CONCLUSION AND RECOMMENDATION:

It is a fact that fish is an important element of Assamese life and culture. Fishing is a very old tradition in Assam as the society itself. Originally, fishing or fish cultivation was not considered as a profession, but, today it is considered as one of the important profession in Assam. Besides being a nutritious food item, fish industry is contributing to the state's economy to a great extent. The development of fishery sector is important because:

1) Fish is a nutritious food item,
2) It effects the economy of the state,
3) It has tremendous scope of employment generation.

The people of third world countries have been suffering from malnutrition, which is one of the factors of underdevelopment. Public health is an important factor for a developing country. For proper growth of human body, animal protein is very essential besides other nutritious food. It is needless to mention that Assamese people are non-vegetarian and as such they require meat, fish, milk, egg etc. in their meal. But it has been observed that people of Assam are unable to take all these items as per body requirement, mainly because of low production and economic condition. In comparison to other items fish is found to be cheaper and easily available to some extent. Moreover, fish is easily digestible and people may catch fish easily from different public water bodies like river, beels, swamps, pond etc. as a natural product free of cost. So, fish has been preferred by mass people as protein supplement and as a delicacy. Fish has got 18 to 20 percent protein contents.
Along with fresh fish, fish seed and dry fishes are also coming to Assam from other states to meet the requirements which, also, have been created drainage of state's money. In this way, crores of rupees are going out of the state, regularly. So, to improve this unhappy state of affairs the fishery sector is to be developed to increase the fish production and to strengthen the state's economy.

The fishery sector and its allied activities have the high potentiality to generate employment. Thousands of people are engaged in different activities of fishery and its allied activities in Assam for their daily meals. A section of the people, mainly, schedule caste community earns their daily livelihood through daily fishing. Moreover, scientific development of fish cultivation paved the employment avenue in Assam. Modern scientific development makes the carp rearing as a profitable enterprise. The composite fish farming generates at least 450 manday per hectare, under the prevailing situation of Assam. Besides, carp rearing, lots of employment scope, are there such as earth work, preparation of nets and crafts, food preparation, ice manufacturing, supply of manure, seed rearing and trading etc. The integrated farm practices viz., fish-cum-pig, fish-cum-duck, fish-cum-paddy culture etc. have greater scope to generate employment.

The beels of Assam are very potential and can meet the entire home requirement, easily. Thousands of people earn their livelihood through daily fishing in these beels. Proper development of beels may create more employment in Assam. Government has various steps to develop the beels to increase the fish production and the employment. Consequently, about 14.78 lakh mandays and 4.62 lakh mandays have
been created up to 1991-92 and during 1993-94 respectively. It was also proposed to create about 6.17 lakhs manday during 1994-95. In the same way, other sources of water may also be developed to increase the fish production and employment in a planned way. It is, therefore, concluded that the development of fishery sector is an urgent need to mitigate the unemployment problem to some extent.

Assam is almost isolated from the rest of the country except a narrow corridor at the western side. The state has been neglected because of its location. The North Eastern region shares an international boarder with China, Burma, Bangladesh, Bhutan, Nepal and it has only one link through Assam to rest of the country. On the other hand, the roads and communications are in very bad condition in Assam. The transport and communication facilities and other infrastructural facilities are responsible for industrial underdevelopment of the state.

Most of the people of Assam live in rural area and agriculture is their main occupation. Almost all types of agriculture have been practiced by the people of Assam. Assam is endowed with different natural sources like hills, river, ponds, beels, swamps, lowlying area etc. Being a monsoon favoured region, it possesses moderate climate for all kharif and Ravi crops including fishery.

The rapid growth of population reduces the per capita land holding and consequently, the traditional practices of cultivations are found to be inadequate to meet the growing demand. So, to meet the growing demand, the modern scientific methods of cultivation must be adopted intensively. Fishing and fish rearing is also a traditional system in Assam
which has been confined to a backward section of the society, is one of the factors of underdevelopment of this sector. With the passage of time people of other caste and communities also accept this culture due to introduction of scientific methods. Easy availability of fish in the natural sources up to early sixteens was also a factor of not considering fishing as profession.

Assam and West Bengal have highest fish consumers among the states of the country. Considering the world's average consumption as minimum requirement, the minimum demand for fish in Assam was 234 thousand tonnes during 1992. As the state hardly produces only 58 percent of the minimum requirement, so, proper measure should be taken to increase the fish production.

Of late, fish farmers of Assam have adopted various scientific methods of fish cultivation like composite culture, integrated fish culture with animal husbandry and agriculture. The expansion of scientific fish cultivation is very essential in Assam because of:

1) The traditional practices are low productive.

2) The rate of production is very high under scientific cultivation.

3) The scope of employment generation is very high in scientific fish cultivation.

The fish production from open water varies from 5 kg. to 100 kg./ha/yr. and it is hardly 300 kg. to 700 kg./ha/yr. under traditional practice of fish cultivation. Though the scientific culture
practices have been adopted by fish farmers of Assam, yet, production of fish is not up to the mark. The average fish production under composite culture practice is about 2000 kg/ha/year only, which is far below the pond potentiality of 3000 kg/ha/year in Assam. One of the main constraints of low fish production is the lack of awareness of the fish cultivators regarding the importance of scientific guidelines. The farmers should be motivated to use scientific culture properly, to increase the fish production.

The use of land to the optimum level, multicropping methods are to be adopted to cope with the problem of decreasing land holding sizes. In fishery sector also, different integrated fish farming such as fish-cum-pig culture, fish-cum-duck culture, fish-cum-paddy culture etc. are yielding desired result in Assam. The integrated practices are more profitable because, they do not require extra manure as the animal excreta and agricultural wastes act as manure.

The marketing system in Assam is still prevailing in the traditional position. Fish reaches the consumers through different channels of intermediaries of wholesaler, commission agent, retailer, vendor etc. About 3 to 5 intermediaries are involved to transport fish from producers to consumers. Involvement of more intermediaries affect the fish pricing due to their profit margin. Fish pricing is mostly affected by cost of production and profit margin of market intermediaries. The most common channel of market intermediaries is producer + commission agent + wholesaler + retailer +
consumers. Under this system at least 31 percent of the consumers price goes to the market intermediaries and rest to the producer. At least Rs. 3/- per kg. increased due to involvement of every additional middle man in the channel. The price differential, i.e., what the consumers paid and what the producer received, is very high in Assam, at least Rs. 15/- per kg. To avoid the unnecessary traffic of market intermediaries, FISHFED was established in 1982 to serve the consumers at a reasonable price. But, the jurisdiction of this agency, in this regard, is still confined to the Guwahati city only.

The fish farmers of Assam have to face a series of problems in scientific fish cultivation like finance problem, resource problem, managerial problem, technical problem etc. A large amount of money is required in scientific fish cultivation right from pond construction to the marketing. Different financial institutions and Government have been provided assistance in this regard, but, that is not found to be sufficient and easily available to the users. So, Government should take proper steps to improve the financial situation, so that, interested people may get proper assistance at proper time.

In the same way, resources and technical problems are acting side by side as a problem of fish cultivation, scientifically. Mainly, ponds are the most suitable resource for scientific cultivation of fish, but, ponds are used for multiphierarchical purposes in Assam like drinking water, washing etc. So, in such situation fish farmers do not want to use manure and chemical. Similarly, flood also poses a serious problem to maintain the water quality of the culture area. The general awareness
should be created about the implication of scientific norms and try to motivate the people to consider fish farming purely on commercial line.

Again seed is also a big problem because, the mortality rate is higher and local seed not available, timely. Consequently, fish farmers of Assam using imported seed at a very high stocking density compared to standard rate. Manpower is another important factor for scientific fish cultivation. Manpower is available in Assam, but, there is an acute shortage of skilled labour. To overcome this situation Government provides training and trying to produce more technical persons.

The outbreak of the disease EUS is affecting the farmers greatly. The remedial action should be developed properly and proper measures should be adopted to treat the pond to avoid large scale destruction of the fish.

It has been discussed earlier that the eco-system and climatic condition of Assam are favourable for fish cultivation. Different water resources also satisfy the requirements for fish cultivation. It is, therefore, considered essential to have coordinated efforts of Government, fish farmers and the public to develop the scientific fish cultivation.

The composite culture practices of fish production is highly productive and profitable compared to the traditional practices. The economic analysis shows that composite culture practice may earn Rs. 12,000/- against an investment of Rs. 48,100/- from one hectare of water area. Other
integrated fish cultures also found to be equally profitable under the prevailing condition of Assam. It is, already, mentioned that the fish farmers of Assam are not using the scientific norms properly. The present performance of culture fishery is, though satisfactory, compared to the traditional method, but yet to achieve the target.

Government efforts are on to develop the fishery sector. The development of both capture and culture fishery are equally important from the economic point of view. Government provides incentives in cash and kind, free training, seed at subsidised rate etc. But, these are not found to be adequate compared to its requirement. The Government subsidy not distributing uniformly, as many needy persons have been deprived of it. So, Government should take care of the incentives, so that it is distributed timely and uniformly.

The study at Kamrup district shows that nature has given sufficient water resources which may be utilised for fish culture. It is also a good sign that some people are using composite culture practices of fish production. But, regarding the mode of operation, the farmers are not adopting the practices in a proper scientific line. Being a leading area of the state, it is fortunate to avail all the facilities provided by the Government. Many youths are accepting fishing enterprise as their primary occupation. With proper motivation and financial assistance, the fishing enterprise may go a long way to solve the unemployment problem and to strengthen the economic condition of the poor people.
Statistical analysis have been made with both primary and secondary information to comprehend the idea of economic viability of culture fishery practices.

It is seen that the fishery sector has been progressing with a good trend right from 1990. If this trend maintains uniformity, bright prospect may operate by 2000 A.D. and the economy of the fisherman, as well as, the state will be improved. All the infrastructural facilities are improving gradually for the development of this sector.

Scientific fish farmings is found economically viable and a dependable source of income. The multiple regression analysis shows that fish production is mainly affected by farm size, preparation of pond, manuring, maintenance, labour, feeding and seed. The correlation effect of production and farm size, production and investment, farm size and investment, farm size and return etc. found to be highly correlated and having approximately linear relation. The farm size and profit relation shows that a farm of size 0.5 ha is advisable to meet the expenditure of a standard family.

Finally, it may be concluded that pisciculture practices are to be adopted properly by the farmers which will improve their deplorable condition and will strengthen the economy of the state. Moreover, the scope of employment will be increased intensively.
The research project has yielded different information and observations as summarised below:

1) It has been observed that demand for fish is very high in Assam where all the people consume fish. The minimum requirement of fish was 234 thousand tonnes during 1992-93. Moreover, the demand for fish is increasing day by day.

2) Compared to the demand, the fish production is very low in Assam. During 1992-93, the total production 140 thousand tonnes from all sources was only 58 percent of the minimum requirement. Consequently, about 30 thousand fish has been imported yearly to Assam which makes a drainage of about 105 crores of rupees from the state annually.

3) The most of the fishermen are living below the poverty line. Earlier fishermen belonged to schedule caste community only, but, now the development of scientific fish cultivation attracts people of all the communities to cultivate fish in Assam.

4) Above 75 percent fish of total production is coming through capture fishery where the rate varies from 5 kg to 100 kg/ha/yr.
5) The scientific culture practices are not to develop properly in Assam. The adoption of practices are not according to the scientific line.

6) The present rate of fish production under composite culture practice is 2000 kg/ha/year, but the same goes up to 10-15 tonnes/ha/year in other parts of the country. However, some farmers have obtained above 3000 kg/ha/year occasionally from their ponds.

7) A good trend has been observed in Assam since 1990, regarding fish seed production. But, the lot reaches the fingerling stage just after July; consequently, farmers have to opt for imported seed.

8) The farmers recruit seed from April to June i.e., during the premonsoon period. This period can be extended up to August which will offer scopes for local seedlings.

9) The fish farmers of Assam recruit seed at a very high density. Some farmers even use 20 to 40 thousand fingerlings against the scientific norms 5000 fingerlings/ha/year. Seed recruited to the stocking pond, batch by batch. Occasionally, seed is recruited directly to the stocking pond.

10) The mortality of seed is very high in Assam. The rate is higher in case of imported seed. Occasionally, cent percent mortality has been recorded by the farmers.
11) The average price of imported seed at farm gate is Rs. 250/- per thousand, against, only Rs. 70/- per thousand of the Government (local) seed.

12) The size of the ponds of Assam is smaller which is less than one hectare.

13) The growth rate of fish is not found to be satisfactory. The size, hardly, crosses one kg. after 10 to 12 months of rearing.

14) Supply of organic manure viz., cowdung is not sufficient and farmers facing problem to apply manure as per the prescribed rate of scientific cultivation.

15) "Multiplex", a chemical, may be used as a substitute of cowdung to improve the water quality. But, that too, is not sufficient in the local market.

16) Farmers have been suffering due to the regular flood. Flood has created problem to maintain the scientific norms.

17) Rain is the main source of water and it is started from April. The rain water remains in different sources like ponds, tanks etc. upto December. So, fish cultivation must be done during that period.

18) Lack of awareness of the farmers is a problem because they ignore the importance of the scientific guidelines.
19) Supplimentary food has been used as a combination of rice bran and oilcake. But the norm 1:1 is maintained, hardly, as oil cake costs more.

20) The water quality of the culture area is not maintained according to the requirement throughout the year. No systematic approach is there to test the water quality at regular interval which is a basic requirement of scientific fish culture.

21) The old stock should be completely removed before the recruitment of new seed, which is not strictly followed by all farmers.

22) Most of the farmers of the study area start harvesting just after 3 months of recruitment of seed and go for 10 to 20 times intermediate netting during the culture period.

23) It is seen from the analysis that the farm size 0.12 hectare shows marginal profit, but depending on the family expenditure, the size of a farm should not be less than 0.5 hectare. The farm size and production is closely related with a high degree of correlation ($r = 0.865$).

24) Different integrated fish culture practices viz., fish-cum-pig, fish-cum-duck, fish-cum-paddy culture practices are found to be suitable and profitable.

25) The investment and production is positively related. The cost on housing, watchman, contingency are found to be more or less constant up to one hectare of water area.
26) The profit of fish farming mainly depends on two factors price and farm size. The correlation between profit and farm size is positively related \( r = 0.998 \) i.e. there exists 99 percent association between profit and farm size. Due to variation of price also, the profit increased significantly as shown in the fig. 6.5 (Chapter VI).

27) According to the farmers opinion, a farm size of 10 Bigha is sufficient to run a standard family under the prevailing situation of Assam.

28) Besides, the biological factors, fish production of a scientific farm depends on farm size, investment, seed, labour etc.

29) The Governmental incentives viz., subsidy is found to be not properly distributed because many needy persons have been deprived of it.

30) In Assam only 10 percent pond water area has been covered under culture fishery till now.

31) In many occasions, the loan and other incentives are not properly utilised by the beneficiary.

32) Devoted farmers and workers are generally not available in Assam. So it is suggested to impart training to the first generation entrepreneurs.

33) It is observed that the economic condition of fish farmers have been improved through the adoption of scientific fish cultivation in Assam.
34) A large number of unemployed youth of the state are now taking fishery as their occupation. This has helped to solve the unemployment problem to a certain extent.

35) It is also observed from our study that the workers of this region are not up to the standard in comparision to the other parts of the country.

36) The manpowers trained by the Government are not in a position to show spectacular result in fish production in the whole of North-Eastern region.

37) Considering the socio-economic situation of the state fish industry is to be developed to suit the needs of the situation.

38) It is found that fish farmers are not at all aware of the cost and output of fish farming for taking proper decision.

To study the objective of the project a few hypothesis have been assumed, repeated once again to comprehended the idea more presisely as follows:

**Hypothesis**

1. Fishery industry is one of the economic segments for socio-economic development of Assam.

**Inference**

The hypothesis may be accepted as we have varified in the preceeding chapters that fishery sector provides employment to thousand of people and has the scope to further development of the sector.
Hypothesis

2. Composite fishing practice is more productive than the traditional fishing methods.

3. A scientific fishing policy and its implementation is the means of increasing fish production.

4. A coordinated efforts of Government and the fish farmers is contributing significantly to the level of investment and level of fish production in our economy.

Inference

This hypothesis is acceptable as we have seen in chapter IV that composite practices are highly productive (at least 3 to 5 times) of the traditional practices.

The hypothesis may be accepted partially because it is evident that with developed scientific policy the production may be increased significantly. But in Assam it has been observed that though the same kind of policy have been using as in other part of the country, the result is not satisfactory compared to some other part of the country. This is due to faulty implementation of the policy.

This hypothesis is also accepted in our study. It is seen that a coordinated efforts help to get higher production. But the relationship between
Government agencies and the farmers do not exist properly in our state.

Therefore, it is evident from this study that fishery sector is a part and parcel of the state's economy. The development of the fishery sector is very much essential for the economic development of the state as well as the fisherman community. Though, the efforts made so far is not sufficient but the picture may be changed with coordinated efforts of Government and the public.

A few recommendations may be put forwarded for the development of fish production from the present piece of research study.

1. Awareness of the people must be developed about the importance of the pisciculture. The measures taken by the Government is not sufficient. So, extensive measures must be taken like distribution of leaf lets, regular news items, informations, about the economic benefit, importance of fish as food item, broadcasting through different medias. Fish culture practice must be, socially, honoured, so that the people may get encouragement. To motivate the fish farmers excursionial trips must be organised to visit fishery centres, all over the country, so that, farmers may realise the importance of fish cultivation and its economic viability.

2. Modern scientific fish culture practices must be intensively used to get optimum result.

3. To popularise and motivate the fish farmers Government should organised demonstrational programme at farmers ponds through out the state instead of simply giving oral guidances.
4. The loan should be provided to the farmers at more easy terms and conditions and special offer must be there who consider scientific fish farming as primary occupation.

5. The activities of beneficiary must be strictly supervised, so that they can not show any negligence in performing the scientific guidelines. Government should take necessary measures for extraordinary damage. There should be the facility of insurance coverage for large scale damage and that should be made popular.

6. For the development of pond fishery, the modern scientific infrastructural facilities must be developed properly such as:
   a) The water quality of pond is one of the important factor of fish growth. Maintenance of water quality is one of the basic criterion in culture fishery, which speaks about the availability of scientific laboratory facilities nearby the farm. The event may best be served through mobile laboratory van, which should be made available to serve the objective by the Government. The farmers should submit the report to the expert of the concerning locality and take proper measure according to the advice of the expert.
   
   b) Well educated technical person must be available at least at every block.
   
   c) Seed can be reared under ration feeding at a high stocking density to use in the next year at proper time to yield
better result. So, Government should take necessary measures to develop the nursery facilities.

d) The fish seed marketing facilities are to be improved. The marketing network should be developed and the seed should be available at farm gate or at a suitable place.

7. The farmers should be made aware of the fact that overstocking is not a healthy practice, because, the natural food become comparatively, low and get less space for proper proliferation. Moreover, farmers should be motivated to use local seed with due treatment as they are more accustomed at the local climate. From economic point of view also, local fish seed is preferable as it is available at a subsidised price.

8. To avoid renaging, some measures must be taken at the time of sanctioning loan such as:

   a) The loan should be sanctioned only to devoted farmers.

   b) The utilisation of loan must be ensured from time to time.

   c) There should be a follow-up action by the concerned department.

9. The beneficiary should culture at least 0.5 hectare of water area for fish cultivation.

10. The development of beels in Assam is an urgent need as 'beels alone' can meet the home requirements of fish in Assam. The Government is to modify the terms
and conditions for the development of beels fishery:

a) The leasing period of beels should be increased at least to 10 years.

b) The bidder must have to perform some developmental work of the beels like cleaning, control of aquatic vegetation, renovation of links with river etc.

c) At least, a portion of the beels must be utilised for culture practices viz; pen culture and cage culture.

d) Cooperative societies are to be formed to develop beels to increase fish production.

11. Special incentives may be created to offer for the special achievement of the farmers in the shape of reward or in newsletter.

12. The fallow land and water bodies should be developed to grow fish scientifically.

13. Extensive and intensive research work may be conducted on different aspects to increase the fish production such as to find the optimum stocking density, optimum farm size, other inputs etc. from time to time. Different constraints of fish production should be repeatedly studied to find remedial action to increase the production.

14. The Government planning should be based on field level study and that should be conducted by technical group of government. Government's record keeping system must be modified so that chronological study may be conducted for future plan of action. A
Census work should be made at least every decade to have proper idea of fishery position and progress to plan out future strategy. Government should check the distribution of subsidy so that no needy persons have been deprived of it.

15. The loan should be sanctioned at a comparatively low interest. If required, there should be provision for short period loan not exceeding one year as maintenance cost of the farm and the family.

16. The fish farming may be considered on commercial line for social and economic benefit.

17. Different integrated fish culture practices viz., fish-cum-pig, fish-cum-duck, fish-cum-paddy, fish-cum-dairy, fish-cum-poultry etc. should be more extensively adopted by the farmers. Besides, three-tier practices viz., fish-pig-duck, fish-pig-poultry, fish-duck-dairy etc. are also to be adopted by the people.

18. The sides of the ponds should be high elevated to prevent flood water and provision of water supply should be made to maintain the water level.

19. To find out more effective remedial action of the disease EUS, effective steps are to be taken by the Government. Intensive research work is required in this regard, for the development of the sector.

20. The coordination should be increased between Government and public cultivators. Overall research and extension programme should be encouraged for proper development of the fishery sector.