INTRODUCTION

Increasing population in Asian countries has led to over-utilization of land and subsequent diminishing returns in actual and potential agricultural productivity. India's population has crossed the mark of 1 billion and has reduced the per capita availability of land, which is assumed to be 0.14 ha by the turn of the century. Food and other basic requirements for such a huge population will have to be arranged through optimum utilization of the potential resources on sustainable basis. In spite of the tremendous technological advancements achieved in various land based farming systems, major section of the population is still suffering from malnutrition. In this context it is high time to utilize the potential resources to enhance fish production on sustainable basis to meet the ever-increasing nutritional requirement of the growing population.

One of the major public health problems facing in our country is the protein malnutrition. To solve this problem of malnutrition, we have to depend mainly on fish. Fish has 16-22 per cent protein on an average along with vitamins, minerals and low cholesterol fatty acids. Fish accounts for nearly one quarter of the world supply of animal protein and it has been described as the meat of the "Third world". In many Asian countries, over one half of animal protein intake comes from fish, while in Africa the proportion is 17.5 per cent (FAO, 1998).

The importance of the fisheries sector in both developing and developed economies is mainly that it provides nutritious food and foreign earnings. The fishery sector can provide employment to 7 million people in India by involving various fisheries activities. During 2003 - 04, the volume of seafood exported was 412017 tonnes worth Rs.6092 crores (MPEDA). In spite of the phenomenal increase in fish production during the last decade, the present per capita availability of fish in India is still only about 10 kg per annum against world average of 12.1 kg per annum. To fulfill the minimum nutritional requirement of 11 kg per capita as per the World Health Organization (WHO) recommendation and with the assumption of 56 per cent of population as fish eaters in India, 12.0 Million tones of fish will be required by 2020 A.D. for the country's projected population.
Extensive and continuous research and developments during the past decades have added many glorious chapters in the annals of inland fisheries by developing a number of technologies and package of practices in accordance with developmental needs. In some regions freshwater fish represent an essential, often irreplaceable source of high quality and cheap animal protein, crucial to the balance of diets in marginally food secure communities. Most Inland fish is consumed locally, marketed domestically and often contributes to the subsistent livelihood of poor people. Recently, some inland fish products are also traded internationally generating additional foreign earnings. The degree of participation, including a significant number of women and children, in fishing and fish farming can be high in some rural communities, and fish production often is undertaken in addition to agricultural or other activities.

In 2002, world total fish production (excl. aquatic plants) was reported to be 133.0 million tonnes, of which 41.9 million tonnes from aquaculture practices. World capture fisheries production amounted to 93.2 million tones, representing a slight increase compared to 2001, but a 2.4 percent decline from the peak of 95.5 million tonnes reached in 2000. The estimated first sale value of the capture fisheries in 2002 amounted to some US $ 78 billion, 91.6 percent decline compared to 2000, partly due to the decrease of total catch, but also of the unit value of landings for food consumption (FAO, 1998).

The contribution from marine and inland fisheries was 3.4 million tonnes and 2.9 million tonnes respectively to the total Indian fish production. India's fish production of 6.3 million tonnes in 2003-04 places it at seventh position in the world and accounts 4 per cent of world fish production. India ranks 2nd position in global inland aquaculture production with a contribution of 2.2 million tonnes to the global aquaculture production of 39.8 million tonnes (FAO, 2004).

Inland fish production in our country has shown a phenomenal growth rate during the last four decades. As against 0.2 million tonnes produced in 1950-51, the production has gone up to 3.4 million tonnes in 2003-04. Out of the total potential inland fish production of 4.5 million tonnes only 75.5 per cent is now produced through the culture. One of the major production systems in inland fisheries is
composite fish culture, which received a tremendous boost after the launching of the IDA (International Development Association) - assisted inland fisheries project in 1980. The average production has reached 2,105 kg ha\(^{-1}\) yr\(^{-1}\) in fishponds managed and supported through Fish Farmers Development Agencies (FFDA). Considering the gap between the highest production achieved and the average, there is ample scope to increase the yields through proper extension of scientific management.

The future of the aquaculture sector is of interest to both the planners and the industry. This interest has been heightened by the growing importance of aquaculture in global fish production and the fact that the capture fisheries probably will not be able to meet the increasing demand for fish as the world population increases. As marine fish catch rate is declining at an increasing level due to over exploitation through indiscriminate fishing poor people can't depend solely on marine fisheries to solve the problems of malnutrition, low income and unemployment. Aquaculture can be one of the solutions in providing the basic needs of the rural poor through generation of employment and earnings. These provisions depend, of course, on the species cultured and the intensity of operations. More importantly, aquaculture holds the promise of becoming a viable alternative to capture fisheries. With increasing depletion of fish from natural sources and rising employment and income needs of small scale fishermen and other socio-economic groups, contribution of aquaculture for the overall development can't be ignored.

Some major applications of aquaculture for rural development can be identified as meeting basic human development needs, particularly food and livelihood, rehabilitating the environment and maintaining social harmony and promoting social equity. In order to solve the problem of malnutrition in rural areas, knowledge in fish production is vital to rural people. Rural aquaculture is an important sub-sector that contributes significantly to the national food security, family nutrition, and rural employment livelihood security of poor especially in the remote and most forward areas.

Fish production from village tanks and ponds can be increased through scientific farming, which will improve the socio-economic condition of rural population by providing them employment opportunities. India is blessed with 2.414
million ha of tanks and ponds, which has a production potentiality of 3.6 million tonnes. Proper utilization of these water resources will ensure increase in fish production in the country. Although plenty of resources are available in our country aquaculture production is not contributing significantly for our national income. Fisheries development in India is, thus, focused on prospecting and developing various water resources for fish production, welfare and development of fishermen communities to improve their socioeconomic standards.

There are manifold interactions between fisheries and agriculture through the common use of land and water resources and concurrent production activities to support rural village communities and supply urban areas with the needed quality and variety of food. Such interactions extend to the institutional sphere, as fisheries and agriculture often fall within one government ministry. Improved integration between the two sectors is therefore an important means to enhance fish production and food security.

Integrated approaches to resource management are challenging, but provide significant avenues to enhancing fish production. There are various levels and areas where integrated measures for enhanced fish production are possible or desirable i.e. at the farm level, at the community level and at state and national levels.

The socio-economic status of the fishermen could not permit them to adopt scientific fishing or fish farming. They are least conscious about the existing fish culture technology. To narrow down the gap between actual and potential levels of fish production, propagation and popularization of fish culture technologies along with appropriate legal and policy intervention and infrastructure support are essential.

Fish farming involve economics because fish farmers produce fish and sell them, other people buy the fish and eat them. The fish farmer is called producer because he grows the fish and looks after it just as he does with any other crop and animals. Reasons like better earnings from fish farming than agriculture, utilization of inherited water areas, higher demand for fish, in addition to the opportunity to earn money from other jobs where the farmer lives have motivated people to go for fish farming (Williams, 1983). If the main motivation is mainly to earn money, he will probably produce fish as much as he can from fish farming. If his motivation is
simply to keep up with tradition of fish farming he may be less interested in earning, but is happy in producing enough fish for his family. This is why some farmers work hard and try to use the most effective methods of farming while others are happy to just earn enough from the amount of fish that can be produced without much effort.

Studies related to aquaculture economics are very few in our country, costs and benefits of traditional fish culture has first analyzed by Ranadhir (1976). Then Tripathi and Ranadhir (1981) studied the economics of composite fish culture. Economic evaluation of various fish farming practices at farmer's level is essential to know the techno-economic viability of their farming practice. The feed back knowledge of the farmers will help the policy makers and scientist to refine the technology for better profit and technological adoption.

**Fisheries of Maharashtra at a glance**

Maharashtra state has got both marine and inland resources. Total length of coast line is 720 km. With continental shelf area of 1.11 lakh km. Rivers canals having total length 16000 km. Total water spread area covered by reservoirs is 0.27 million ha. (small 0.12 million ha. Medium 0.04 million ha. And large 0.11 million ha.). Ponds and tanks covers 0.03 million ha. Area. In Maharashtra state total inland area available for culture is 1.0 lakh ha. For such a potential resources, total fishermen engaged in various activities of fisheries were 425652 with total number of fishermen co-operative societies 2024. A total number of hatcheries engaged in seed production was 18 with22 seed farm to provide seed to the state. In 2003 – 04 total fish production is 545137 metric tones comprising marine production with 420017 metric tones and inland with 125120 metric tones(culture and capture).

Fish culture practices becoming an important economic activity for generating income and employment for a section of population in Latur districts of Maharashtra State. Due to the paucity of the fish production with in the state, middle and lower class people spend a major share of their income on buying fish at exorbitant prices. As the man to land ratio is declining, agriculture can't bear the entire burden of providing food to the population of the region. In this regard fish culture in the available unutilized water resources will be the best option to meet the protein requirement of the people of the region.
Latur district, situated in the southern region of the Maharashtra State, has rich fishery resources in the form of riverine fisheries (combined length 360 km) ponds and tanks (14748.8714) and so on totalling 21639 ha. These resources are not fully tapped to produce fish to fulfill the demand of the people. There is wide gap between supply and requirement of fish which is partially met by supplying fish from Andhra Pradesh, Karnataka. Through aquaculture contributed only 22.9 percent of total fish production at present, it has tremendous scope for development. Availability of a large number of cultivable water bodies, increased availability of quality fish seed and prevailing high demand/price of fish are some of the factors favouring growth of aquaculture in the State. Pond aquaculture is increasingly becoming popular even though the recommended culture packages are not followed in toto in most cases. To meet the domestic demand of the state and to stop draining out of money from the state the individual fish farmers of the district whose water resources are primarily tanks and ponds are to be encouraged to adopt scientific fish culture technology. Adequate credit and banking facilities are required to expand their water area by excavating new ponds or extension of the existing ones.

The Present study area having totally 21639 ha of water resource. Out of which only 12983.4 ha was used for fish farming Ponds above 200 ha used for fish culture are 11 having area of about 5767 ha. and below 200 ha. These ponds are used for fish culture by fisherman’s co-operative societies. Totally 111 co-operative societies with 2810 member are present in Latur Districts. All these ponds were constructed by state Government for irrigation purpose and culture to co-operative societies on lease base. some ponds are given an leases base by auction system for five year. Generally ponds are stoked with Indian Major carps or polycultare depends on available of fish seed. Information on socio-economic framework of the fish farmer community forms a good base for planning and development of this economically backward sector. The socioeconomic characteristics pertaining demography, caste and age structure, literacy and education, employment and wages, ownership of means of production and capital investment, income and expenditure, savings and indebtedness and customs, conventions and habits of people living in a particular location strongly influence their responses to technological changes and participation in developmental schemes. Lack of adequate and authentic data on
Socio-economic condition of the target population is one of the serious impediments in the successful implementation of developmental programmes. In the fisheries sector, several micro and macro level socio-economic surveys had been conducted by various agencies and research workers in different regions of our country to study one or the other problems of the fishermen community.

A number of studies have been conducted on the socio-economic status of fishermen population both in inland and marine sectors of capture fisheries (Chaudhury, 1989). However attempts have not been made to carry out similar studies among the inland fish culturists. The package of practices of improved aquacultural methods have been standardized and applied in various experimental and demonstration centres in different parts of the country. Such studies carried out in Assam from 1975 to 1977 under composite fish culture, showed fish production ranging from 3.71 to 6.5 t under experimental conditions (Sinha, 1978). But studies on Socio-economic status of fish farmer, knowledge and attitude towards composite fish culture and adoption of recommended improved culture practices are not sufficient enough in the country as a whole and more particularly in case of Latur districts. Keeping in view of all these factors the present study is attempted to evaluate the technical as well as social status of fish farming practices in Latur district of Maharashtra State.

**Objectives of the study**

. To analyse costs and earning details of different fish farming practices.

. To analyse comparative economic efficiency of various fish farming practices.

. To workout input-output relationship of different fish farming practices.

. To assess the market potential, marketing channel and market structure.

. To assess socio-economic status of the fish farmers with special emphasis to adoption behaviour of fish farmers, their technical knowledge, source of technical information to adopt fish culture practices, problems affecting the adoption of scientific fish culture and women's participation in fisheries.
. To access technical problems of fish farming practices.

. To access Economical problems about fish farming.

. To suggest technical guideline for improving fish production.

. To suggest policy guidelines for improving socio-economic conditions of fish farmers.

**Limitation of the study**

The results of the present study are based on the ability of the respondents to recall the information. The objective of the study is limited to their ability to recall and also to their openness in furnishing the required information. The number of respondents were limited to 120 due to limitation of resources like time and finance. Moreover some of the places under study were declared as disturbed areas due to extremist activities.

**Hypotheses set for the study**

In the background of postulated relationship of variables as per the theoretical orientation and based on the objectives and assumptions underlying the present investigation, the following null hypotheses were formulated.

• There is no significant difference in the level of adoption among the fish farmers of the two blocks.

• Farmers are conscious about cost reduction and profit maximization in fish farming practices.

**Scope of the study**

The present study is a pioneering and unique attempt in the field of socio-economic and related aspects of fisheries extension in Latur district. Since no basic data is available on the above aspects, the present study will bridge this gap and the constraints for economic development of fish farmer. Further with particular reference to the present study, the credit policies of the financial institutions could be planned for optimum production of fish as well as socio-economic development of the inland fish farmer.