SUMMARY AND CONCLUSION

The main aim of the fish culture on commercial basis is to get high and profitable fish yields. This can only be possible through sustainable management practices without damage of environment. The successes of fish culture depend on a number of factors, of which fertilization of the ponds to increase the production of natural fish food organisms is a very important aspect. For fertilization of fish ponds both organic and inorganic fertilizers were used. The role of the fertilization is bringing about the growth of specific forage organisms and the change in physico-chemical parameters of the waters. For the present study, ponds have been selected, in which the managerial practices and the fish yields are different. The factors which are responsible for high fish yields were analyzed by studying several aspects of fish culture in these polyculture ponds under semi-intensive culture system for a culture period (August 2009 to July 2010).

Survival and growth of the fish was depending on the feed and fertilizer in cultural practices. In ponds, the required nutrients for the proper growth of fish are limited because of the nutrient loss in pond sediments. By using fertilizers and feed the requirement of nutrients in pond ecosystem can be rectified. Thus, the objectives of this experimental trail was to assess the influence of fertilization and supplementary feeding in different combinations on growth performance, physico-chemical characteristic of pond water, meat
composition, use of probiotics and disease observation of Catla, rohu, mrigala and pangas.

To compare the growth increments and meat composition of catla, rohu, mrigala and pangas under the influence of fertilization and supplementary feed in various combinations was conducted in earthen ponds having area of 1.0 ha with two replications for each treatment. After preliminary preparation of ponds, each pond was stocked with in the ratio of 3: 9: 3: 6, catla, rohu, mrigala and pangas respectively. In this experiment, all the ponds received the same quantity of N but the sources were different. The amount of organic manure, fertilizer and supplementary feed was calculated on N-equivalence of 0.2g N/100g body weight of fish weekly for cow manure, nitrophos and daily basis for supplementary feed.

The fish samples were captured randomly from each of the treated pond and their morphometric characteristics viz. total body weight and total length were recorded on monthly basis and after obtaining the data, the fishes were released back into their respective ponds. At the final harvest, the proximate composition of fish meat sample was studied. For the limnological studies, water samples were collected on fortnightly but their averages were calculated on monthly basis and analyzed for different physicochemical characteristics.

The findings of the present experiment are summarized as follows:
1. Overall, these four fish species attained the maximum average body weight in T4 which was treated with organic (cow dung), inorganic fertilizer (Nitrophos) and supplementary feed. Among the three fish species Pangas showed the maximum average body weight (1485.6 g), followed by catla (1300.7 g), rohu (1235.9 g) and mrigala (1064.6 g) in T4.

2. Among the abiotic factor water temperature played major role towards fish growth as higher increase in body weight was observed for all the treatments during summer while minimum increase in body weight was observed during winter for all the treatments which was perhaps due to low water temperature.

3. Catla, rohu, mrigala and pangas showed that the specific growth rate as 2.7850, 2.7576, 2.7073 and 2.8466%. Analysis of variance for specific growth rate revealed the highly significant difference for the months and treatments in T1, T2, T3 and T4, respectively.

4. Among the four fish species meat composition of the moisture percentage value under all the treatments mean values showed that the mrigala had highest (78.3%) moisture contents followed by rohu (77.5%), catla (77.0%) and for pangas (76.3%). The comparison mean of crude protein values under treatments showed that rohu has highest (18.4%) crude protein followed by catla (17.3%), mrigala (17.0%) and pangas (14.6%). In catla, mean value of all the treatments found to be 1.55%. 1.31% was recorded in rohu which a mean value of total fats. In case of mrigala, mean value of total fats was found to be 1.61%. In pangas mean value of all the treatments recorded as
1.44%. In all the four species total mean fat was recorded in mrigala (1.61%). The comparison of ash percentage showed that mrigala had highest ash contents 1.99%, followed by pangas 1.77%, catla 1.31%, and rohu 1.30%. The minimum and maximum percentage of carbohydrates is 1.32 and 1.85% in T1 and T5, respectively. The mean value of 1.54% was recorded in mrigala from all the treatments. In Pangas, the carbohydrates percentages were found to be 1.2, 1.18, 1.36, 1.45 and 1.35% in T1, T2, T3, T4 and T5. The lowest value 1.18% was recorded in T2 and maximum value was recorded as 1.45 in T4 under the influence of fertilization and supplementary feed. The mean value of carbohydrates from all the treatments found to be 1.31%. Among the species rohu goes to better results in case of crude protein (mean value 18.4%) and total fats (mean value 1.31%). Mrigala also occupied high position in respect to total ash (mean value 1.61%) and carbohydrates (mean value 1.54%).

5. The physicochemical characteristics of pond water remained within the favorable limits for fish culture. The correlation coefficient between water parameters remained non-significant under all the treatment.

6. In the present study, probiotics improved water quality parameters as well as fish growth by reducing pathogens, and enhance the production in the experimental ponds than in control ponds. Among all the treatments T2 (Procon-PS + feed probiotic Amruth) goes to better results. The application for probiotics in fish culture ponds appears bright. There is an over increasing demand for fish production and a similar increase in the search for alternative to
antibiotics. The application of probiotics intended for culture system now attracting considerable attention and number of commercial products is available, particularly directed at the culture organisms. Probiotics strains already adapted through natural process to the dynamics of an aquaculture.

7. Different types of diseases were observed during the study. All the four species are affected by bacteria diseases, fungal disease and crustacean’s diseases in the limiting manner.

Finally, above experimental findings proved that by using organic, inorganic fertilizers and supplementary feed is more helpful for the production of better yields by increasing planktonic biomass in the cultured ponds. Proper maintenance of water quality is also more influenced on the fish production.

Further, concluded that, sustainable management practices are solution for obtaining of high yield in the polyculture system with different combinations of fish species. In concept of sustainability, serves as a tool for evaluating the more sustainable product, a farm-raised fish. The technical advisory committee of the consultative group of International Agriculture Research defines sustainability as “Successful management of natural resources base and the orientation of technological and institutional changes in such as to ensure the attainment and continued satisfaction of human needs for the present and future generations” while marinating or enhancing the quality of the environment and conserving natural resources (Pullin et al., 2007). The present study concluded that the major carps
along with catfish’s pangas in rearing ponds in polyculture could be the great help in achieving better growth and higher survival for the production and it would not only meet the demand of stocking material for major carps catla, rohu, mrigala and catfish pangas grow out practices but also help in private sector to take up rearing activities for encouraging and commercializing above combination of polyculture in Andhra Pradesh as well as in India.

The main challenge lies in roughly tripling the level of output of fish production in the country by the end of 2020. Exactly how this will be achieved in a large complex issue. Improvement in infrastructure will definitely encourage fish farmers to shift to polyculture systems. Further, improvement in product quality through sustainable management practices will also help the boost production and accessibility to better yield. Through eco-friendly methods such as the use of probiotics and recirculating water systems, the prevention of virulent bacterial out breaks has been possible. Diseases prevention is much depend on good environmental management.