe also like fish much and their per capita consumption of fish is also high.

There are four important fishing areas in the world which are all located in the temperate region. More than 3 million men are engaged in fishing in these areas[4]. The four mentioned fishing areas are -

a) the North-East Pacific coast
b) the North-West Atlantic coast
c) the North-East Atlantic coast
d) the North-East Pacific coast.

a) <u>North-West Pacific coast (The coast of Japan)</u>

Japan occupies a strategic position for fishing. The mixing of two currents, kuroshio warm waters with cold waters of the oyashio favours the vigorous growth of fish in the inter-island straits and seas and in the nearly shallow waters.

Japan is fortunate in having large marine resources. The fisheries of Japan have an annual production of 8-10 billion pounds and marine products account for about 20-25 percent of the world's total. The coasts of Japan, the pacific waters east of Japan and the yellow and China seas and the coasts of Korea and Karafuto and the margins of the Okhtosk sea- are the areas of concentration of fishing. Japan has a total coast line of 17,000 miles. The areas of Japan's coastal fishing grounds is 9 lakh sq. miles. Besides Japan, the Soviet Union, Korea and China are important producers in the waters bordering their coast.

b) North-West Atlantic (The coasts of New foundland and New England)

The banks off the coasts of the New England and New Foundland constitute one of the most important fishing grounds of the world. They extend from Nantucket to the eastern coast of New Foundland, a distance of 1100 miles with an width of 50 to 250 miles. The continental shelf is very broad and has many fishery banks like, grand Bank, Georges Bank, Sable Island Bank. Fishing vessels of different countries like France, Great Britain, Portugal, Italy undertake fishing in this area. The maximum catches are made in the coasts of Nova Scotia and New Foundland. Two third of the total expert of New Foundland are fish and fisher products and most of the people depend mainly on fisheries. The people of Canada and USA mostly undertake fishing in this area. St. John, Halifax, Portland, Gloucchester, Nova Scotia, Providence, Boston and New York are the ports through which fishing is largely done.

c) North-East Atlantic (The coasts of North-West Europe)

The sea in this area are an important fishing ground of the world. Britain, France, Holland and Norway are the four leading nations participating in, large-scale fishing. Belgium, Denmark and Spain also take part in fishing in this area. The North sea contains submerged land and is shallow with many fishery banks viz. Doggers Bank and Great Fisher Bank. UK, France, Belgium, Netherlands, Denmark, Germany, Norway and Sweden with their vast markets are situated around this fishing ground. 1,15,000 people of Norway are engaged in fishing. Iceland topped in 'catch of fish per capita' (Yearly 3,200 kg.). 93% of the total export of Iceland are fish products. Grimsby, Hull, Bergen, Aberdeen, Billings gate and yarmouth are important fishing centres. Pisciculture is practised in the Thames Estuary, inland sea creeks of Denmark of Morbihan in Britanny.

The economy of Norway and Iceland depends mainly on fishing and its trade.

d) North-East Pacific (The Western coasts of North America)

The area that extends from Alaska to California is another important fishing ground in the world. The value of the catch in USA exceeds 65 million US dollars annually. The catch of Canada was also of the same value. Conservation methods have recently been undertaken by international agreement. California has developed fish canning. Fish canning is important in the USA, Japan, Canada, UK, Netherland and Federal Republic of Germany as shown in Table 1.1.

Table 1.I

Canned Fish in 1988 (in '000' metric tons)

Countries	Quantity
USA	498
Japan	296
Canada	78.4
UK	36
Netherlands	33
F.R. Germany	27

Source : U No. Statistical year Book

Per capita catch of fish in Japan is the highest (without considering Iceland here) followed by Canada, Denmark, UK and the USA as shown in Table 1.II.

Table 1.II
Per capita catch 1980 (in Kilograms)

Countries	Quantity
Japan	58
Canada	55
Denmark	32
UK	25
USA	20
Russia	10
India	3

Source: U No. Statistical year Book.

The fisheries of Japan are in a leading position over those of all other nations - (1) in the actual number of people making a livelihood (10% of total population) out of it,

(2) in the relative number of persons engaged in and dependent on the industry,

(3) in the quantity of fish catch annually from the water,

(4) in the relative importance of fishery products in the domestic economy,

(5) in the ingenuity and skill shown by the people in devising and using fishing appliances, and preparing catch for use,

(6) in the extent to which the fisheries of foreign countries have been studied and the best methods adopted to home conditions,

(7) in the extent to which aquaculture has been carried out,

(8) in the zeal, initiative and intelligence displayed by the Government is promoting the development of the fisheries and welfare of fishing population.

There has always been a tendency in Japan for artisans or traders to unite in small guilds or associations, like the cartels in Russia, and doubtless this was the case also with regard to fishermen especially as the fishing community were frequently at odds with the local farming community as to various foreshore and inshore rights of fishing and sea-weed collecting, and as some fishing operations require combined effort and expenditure.

There are many progressive capitalists and proprietors who are developing the industry as in Europe. These men are ousting the independent fishermen and bringing them under the control of organised intelligence and capital (5).

Norway, Japan and New foundland are the three countries in the world where fisheries account so largely in the national economy that their development is taken as one of the major causes of growth. In Japan the primitive methods of fishing universally employed till recent years, have been elaborated and expanded in a wonderful manner since the beginning of the 20th century by the fostering care of the department charged with their improvement. The central and local Governments have been lavish in their expenditure and, as seen to-day in the enormous expansion of the Japanese fisheries and associated industries.

Norway a much smaller country than Japan, with a sparse population and limited funds at her disposal, has been equally enterprising and for her resources, even more generous in expenditure upon development.

In Japan, a "hermit kingdom" till two generations ago, the world had to be searched for methods that were improvements on the cruder indigenous ones; Norway on the other side, had a fishing reputation for individual enterprise and for the excellence of the methods pursued. Her fishing fame dates back to the early

days of the Hanseatic league, whose Long-headed merchant princes, with true teutonic foresight and power of organisation, settled in Bergen and made that city the centre of the herring trade. Whatever their faults of arrogance and trade monopoly, these early germans undoubtedly organised the Norwegian fisheries on a commercial basis; they directed the adventurous viking spirit into commercial enterprises requiring equal courage and daring but without futility of the old bloody feuds and forays. The lesson was well learned and Norway is now pioneering the fishing industries to the verge of the Antarctic circle, supported even thereby the resources of the home Government through the medium of the Fisheries Department[6].

The sea fisheries of Denmark compared with those of Norway are relatively small, and homogeneous to a far greater extent. The coast line is long, but on the most productive sections, those to the West and North, the dangerous character of coast limits the number of fishing harbours suitable to the needs of larger craft of to-day to a very few, and this renders the control of operations by the administration a far simpler task than it is in Norway, where the number of fishing harbour is particularly numerous owing to shelter given by the line of islands that front the coast for hundreds of miles. There are indeed only 23 ports of register in Denmark and many of these have but few boats sailing under their distinctive lettering. Her trade, unlike that of Norway, is largely in fresh fish sent in ice inland to central Europe. This ensures usually good prices and a particularly profitable trade[7].

About 96% of the total production of fish in the world is raised from the marine water. The maximum inland fish catch are reported from Asia followed by Africa and the minimum from Oceania. From the view point of inland fish production, India ranked second in the world, preceded by only China and followed by USSR. Against a world percentage of about 14%, India's inland fish production constitute as high as 46% of the total fish

Catch[8]. This demonstrates the importance of inland fish culture in India's economy.

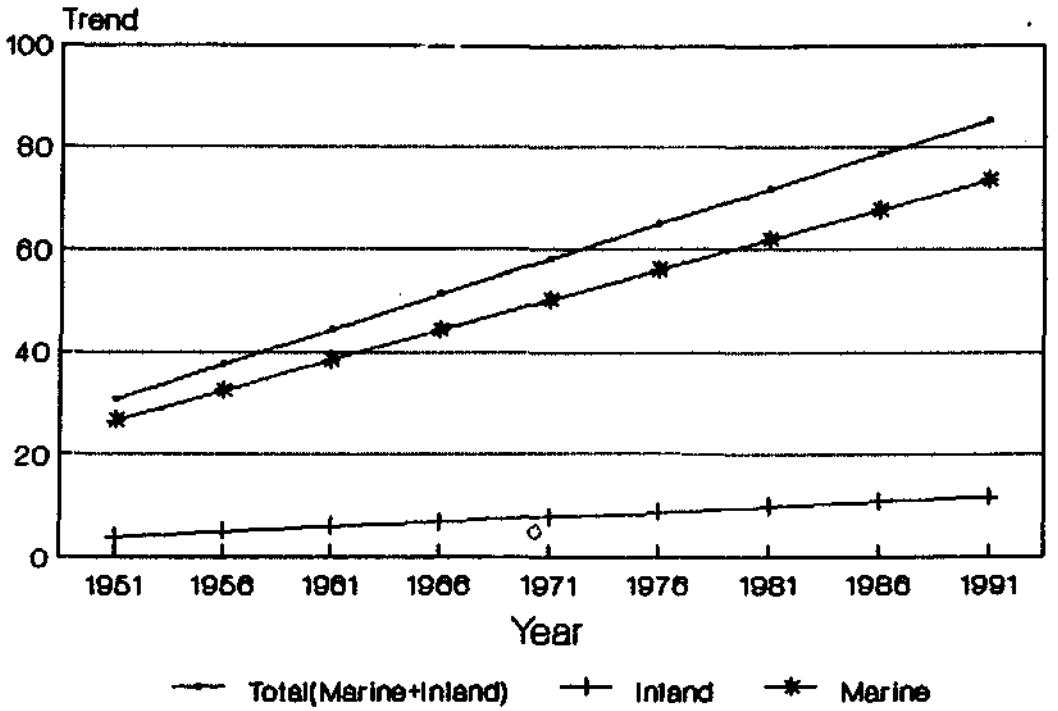
Inland fishing areas of the world are

1. Africa 2. America, North and Central
3. America, South 4. Asia, 5. Europe
6. Oceania 7. USSR 8. Antarctica.

From the Graph 1.1 the trends of world fish production are shown by the least square method of time series for the period 1951 to 1991 (One individual year taken out of every five years covering the period). It is observed that average growth rate (5 yearly) in marine fisheries (5849.13 thousand ton of fish) is higher than in the inland fisheries (964.38 thousand ton). These two sources incombination contributed an average growth rate of 6813.51 thousand ton towards the total fish production of the world. The reasons of 'higher growth rate' in the marine fisheries are - improved mechanisation, maximum fisherman population engaged in marine fisheries and vast water area considered for the marine fisheries[9].

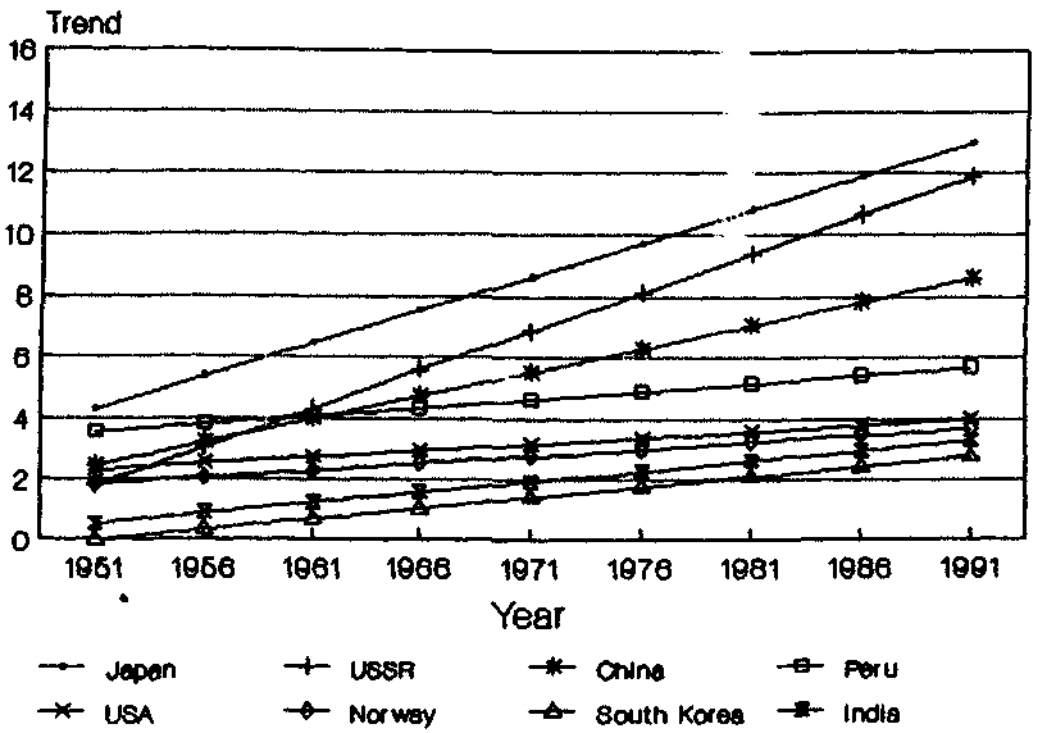
TREND OF FISH PRODUCTION - WORLD

Trend values in '000000' M Tons. Graph-1.1



TREND OF FISH PRODUCTION-Marine+Inland

Trend values in '000000' M Tons. Graph-1.2



From the Graph 1.2 it is observed that the average growth rate (5 yearly) of the total fish production of USSR, worked out from linear trend (1268.81 thousand tons) is higher than the average growth rate of any of the remaining seven countries (where eight top fish producing countries of the world are considered); followed by Japan (1085.14 thousand tons) which together contributed an average growth rate of 6813.52 thousand tons of fish along with all the countries engaged in fisheries towards the total fish production of the world. The trend lines of the countries coincide each other which indicate the similar growth rate of those countries. The reasons for 'higher growth rate' in USSR and Japan are improved mechanisation combining with the Governmental initiatives, skill and ingenuity of the fishing population and successful co-operative activities in the fisheries (10).

According to FAO, by the turn of this century, the gap between world consumption of sea food and the total world production would be around 20 million tons[11].

The amount (Value in US dollar) of imports and experts of fish and fishery products in the world economy have been increased more than five times from 1976 to 1990[12].

As regards value of total export and import of fish in the world a few countries are dominating the fish trade as is seen in Table 1.III

Table 1. III

Value as P.C. of Total Export/Import of different countries (Fish and fishery products)

	Countries	1981	1985	1990
Export of fish	USA, EEC, Canada, Korea Republic, Iceland	87.4%	87.9%	78.9%
Import of Fish	EEC, Japan, USA	83.9%	84.7%	89.8%

Source: Year Book, International Trade Statistics 1985, 1990.

From Table 1.III it is observed that USA, EEC countries, Canada, Korea Republic and Iceland dominate the export of fish in the world and EEC countries, Japan, USA dominate the import of fish.

A number of industrial products are made from the scales and shells of fishes. Marine and fresh water shells which are harvested in Australlia and Far East are used in manufacture of

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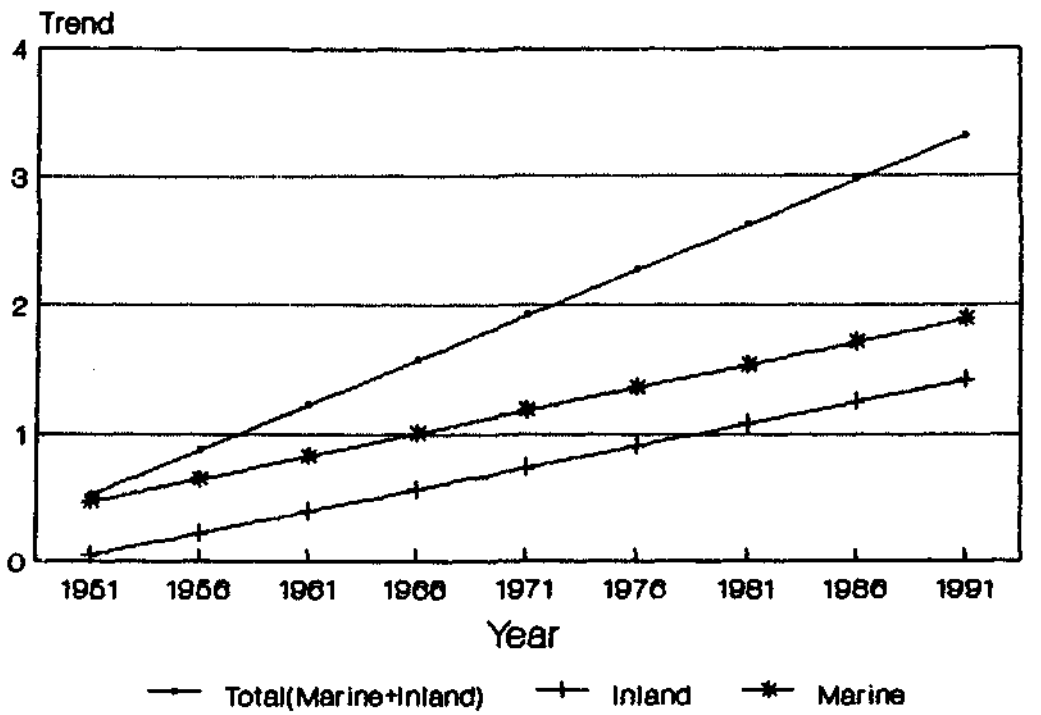
buttons, buckles and similar items; fresh water mussel shells are exported to Japan to be used as spherical core matrices for artificial cultivation of pearls. Some of the shells are used for production of toilet articles, knife handles, cufflinks, combs, hairpins and earrings etc. which have much economic importance all over the world. The fishing industry, when developed on a commercial scale gives rise to a large number of ancillary industries. Important among them are ship building, marine engines, nylon manufacturing, net making, freezing, canning, fish meal, fish oil, cold storage, ice-manufacturing and others. USSR invested more than half of her food industry investment since 1952 into the fishing industry[13]. Big fishery units make good marketing facilities, improved transportation and industrial centres which can contribute to the economic development of different countries to a considerable extent.

1.11 PREFERENCE IN INDIA IN INLAND FISHING :

TREND OF FISH PRODUCTION - INDIA

Trend values in '000000' M Tons. Graph-1.3



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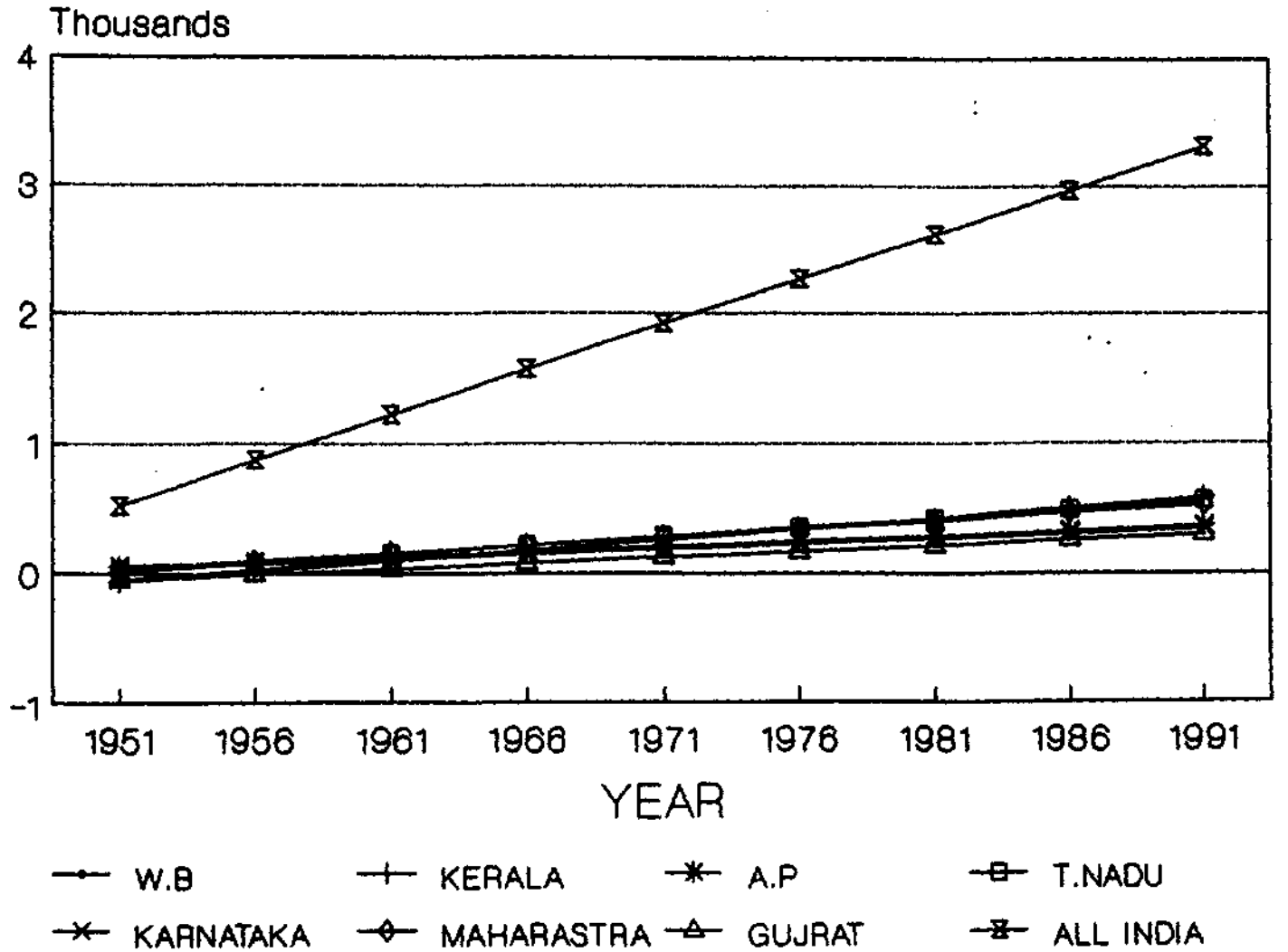
From the Graph 1.3 the linear trends of fish production in India for the period 1951 to 1991 are shown. It is observed that average growth rate (5 yearly) in marine fisheries (177.60 thousand ton) is slightly higher than that in the inland fisheries (171.08 thousand ton). These two sources combinedly contributed an average growth rate of 348.68 thousand ton towards the total fish production of India. The reasons for 'higher growth rate' in marine fisheries are heavy capital investment, maximum number of fishermen being engaged in marine fisheries, mechanisation in marine fisheries and vast water area considered for the marine fisheries[14].

TREND OF FISH PRODUCTION

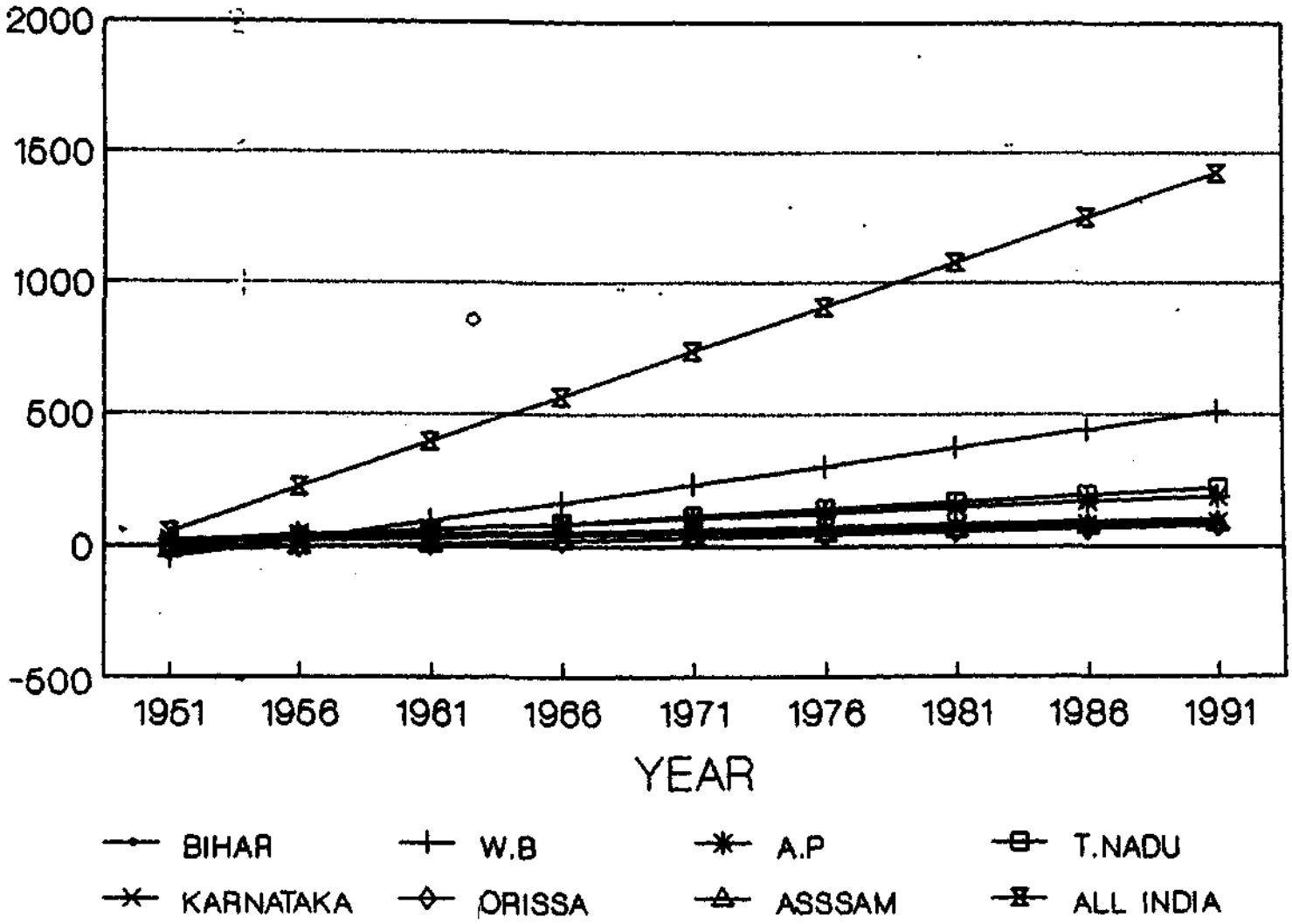
(Marine + Inland). Graph-1.4



From the Graph 1.4 made of the fish production trend (linear) of seven top fish producing states of India it is observed that the average growth rate (5 yearly) of total fish production of Kerala (80.80 thousand ton) is higher than the average growth rate of any of the remaining six countries; followed by West Bengal (79.90 thousand ton). The trend lines of the states coincide each other which indicates the similar growth rate of those states. These states along with others engaged in fisheries jointly contributed an average growth rate of 348.70 thousand ton of fish towards the total fish production of India. The reasons for 'higher growth rate' in Kerala and West Bengal are - maximum utilisation of resources of fisheries i.e. by mechanisation in fisheries, ingenuity of the fishing population and Governmental initiatives in the progress of fisheries[15].

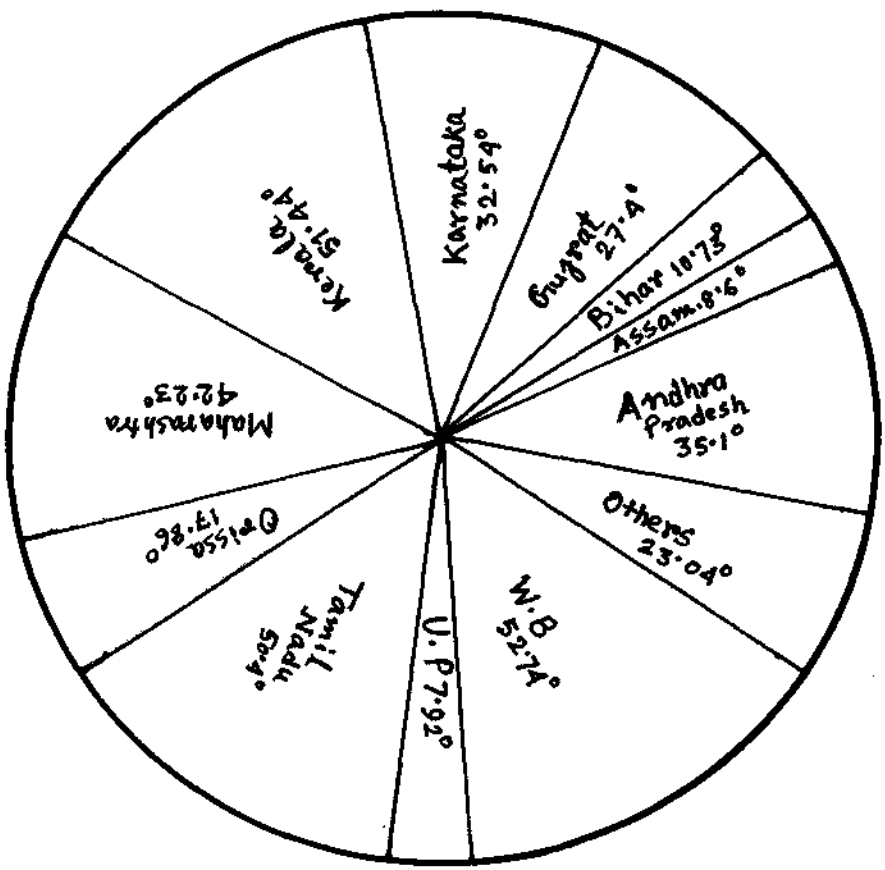
TREND OF FISH PRODUCTION

(Inland). Graph-1.5



From the Graph 1.5, the linear trends of Inland fish production of India comprising of seven important inland fish producing states, are shown for the period 1951 to 1991. It is observed that the average rate of growth (5 yearly) of inland fish production of West Bengal (69.05 thousand ton) is higher than in any of the remaining six countries, followed by Tamil Nadu (26.70 thousand ton) and Andhra Pradesh (20.90 thousand ton) and contributed an average growth rate of 171.10 thousand ton of fish towards the total inland fish production of India. The reasons for higher growth rate in West Bengal are - Governmental initiatives to improve inland fisheries through different schemes, proper training to the fish farmers, maximum utilisation of financial resources and water area resources for inland fisheries [16].

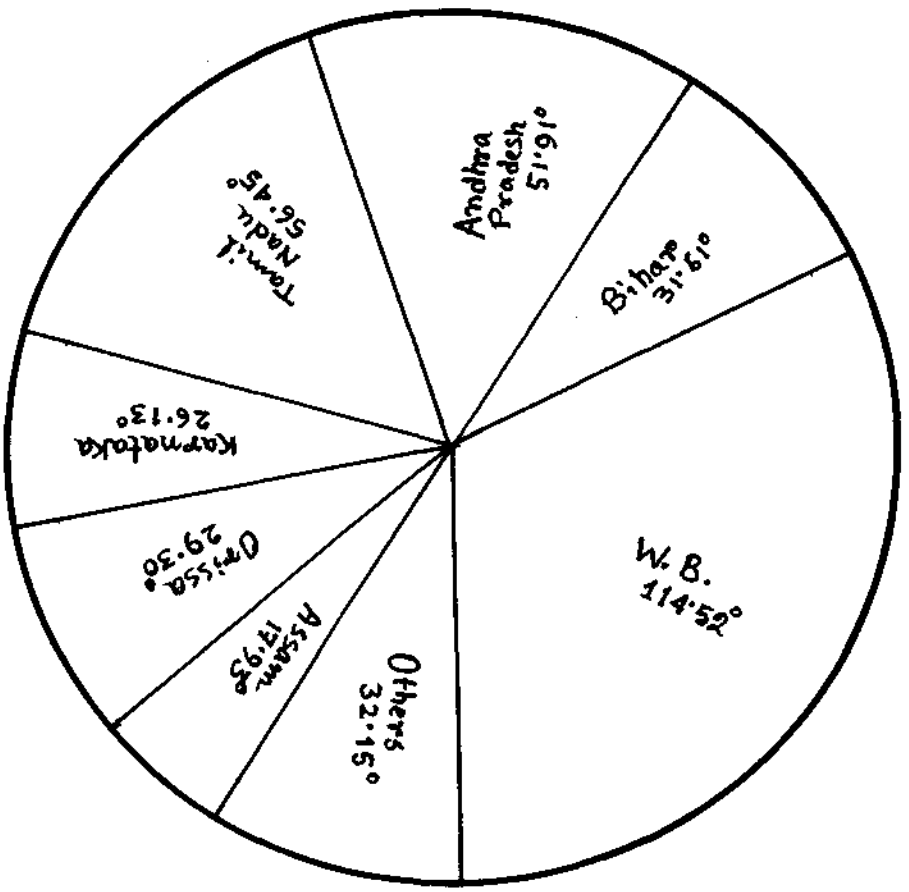
Average production of Fish for the period 1980-1990 depicted through Pie-diagram



F I G U R E - 1.1

From the Figure - 1.1 it is evident that the state of W.B. produced the major portion of fish in India followed by Kerala and Tamil Nadu for the period 1980-1990 on an average.

Average Inland Fish production for the period 1951-1991 (one individual year taken out of every five years covering the period) depicted through Pie-diagram:



F I G U R E - 1.2

It is also observed from the Figure 1.2, that W.B. produced the major portion of fish from inland water areas followed by Tamil Nadu and Andhra Pradesh for the period 1951 to 1991 on an average.

The fresh water inland fisheries of India involves three types of activities : (a) capture fisheries undertaken mainly in rivers (b) stocking-cum capture fisheries practised in reservoirs and (c) culture fisheries practised in ponds and tanks.

India has a 29,000 k.m. stretch of rivers and canals, 1.45 million hectare reservoirs and 0.75 million hectare tanks and ponds. There has been a steady growth in fish production from inland fisheries [17].

The potential fresh water ponds tanks and reservoirs with favourable climate and environmental conditions can be used for pisciculture in India. In addition the available riverine water have been traditionally providing subsistence to a large number of fishermen, and large proportion of seed for pisciculture.

The actual area of brackish water available in India is about 0.90 million hectare. In addition lands adjacent to it could be utilized for aquaculture and the total available area is more. One estimate puts this at about 1.406 million hectare. Out of readily available 0.90 million hectare, only an area of about 50,000 hectare is presently used for culture, mostly by traditional methods.

The present annual production from fresh water ponds, on an average, is only 1560 kg per hectare as against the technologies available at the research institutions for a production of 10 tons per hectare per annum. The total production of these water bodies is estimated to be in order of 17,000 tons as against the theoretically expected production of 4.5 million tons, even when a conservative estimate of annula productivity of 5 tons per hectare is taken into account. As India has been concentrating its efforts on the export front, no major attempts have been made for the development of the domestic market. The projection indicates that by the turn of the century domestic

demand would be 12.5 million tons and not more than 50% would be met through marine resources[18]. Fresh water fishes are used for meeting domestic consumption. Peoples of eastern region and northern region of India are having a habit of taking fish of the fresh water for consumption, mainly for want of sufficient marine water resources for 'fishing' in these regions.

Therefore, inland fisheries have to play a vital role. It is in this context that the Government of India has accorded high priority to the following three fresh water subsystems:

i) Brackish water shrimp culture development programme.
ii) Reservoir fisheries development programme.
iii) Expansion of carp hatchery and pon development programme.

The National Commission on Agriculture (NCA) projected the demand for fish for the year 2000 as 5.53 million tons as a high estimate (Table 1.IV). In making these projections they used the available population projections and urbanisation (Table 1.V). The NCA has taken note of the differential demand between rural and urban population both in terms of higher growth and higher per capita consumption for the urban population.

Table - 1.IV

Demand Projection of Fish (in million Tons)

Sector	1980		1985		2000	
	High	Low	High	Low	High	Low
Rural	1.50	1.34	1.85	1.48	2.39	1.89
Urban	0.85	0.76	1.16	0.93	3.14	1.70
Total	2.35	2.10	3.01	2.41	5.53	3.59

Source: Report of the NCA, Part III (1)

Table - 1.V

Population Growth and Urbanisation

Year	Total population (Million)	Decimal growth (%)	Urban population (Million)	Percentage of urban population to Total
1961	442.21	-	79.61	18.00
1971	550.70	24.53	110.04	19.88
1980	659.54	19.76	146.96	22.28
1985	724.91	-	172.18	23.75
2000	935.35	19.11	272.86	29.17

Source: Report of the NCA, Part VIII (1)

The NCA's supply forecast was based on very optimistic assumptions (given in Table 1.VI). Therefore this demand supply gap was not projected to be positive. In practice, however, while the fish production has not been stepped up sufficiently during the last three decades it has failed to make any major impact either in the form of net availability, or per capita availability, or price stability.

Table - 1.VI

Supply forecast for Fish and Fishery products (in million tons)

Source	1971	1985	2000
Fish catch: Inland	0.70	2.27	4.50
Marine	1.10	2.01	3.50
	1.80	4.28	8.00
Estimated export	0.04	0.10	0.25
Fish meal and other industrial products	0.15	0.40	1.00
Balance available for human consumption	1.61	3.78	6.75

Source: Report of the NCA, Part III (1)

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 other commodities as is shown in Table 1.VII.

Table - 1.VII

Wholesale Price Indices

1970-71 = 100

Year	Price Indicies			
	All commodities	Food articles	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	98.1	97.7
1975	175.8	170.2	202.5	157.9
1976	172.4	152.2	191.7	172.7
1977	185.4	170.8	215.9	192.3
1978	184.9	173.4	225.9	228.9
1979	206.5	181.3	255.8	253.4
1980	248.1	200.7	306.4	267.0
1981	278.4	230.3	330.4	346.6
1982	285.3	244.7	358.0	429.8
1983	308.1	275.9	376.5	451.6
1984	334.0	294.6	409.5	433.9
1985	353.3	312.4	489.9	484.6

Source: Compiled from various issues of Wholesale price indicies in India, Govt. of India.

It was observed from the 'Indian Institute of Management - Ahmedabad' study 1986-87, that although inland fish production is only one third of total fish production in India it contributed about 57 percent of the total domestic fresh fish supply.

IIMA studies took into account the growth rates of the population till the year 2000, projected income increases, rate of increase in fish eating habit (put at 5.6 percent per annum compound rate) and price and income elasticities, arrived at a total domestic demand of 12.5 million tons. More recently a Government of India Study Group has toned down the projected demand for the year 2000 to only 6.2 million tons[19].

It has been recognised that inland fish production will have to increase by about seven times during the next two decades to meet this demand[20].

Fresh water inland fish culture (pisciculture) cover all activities from raising to marketing of fishes through human effort. In particular, it includes fish seed stocking, rearing, harvesting and marketing of fish raised in fresh water ponds and tanks.

The importance of fresh water fish culture in India is being increasingly emphasised due to the following reasons:

a) A growing domestic demand for fish.

b) Augmenting marine production is difficult without considerable resources and effort. Therefore, the demand-supply gap will have to be bridged only by inland fishery system to a great extent.

c) Natural sources of fish supply are depleting due to overfishing, creation of barriers across river systems, pollution, steeply increasing cost of fuel with resultant high cost of fishing and labour.

Fresh water fish culture could be the only answer to bridge the demand-supply gap. Also in fish farming, fresh water ponds have a high potential in India[21]. Further fresh water fish culture has the following added advantages.

(a) Species mix in capture fisheries can hardly be influenced whereas culture fisheries determine the species mix to suit consumer's taste.

(b) The supply of fish from capture resources is difficult to schedule, requiring costly storage facilities thus leading to serious price fluctuations. Supply of fish from culture is under human control.

(c) Fresh water fish culture provides adequate employment potential.

(d) It is possible to transform barren lands not useful for agriculture into fresh water ponds.

Growth of modern fisheries requires a high degree of capital intensity, significant upgradation, technology and large scale development of infrastructure. Less developed countries like India would therefore, have to depend on external assistance on a significant scale in order to embark upon an ambitious programme of fisheries development.

External assistance for fisheries development is available to the country either in the form of direct aid or soft loan from international institutions like the World Bank, UNDP, FAO etc or it can also be obtained through bilateral arrangements with specific countries. Contributions from international funding agencies have been predominant till the mid eighties. However, in recent years bilateral assistance has also started making a significant contribution to the inflow of external assistance for fisheries development in India.

Out of a total amount of Rs. 1276 million of external assistance received till December 1988, more than 65% (Rs. 832 million) has been provided by the World Bank[22].

External Finance

Direct aid or soft loan for infrastructure development through Govt. Projects or centrally sponsored projects.	Credit to Financial Institutions
	NABARD
	SCICI
	IDBI
	NCDC

The external finance plays a crucial role in directly financing government projects and also augmenting the financial resources of the existing financial institutions which provide long term as well as short term finance for fisheries project at the enterprise level.

In the inland fisheries sector, International Development Authority (IDA) has sanctioned a major project namely 'World Bank Assisted Inland Fisheries Project' (WBAIFP) which commenced in May 1980. The 'WBAIFP' introduced in 1980 in the State of West Bengal, Bihar, Orissa, Uttar Pradesh and M.P. to utilise the resources for pisciculture in an intensive and scientific way having considered the advantage regarding the licensing policy of ponds and tanks followed by these states and also considered the priority given to the 'State Fisheries Development Corporation' and Co-operative Sectors by WB, MP, UP, Bihar and Orissa with a view to ensure good revenue from the inland fisheries[23]. The externally aided project financed through National Bank for Agriculture and Rural Development (NABARD). The details are given in Tables 1.VIII, 1.IX and 1.X.

Table - 1.VIII

Details of Inland Fisheries Project funded by NABARD

1. Name of the Project	:	Inland Fisheries Project
2. Date of Commencement	:	5.5.1980
3. Date of closure	:	30.9.1988
4. i) Project cost	:	US $ 40 Million
ii) IDA credit	:	US $ 20 Million
iii) IDA credit routed through NABARD	:	US $ 9.3 million (revised to US $ 12 million by Govt. of India during 1988)

Table 1.IX

Programme Sanctioned by NABARD

Name of the State	Items of Investment (Rs. in million)					
	Fish pond Development			Hatchery Development		
	Units	Financial Assistance	Refinance Assistance	Units	Financial Assistance	Refinance Assistance
	(Nos.)	Rs.	Rs.	Nos.	Rs.	Rs.
Uttar Pradesh	109	152.1	129.6	5	14.5	11.6
Madhya Pradesh	48	69.5	55.0	3	13.8	11.1
Bihar	155	390.6	357.9	4	10.6	9.5
Orissa	NA	89.1	80.2	5	31.3	28.2
West Bengal	169	167.7	152.5	11	20.8	18.7
Total		869.0	775.2		91.0	79.1

Source: World Bank Annual Report, Washington DC, 1980, 88.

Table - 1.X

Achievement of Programme Sanctioned by NABARD

Name of the State	Items of Investment (Rs. in million)					
	Fish pond development		Hatchery development		Total	
	Financial Assistance	Refinance Assistance	Financial Assistance	Refinance Assistance	Financial Assistance	Refinance Assistance
Uttar Pradesh	29.6	25.1	11.3	9.1	40.9	34.2
Madhya Pradesh	16.6	13.3	7.8	6.3	24.5	19.6
Bihar	17.8	16.0	5.1	4.6	22.9	20.6
Orissa	76.8	69.2	28.7	25.9	105.5	95.1
West Bengal	101.5	91.4	7.8	7.1	109.3	98.5
Total	242.3	215.0	60.7	53.0	303.0	268.0

Utilisation of IDA Credit by NABARD : US $ 11.7 million

Source: World Bank Annual Report, Washington DC, 1980, 88.

1.III ROLE OF FISHING IN INDIA SPECIALLY RURAL AREAS AS AN AGENT FOR DEVELOPMENT:

An important advantage of employment opportunities is derived from the fishery activities of the country, the rural section of the population which is benefited most[24]. About 80 percent of the Indian Fishermen and related workers are engaged in the rural sector[25]. Heavy pressure of the population on arable land, coupled with conditions of the backward technology and organisation has resulted in severe under employment and low output per engaged person. Fishery activities may provide some additional employment.

Public revenue from fisheries would be welcome in the context of present financial position of a large number of Indian states. The revenue from fish culture has reached a level of about 20 percent in the case of Gram Panchayat of some states like Orissa, UP[26].

Having a coastline of over 2 million Sq. Km. of Exclusive Economic Zone (EEZ), of which 4.15 lakh sq. km. are continental shelf rich in demersal and mid water fish resources[27], India has a great scope to raise its fish production commercially. The fishing industry when developed on a commercial scale, gives rise to a large number of ancillary industries. Extraction of oil and fat from fish, making leather goods from the skins of large fish, making manures, fish canning etc. are important. Tamil Nadu has more than 650 factories along the sea coast for producing manure and fish oil, fish liver oil such as 'shark liver oil'. West Bengal has such a factory at 'Junput' on the Contai coast of Midnapur. Maharashtra and Kerala have also set up a few shark liver oil factories[28]. Fish canning, though not very important in India, is practised on a limited scale in the states like Kerala, Karnataka, Goa, Maharashtra and Tamil Nadu. There are 25 canning plants in these states having a total

capacity of 84.5 tons per day. There are also 128 ice plants and 217 freezing plants with capacity of 1805.14 tons and 2118.6 tons per day respectively situated mainly in the State of Kerala, Maharashtra, Gujrat, Tamil Nadu, Karnataka, Andhra Pradesh, West Bengal, Goa and Orissa[29].

The fishery sector is important for Indian economy as it contributes a source of employment for 95 lakh fishermen (including the occasional fishermen), an average per capita supply of 3.5 kg of animal protein food and 3.67% to the nation's total export earnings[30]. Exports of fish products accounted for about 23% of the total exports of principal agricultural commodities[31].

Table 1.XI disclosed that fishery sector involves 56.847 lakh fishermen (excluding the occasional fishermen). Of this 16.39% are actively engaged in fishing (9.31% on a full time basis); another 10.10% are engaged in activities related to fishing like marketing, net mending, fish curing and processing. Out of the 5.29 lakh full time active fishermen, about four lakh fishermen are in the marine sector and about 1.29 lakh are on full time basis in the inland sector. The position is reverse in the case of part time fishermen (i.e. about 3 lakh in inland sector and 1 lakh in marine sector). These data do not include occasional fishermen but their number should be higher than the active fishermen and many do not belong to the traditional fishermen communities.

Table - 1.XI

Fishermen population in India (1981)

(Figures in Lakh)

Particulars	1972	1977	1982
Total Number of Fisherman	50.458	40.849	56.847
Male (Adults	14.581	8.520	17.697
Female (adults)	14.035	7.136	15.661
Children	21.842	25.193	23.489
Engaged in Actual fishing	7.682 (15.22)	8.612 (21.08)	9.317 (16.39)
Full time	3.826	4.511	5.290
Part time	3.856	4.101	4.027
Engaged in related operation	4.936 (9.78)	6.561 (16.06)	5.776 (10.16)
Fish marketing	2.603	3.585	3.246
Net repairing	1.650	2.083	1.863
Fish curing/processing-	0.683	0.893	0.667
Others	0.140	0.210	1.387
	(0.28)	(0.51)	(2.44)

Note: The data presented above do not include numbers from Manipur, Nagaland, Meghalaya, W.B., Sikkim, Arunachal Pradesh and Mizoram (these data are incomplete and still under publication). Figures in parentheses are percentage of total number of fishermen.

Source: Hand Book of Fisheries Statistics, 1986.

Contribution to GDP and exports

Fishery sector of India contributed about 2.40 percent to the GDP originating from agricultural, forestry, logging, fishing, mining and quarrying Group (shown in Table 1.XII). Exports of fish and fish products were about 4,600 million in 1986-87 and these accounted for about 3.67 percent of total exports from the country (shown in Table 1.XII). In 1989-90 with an export of 110843 tons of fish and fishery products valued at Rs. 634.99 crores the growth is expected to be 11.09 percent in volume and 6.21 percent in value as against 1988-89 (shown in Table 1.XIII). Thus fishery sector is important both from the point of view of the population involved and its contribution to exports.

Table - 1.XII

Contribution of Fishing Industry in Indian Economy

(Rs. in crore)

Year	Agricultural, forestry and logging, fishing, minning and quarrying	Fishing	Fishing (%)	Total Export	Exports of fish products	Share of fish products (Percent)
1970-71	17,307	229	1.32	1535	35.07	2.28
1975-76	27,732	526	1.90	4042	127.00	3.14
1980-81	42,668	845	1.98	6711	234.84	3.47
1981-82	47,375	931	1.97	7806	286.01	3.66
1982-83	50,568	1019	2.02	8803	361.36	4.10
1983-84	63,194	1191	1.88	9771	373.02	3.82
1984-85	65,174	1460	2.24	11744	384.29	3.27
1985-86	69,513	1666	2.40	11012	398.00	3.61
1986-87				12567	460.67	3.67

Source: Report on currency on Finance (1986-87)
Reserve Bank of India, 1986-87.

There has been a phenomenal growth in the export of marine products during the last two decades. About 110843 tons of marine products were exported in 1989-90. These amounted to Rs. 6349.9 million with the unit value realisation of Rs. 57.29 (shown in Table 1.XIII and Figure - 1.3). Shrimp has been a dominant item in the sea food export. During the last eight years, shrimp has, on an average, constituted 64 percent of the total marine products export in terms of volume and 84 percent in terms of value[32].

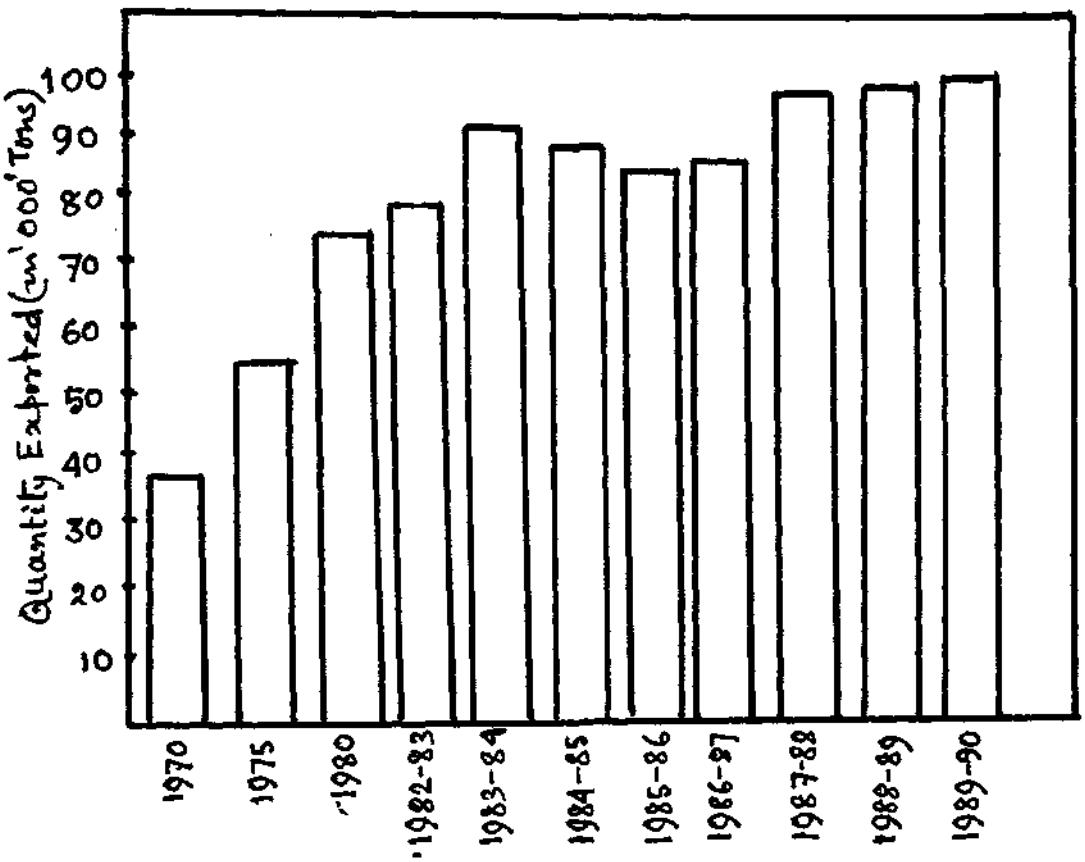
Table - 1.XIII

Export of Indian Marine Products

Year	Quantity in Tons	Value in Rs. million	Average Unit Value Rs./Kg
1970	37,175	355.4	9.66
1975	53,412	1041.1	19.14
1980	74,542	2188.8	29.36
1982-83	78,175	3613.6	46.22
1983-84	92,691	3730.2	40.24
1984-85	86,187	3842.9	44.58
1985-86	83,651	3980.0	47.58
1986-87	85,843	4606.7	53.66
1987-88	97,179	5312.4	54.72
1988-89	99,777	5978.50	59.92
1989-90	1,10,843	6349.9	57.29

Source: MPEDA, Cochin

F I G U R E - 1.3
(B A R D I A G R A M)



Japan imports all item of sea foods from India, the USA only shrimps continuously, and fish recently. Frozen cuttle fish and squids are exported mostly to Europe and to some extent to Japan. Europe takes small quantities of shrimp. Japan is the major importer of Indian Marine products (Sea food), it imports about 34.86% quantity and 58.92% value of the total exports of marine products of India followed by USA importing 13.84% quantity and 12.32% value in 1988 as is shown in Table 1.XIV.

Table - 1.XIV

Major importers of Indian marine products and their share in exports

Country		1985	1986	1987	1988
Japan	Quantity %	47.16	44.85	43.28	34.86
	Value %	68.04	67.62	66.55	58.92
USA	Quantity %	13.37	12.96	14.67	13.84
	Value %	13.20	12.48	13.27	12.32
France	Quantity %	3.35	4.87	5.06	4.75
	Value %	1.57	2.58	2.85	2.41
Netherlands	Quantity %	0.72	0.99	0.49	0.88
	Value %	0.98	1.57	0.87	1.06

Source: DATA BANK compiled by THE ECONOMIC TIME, Calcutta, 21.2.92, p. 63.

Agriculture has, of late, received considerable attention in this country and much is being done to improve the productiveness of land but very title emphasis has been laid on the development of the derelict and semi-derelict water courses which once used to give a prolific supply.

Government of India through 5 year plans initiated measures for the development of fisheries. With the passage of time fisheries development programmes gained much importance. Though between 1st and 6th plan outlay for fisheries increased by 72.35 times but in reality the percentage of fisheries outlay to total outlay increased only by 0.12%. Though the percentage in relation to total plan outlay for agriculture and allied activities increased by 3.23 times (i.e., from 1.74 to 5.62) as is shown in Table 1.XV.

Table 1.XV

Investment in various Five Year Plans

(Rs. in crores)

Five Year Plans	Total outlay	Total outlay for agriculture and allied sectors	Total outlay for fisheries	Percentage of fisheries outlay to	
				Total outlay	Total outlay for agriculture and allied activities
I	1960	294	5.13	0.26	1.74
II	4600	529	12.26	0.27	2.32
III	7500	1068	28.27	0.38	2.65
IV	15902	2728	82.68	0.58	3.03
V	39322	4302	151.24	0.38	3.52
VI	97500	6609	371.14	0.38	5.62

Source: Fisheries Division, Ministry of Agriculture and Co-operative, Govt. of India.

The three segments of rural economy fishery, agriculture and animal husbandry are closely interrelated to each other. Fishery and agriculture can complement each other. Pond embankments could be used for growing napier grass and berseem for the purpose of fishery. Vegetables grow well on bunds which are fertilised with pond silt rich in plant nutrients. Some by-products of agriculture such as wheat and riscbran and oil cakes could be profitably used in fishery. In rural India huge tanks and 'Jalkars' came under the supervision and control of the 'Panchayets' and fishery Co-operatives' for the purpose of producing fish and the rights of pisciculture are given to the Gram Panchayets and the Co-operatives to look after the proper maintenance, repairing of tanks and also to investigate the progress of pisciculture as a whole.

65% of the total marine fish landed in India are contributed by rural based small scale fisheries[33]. Co-operatives helped the poor fishermen of the rural coastal areas in procuring engines and other necessary accessories. Fisheries have great potential for 'Panchayets'. It is not only a revenue yielding business but will supply the villagers with much needed protein.

Thus the fishery in India has many dimensions to serve as a developmental agent towards the country's economy such as -
(a) to increase food production and thereby raise the nutritional standard of the population. (b) to generate income, employment and growth of subsidiary industries;
(c) to ensure welfare of the fishermen community through different fishery programmes;
(d) to maximise foreign exchange earnings through export of marine products ; and
(e) to increase the commercial activities within the country.

In conclusion it is observed from the present analysis that out of 80% of the total production of fish from the marine waters of the world Japan, USA, China, Canada, Russia, Norway, Peru, South Korea and India dominate the position. More than 3 million men are engaged in fishing in the four important fishing areas of the world located in temperate region. The areas are (a) The North-West pacific coast (b) The North-West Atlantic Coast (c) The North-East Atlantic Coast (d) The North-East Pacific Coast.

USA, EEC countries, Canada, Korea Republic and Iceland dominate the export of fish in the world and EEC Countries, Japan, USA dominate the import of fish.

Against a world percentage of about 14%, Indias Inland Fish Production constitute 46% of its total fish catch. Average growth in marine fisheries in India is higher than that in the inland fisheries. Inland fishery suffers from the lack of improved mechanisation which is imperative for the modern capital intensive programme of fishery.

The states of West Bengal, Kerala, Andhra Pradesh, Tamil Nadu, Karnataka, Maharashtra and Gujrat produce the major portion of fish in India and West Bengal produces the highest portion of fish in the country having the highest average growth rate in the inland fisheries.

'International Development Authority' has sanctioned the World Bank Assisted Inland Fisheries Project' which commenced in May, 1980, and was introduced in the states of West Bengal, Bihar, Orissa, Uttar Pradesh and Madhya Pradesh to utilise the resources of pisciculture in an intensive and scientific way.

Fishery sector of India contributed about 2.40% to the GDP Originating from agricultural, forestry, logging, fishing, mining and quarrying group and this sector engaged about 56 lakh fishermen (1982). It serves as a developmental agent towards the country's economy by

(a) increasing food production and thereby raising the nutritional standard of the population.

(b) generating income, employment and growth of subsidiary industries.

(c) ensuring welfare of the fisherman community.

(d) increasing foreign exchange earnings through the export of fish.

(e) increasing the commercial activities within the country.

REFERENCES

1. Bhattacharyya, S. 'Resources Studies', IPP Co. Pvt. Ltd. Cal-73, 1992, p. 343.
2. FAO Statistics 1975-77
3. UNO Statistical Year Book, 1989
4. Year Book fish Statistics, FAO 32, 1971.
5. Nicholson Sir F.A. Notes on Fisheries in Japan, Madras, Superintendent Govt. Press 1907, p. 47.
6. Hornell, James The Fisheries of Norway and Denmark notes gleand during visit in 1920, Madras Govt. Pres, p. 12, 1921.
7. ibid ibid p 72
8. FAO quarterly Bulletin Statistics, 1991
9. Guha, J.L. and Chattoraj, P.R. 'A new approach to Economic Geography - a study of resources' The World Press Pvt. Ltd., 1989, p. 266
10. Nicholson Sir F.A. Notes on Fisheries in Japan, Madras Superintendent Govt. Press, 1907, p. 5.
11. Srivastava, U.K.; Dholakia; Bakul H; Vathsala, S; Chidambaram, K. 'Fishery Sector of India', Oxford & IBH Publishing Co. Pvt. Ltd., 1991, p. 176
12. Year book of International Trade Statistics 1980, 1985, 1990, p. 21, 43, 11.
13. Fishing News International, Vol. 5, No. 10, p. 10
14. Srivastava, U.K.; Bakul H; Vathsala, S.; Chidambaram, K. 'Fishery sector of India', Oxford & IBH Publishing Co. Pvt. Ltd., 1991, p. 19, 27-42

15. Department of Fisheries, Govt. of West Bengal, May, 1988 'Fisheries Development in West Bengal at a glance, p. 20.

ibid August 1984 'Growth of Marine Fisheries in West Bengal, pp. 1-15

16. Department of Fisheries, Govt. of West Bengal, May, 1988 'Fisheries Development in West Bengal at a glance', pp. 20,21.

ibid January 1992 - 'Meen Barta' p. 6

17. Srivastava, U.K.; Dholakia, Bakul H; Vathsala, S.; Chidambaram, K. 'Fishery sector of India', Oxford & IBH Publishing Co. Pvt. Ltd., 1991, p. 82

18. ibid ibid p. 3

19. ibid ibid p. 264

20. ibid ibid p. 264

21. ibid ibid p. 106

22. ibid ibid p. 235

23. ibid ibid pp. 115-117

24. Fishing News International, July 1968, pp. 21,22

25. Census of India, 1961, Vol. 1, Part II-B

26. Misra, S.R. 'Fisheries in India' Ashis Publishing House 8/81, Punyabi Bagh, New Delhi-110026 p. 2

27. Srivastava, U.K.; Dholakia, Bakul H; Vathsala, S.; Chidambaram, K. 'Fishery Sector of India', Oxford & IBH Publishing Co. Pvt. Ltd., 1991, p. 1.

28. Guha, J.L. and Chattoraj 'A new approach to Economic Geography - a study of resources', The World Press Pvt. Ltd., 1989, p. 272

29. Report MPEDA, Cochin 30.11.1988

30. Srivastava, U.K.; Dholakia, Bakul H.; Vathsala, S.; Chidambaram, K. 'Fishery sector of India', Oxford & IBH Publishing Co. Pvt. Ltd., p. 1

31. Central Statistical Organisation, 1988-89

32. Report, MPEDA, Cochin, 1980 to 1990

33. Central Marine Fisheries Research Institute, Madras - 'Seminar on the Role of small-scale Fisheries and coastal Aquaculture in Integrated Rural Development', 6-9, December 1978, p. 1.