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DEVELOPMENT OF FISHERIES—ECONOMIC ASPECTS

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SUMMARY

This paper presents a review of fishery development in India in the planning era. It focuses attention on financial outlay, economic condition, availability of fish resources, contribution to national income, disposition of fish catch, fish catch and landings by groups of species, etc. The review reveals that the success of the programmes implemented hitherto was very inspiring. In the light of the success of the measures undertaken so far, the achievement of the targets in the Fourth Plan is by all means within the realm of the possibility of the country. The proposed outlay in the Fourth Plan (Rs. 113 crores) is more than forty times of that in the First Plan, twelve and a half times of that in the Second Plan, and slightly less than five times of that in the Third Plan. The contribution of fisheries to national income has been steadily increasing from Rs. 40 crores in 1950-51 to Rs. 120 crores in 1964-65. The fish catch increased at the rate of 43 thousand tonnes per year from 751 thousand tonnes in 1951 to 1,316 thousand tonnes in 1964. Of the total fish catch, marketing fish formed 70 per cent in 1964 against 43 per cent in 1951. The production recorded a three-fold expansion from 321 thousand tonnes in 1951 to 924 thousand tonnes in 1964. The proportion of cured fish (sun-dried and salted) to the total fish catch was 23 per cent in 1964 against 51 per cent in 1951. The production of fresh water fishes increased at the rate of 18 thousand tonnes per annum from 218 thousand tonnes in 1951 to 455 thousand tonnes in 1964. The production of Herrings, Sardines, Anchovies, etc., increased at the rate of 18 thousand tonnes per year from 144 thousand tonnes to 381 thousand tonnes. The proportion of the production of Crustaceans to the total catch had recorded a fall from 10 per cent in 1951 to 8 per cent in 1964. The share of Sharks, Rays, Skates, etc., to the total catch had shrunk from 4 per cent in 1951 to 3 per cent in 1964. The production of Flounders, Haliputs, Soles, etc., in 1964 was just the same as that in 1951. The share of Tunas, Bonitas, Mackerels, etc., to the total catch had shrunk from 17 per cent in 1951 to a very negligible percentage in 1964 (0.5 per cent).

INPUT-OUTPUT RELATIONSHIP OF FRY PRODUCTION AT THE KAUSALYA GANGA FISHERY FARM, ORISSA

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SUMMARY

The objective in this paper is to find out the input and output relationship of fry production at the Kausalya Ganga Fishery Farm, Orissa. It serves as the sole source of fry supply to the rural areas of Orissa for pisciculture. The figures of cost of production and income have been taken for the year 1967-68. Both the fixed costs and current costs have been taken into account. Interest on both the current and fixed cost is calculated at 10 per cent per annum. The total costs of the farm come to about Rs. 5,942 whereas the total current cost is Rs. 7,925.60. The farm earns a total gross income of Rs. 50,000 by selling fry and the net income comes to about Rs. 36,132.40. The per unit of fry (1,000 numbers make one unit) cost is Rs. 5.54 and the net income per unit of fry produced in the farm comes to Rs. 14.46.

GROWTH OF FISH LANDINGS IN INDIA

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SUMMARY

Fish is an important source of animal protein in human diet and a staple food in many parts of the world. Many of the world's potential fishing grounds are yet under-exploited. Indian ocean is one of them. There is, therefore, considerable scope in India for increasing the supply of animal protein from this source. Output of fish from both inland waters as well as the sea has increased considerably over the last 18 years. Total landings in India have gone up by about 87 per cent from 7.5 lakh tonnes in 1951 to 14 lakh tonnes in 1966; the production is further expected to rise to about 15.3 lakh tonnes by 1970. An attempt has been made in this paper to measure the rate of this growth and to project the annual landings of fresh water and marine fish separately up to 1975. Linear as well as semi-exponential trends have been tried. The latter has given a better fit. The compound rates of growth for fresh water, marine and total landings have been estimated to be 5.34, 2.76 and 3.63 per cent per annum respectively. The linear rates are very close to these. According to the projections made at these rates, the total output of fish is expected to approximate 18 lakh tonnes by 1975. About 60 per cent of this will be marine as against the present 70 per cent. Evidently, there is a welcome enthusiasm in the country for organizing and developing the more manageable inland fisheries. But the potentialities of this source are small in comparison with those of the sea fishing. India has a vast scope for developing the latter also. There has been tremendous improvements in fishing crafts and other equipment outside the country. By modernizing our own equipment, we can catch enough fish not only to meet our consumption requirements which are themselves likely to move up appreciably, but also for larger exports.

All the six trend coefficients estimated in this study are highly significant but the estimated coefficients of determination indicate that the semi-exponential growth function gives a better fit to the data, than the linear function. The difference is larger in the case of marine landings. The linear growth rates for the two types of landings are closer to the exponential rates, when the former are worked out at the arithmetic means rather than the geometric means. So far as year to year variability is concerned, the marine landings have shown greater variability than the fresh water landings. Since marine output is roughly two-thirds of the total output, these fluctuations are reflected in the latter also. While these fluctuations may continue undiminished there is strong tendency of growth at an increasing rate.

PLANNING FOR FISHERIES DEVELOPMENT IN INDIA

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SUMMARY

Considering the vast water area of the country and per capita consumption, the development of fisheries at present is extremely inadequate and unsatisfactory. The per capita per annum consumption of fish is only 1 kg. as against 23 kgs. in Japan and 16 kgs. in Denmark. The total value of exports of fish and fish products in 1965 was Rs. 6.46 crores and during the first ten months of 1966 was Rs. 10.69 crores. From the total quantity of shark fish landed, about 20 lakh square feet skin can be made available for the leather industries. During 1966, the production of fish was 1367.4 thousand tons, 65 per cent being marine fish and 35 per cent fresh water. About 70 per cent of the total production in 1964 was marketed fresh, 12 per cent was cured by salting, another 11 per cent was sun-dried and the remaining 7 per cent was in reduction. The annual wholesale price per quintal of rohu at Calcutta market, prawns at Madras market and pomfret at Bombay market was about Rs. 437, Rs. 308 and Rs. 401 respectively. For the betterment of fishermen, State Governments have organized fishermen's co-operative societies and their number in 1964-65 was 3,205 with a total membership of 3.26 lakhs. The average membership per society was 102. The average working capital, loan advanced, cash value and sale value per member

were about Rs. 110, Rs. 27, Rs. 70 and Rs. 120 respectively. There are about 6,000 mechanized boats engaged in fishing and during the Fourth Plan, provision has been made to add 8,000 small mechanized boats and 200 medium and large boats. The annual production of fish seed is estimated at 5,765 lakhs which is inadequate to stock the available water areas. There are also inadequate facilities for cold storage, refrigeration, quick transportation, boat-building yards, etc. It is therefore necessary to evolve an integrated approach to the solution of the problems relating to fisheries development.

PRODUCTION AND EXPORT POTENTIAL OF FISHERIES IN INDIA

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SUMMARY

An attempt has been made in this paper to survey the general fish production and trade trends in the country during 1950-51 to 1964-65 with specific reference to two issues, *viz.*, (1) fish production—marine, inland and total—and (2) the export and import position in the country. Fisheries resources of India are either marine or inland extending over about 17,000 miles and other subsidiary water channels over 70,000 miles. Out of a total catch of 1.4 million tonnes. 0.3 million tonnes come from inland resources and 1.1 million tonnes from marine fisheries. This is only a small proportion of the total fish potential of the country. Only 61.30 per cent of the readily cultivable water area in the country is presently utilized for fish culture. Empirical analysis in this paper showed that production of both marine and inland fish widely fluctuated during 1951-65. After the maximum production of marine fish in 1959-60, the production has showed declining trend from 1960-61 to 1964-65. On the contrary, the inland fish production showed a continuously increasing trend from 1962-63 to 1964-65. Accordingly, the total production has been affected. However, the marine fish production increased from 533 thousand to 824 thousand tonnes, inland fish production increased from 218 thousand to 507 thousand tonnes and thus total fish production increased from 751 thousand to 1331 thousand tonnes from 1951 to 1965. The upward trend in production indicated the potential for increasing fish production in the country. About 27,000 tonnes of fish products are exported annually from India. Export and import figures show that the value of exports has always exceeded the value of imports except in 1962-63. This is a clear indication that the Indian fish industry has a definite possibility of expansion for export.

The projections of fish production in this study revealed that by 1975 an increase of 15.6 per cent and 65.9 per cent in the marine and inland fish production respectively is likely to be obtained, thus raising the total fish production to 1793 thousand tonnes by 1975 as against 1331 thousand tonnes in 1965. The projected import and export figures revealed that the net foreign exchange earnings from fisheries are expected to increase from Rs. 72.2 lakhs in 1965 to Rs. 299.6 lakhs in 1975. This indicates an increase of 7.42 per cent in the value of total fish export by 1975 over that in 1965. The marine and inland fish production and the value of exports as projected in this paper are nevertheless considered as a maximum goal. By 1975, actual fish production and exports might increase even more than these estimates in view of the emphasis on fisheries development in the Fourth Five-Year Plan.

SOME ASPECTS OF ECONOMICS OF FISHERIES IN INDIA

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SUMMARY

When the land resources will not be sufficient to support the ever growing population in our country and elsewhere in the foreseeable future, searching other sources of food becomes increasingly an important problem. Fish, as a source of food available in the oceans, can be very well exploited in order to supplement our food needs to a large extent as the ocean's resources are limitless. Besides, the consumption of fish would enable us to raise substantially nutritional standards. As the Indian waters are highly potential, fish output can be increased to a great extent in our country, if the

waters are economically exploited and managed. At present, India's rate of growth of fish production is however not significant when compared with the advanced fishing nations such as Peru, Japan and U.S.S.R. In fact, India's fish production is subjected to wide fluctuations as compared with world production. The average rate of growth of fish production in India was only 3.8 per cent per annum during the period 1950-1965. This low rate of growth of fish production was due to mainly, besides various other reasons, the primitive methods of fishing followed in our country. Modern trawlers and other advanced methods of fishing, as it was done in Japan and Peru, have to be inevitably introduced so as to raise the productive capacity of the boat and gear. By rationalizing the means of production, the uncertainty and risk which are there at present can be minimized to a great extent, if not completely. It is therefore essential that the mechanization programme of fishing has become virtually an important step in the development of fisheries in our country. Proper organization of fishing industry, on the other hand, will bring a large number of economic benefits since there are a large number of subsidiary industries such as boat-building and nylon manufacturing industries. About Rs. 120 crores had been contributed to the national income by the fisheries during 1965, accounting for 0.6 per cent of the total national income. The productivity is measured by taking into consideration the production per fisherman or per boat, although it is not strictly scientific in one sense. Proper concepts have to be developed for measuring the productivity. Although substantial increase in the allocation of investment for fisheries had been made during the Second Plan, the fish output had decreased from 10 lakh tons to 9 lakh tons in 1961. The investment pattern followed in the Five-Year Plans had not made any significant impact on the structure of production of fish. It is therefore necessary that fish production should have some bearing on the investment made. Though fish is highly perishable, this problem can be overcome by keeping it in cold storage or freezing fish. Besides, there are innumerable species of fish in waters but all are not readily demanded in the markets due to having certain taste preferences towards particular species of fishes only. Due to this, the price of some fish rules very high whereas the bone fishes and other trash fishes are quoted low. Generally, the availability of fish in a particular area usually creates good demand, but this does not hold good with all varieties. In India a high percentage of fish is however consumed as fresh, especially in inland areas. This is mainly due to the enlargement of urban fish markets and other improvements that had taken place recently. Apart from the human consumption of fish, fish is also utilized for other purposes. Demand for fish meal is abnormally increasing in recent years due to its importance of food value for cattle and poultry. The per capita consumption of fish in our country is also low when compared with the advanced fishing nations such as Japan and U. K. The consumption of fish can be raised to a great extent if distributional facilities are improved in the country.

Just as in agriculture, middlemen provide loans to the poor fishermen on the condition that the latter should deliver all their catches to fisher-merchants at lower prices. Due to this, the incomes of fishermen had not improved. Moreover, the marketing expenses increase usually to a high level due to the presence of a large number of intermediaries, which in turn increase the price of fish at the big urban markets. Due to the malpractices prevalent in the fish markets, normally there is no free and perfect competition. Apart from this, the demand pattern of fish is difficult to ascertain since there are innumerable species of fish and different demand patterns exist for different varieties. In the big consuming areas, it can be said in general, the demand for fish is relatively inelastic. The development of fisheries is going to play a vital role in our national food economy. Inevitably, modern methods of fishing have to be introduced so as to increase the fish output in the country. Besides, there is a very bright future for the export of fishery products as there is an increasing demand in other countries for Indian frozen and canned shrimp.

A STUDY OF GROWTH OF FISH CATCHES IN A FEW IMPORTANT FISH CATCHING COUNTRIES AND THE WORLD

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SUMMARY

With the attainment of over 3 billion population of the world and the anticipated rise to a level of over 6 billion by 2000 A.D., the feeding of the growing millions has already assumed a serious problem of global importance. This terrifying problem can be tackled on many fronts, *viz.*, (*i*) by adopting measures for limiting population growth, (*ii*) by raising the productivity of land and (*iii*) by changing the food habit. Thus for achieving self-sufficiency in food, the need for proper development of unexploited fisheries resources of the world is essential. In this paper an attempt has been made to study the growth of fish catches in a few leading fish producing countries and the

world. Altogether 14 trends, 10 linear and 4 exponential depending upon the behaviour of plotted curves, have been fitted and the standard errors of these rates computed. Finally, a test of goodness of fit has been applied to these trends. From the study of growth rate, it is evident that the highest linear growth rate (13.95 per cent) is recorded for South Africa and the lowest rate (0.80 per cent) for the U.S.A. It is also observed that the highest exponential growth rate (45.61 per cent) is recorded for Peru and the lowest rate (4.46 per cent) for the world as whole. Against the vast potentialities of fisheries resources, a level of production of 1331.3 thousand tonnes achieved in 1965 and a linear growth rate of 5.04 per cent during 1949-65 are not enough for a big country like India. In this context, the role of balanced exploitation of fisheries resources of the country, besides other measures for achieving self-sufficiency in food, will be of much importance. To achieve this, a few suggestions are made in this paper. (1) The sphere of marine fishing activities in the off-shore waters should be extended by introducing deep and distance fishing methods. Before this, the nature of fishing grounds, their potentialities and adaptability of new gears should be assessed accurately. (2) The depleting factors responsible for affecting the growth of inland fisheries wherever set in after the operation of dams, silting up of rivers, over-fishing, etc., should be investigated and remedial measures be taken. (3) The low level of consumption of fresh fish, which is due to unfounded prejudice against or ignorance of some varieties of marine fish, can be raised by removing such notions through constant State publicity. (4) For ensuring the supply of fresh fish the construction of a larger number of fish freezing plants in the coastal and consumers' centres is advocated. (5) In view of the fact that the bulk of fish catches is sold fairly at low prices for manufacturing purposes, adequate State subsidies to fishermen should be considered. (6) In order to prevent the intermediaries from exploiting fishermen, active participation by the State and the co-operative societies mainly for providing the storage and transportation facilities, is highly essential. (7) It should be the primary responsibility of the State to improve the economic and social backwardness and the general outlook of the fishermen. Only then the cherished goal from the development of fisheries in the country can be achieved.

SOME ECONOMIC CONSIDERATION INVOLVED IN ESTABLISHING A FISH PROCESSING PLANT

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SUMMARY

During the past decade, improvement in fish processing and freezing techniques has increased the demand for processed fish. The effects of improvements in processing and marketing have been supplemented by advances in fish production techniques, such as, modern fishing gear, improved processing facilities and better transportation facilities. Changes in the production and distribution methods, along with growth in the total population, shifts in its distribution over the country and changes in per capita consumption of fish have an important bearing on the comparative advantage of the different producing and processing regions. With continuing growth and investment in the fishing industry, the question as to where new facilities can be most effectively located is, therefore, of special interest. The feasibility study with respect to a given commodity assumes the presence or the possibility, of locational advantage in at least some aspects of its production and distribution. Such advantages and different demands among various consuming centres are the basis for inter-regional trade flows. The pattern of these flows in an enterprise economy involving a number of producing and consuming centres reflects the interaction of economic forces that determine (1) product prices in particular markets—a function of supplies and demands of the product in the various markets; and (2) commodity production and transfer costs in the various regions—in each region a function of its location with respect to markets and the opportunity costs, within the region, for services required in the production and processing of the commodity under consideration. This paper discusses a framework for studies of production location with respect to fish production and processing including storage and freezing. While establishing a fish processing plant in a fish producing area, among others, considerations should be given to (1) the relationship between fishing industry and the fisherman, (2) the nature of the fishing industry, (3) the purpose and timing of entry in the fishing industry, (4) plant location and existing competition and (5) automation and future plant location.
