CHAPTER VII

SUMMARY
AND
CONCLUSION
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1. Investigations are carried out on biotic production in the managed and unmanaged sub-tropical ponds (T1 and T2) for a period of eighteen months from April, 1988 to September, 1989. Both the ponds have the same area of 0.045 hectare each.

2. A brief account of the topography, geography meteorology, climate of union territory of Delhi and morphometry of the two ponds under study are given.

3. Material and methods employed in the present study are outlined.

4. Comparative studies of various physico-chemical parameters of pond water such as temperature, turbidity, Hydrogen-ion concentration (pH), Oxyt (Dissolved oxygen), free carbon dioxide, bicarbonate alkalinity/total alkalinity, total hardness, chlorides, phosphates, silicates, nitrate-nitrogen, sodium, potassium, Calcium and Magnesium in both the ponds have been carried out. Diurnal variations of certain physico-chemical parameters of the pond water have also been studied. Their monthly variations are indicated in tables and figures.
5. Physical and chemical characteristics of soil such as texture, pH, Organic carbon and C/N ratio, available nitrogen, available phosphorus and available potassium in both the ponds have been studied. The monthly variations of above parameters are given in tables and figures.

6. Copepods, Rotifers, Cladocerans, Ostracods and Rhizopods which form the major groups of Zooplankton populations have been studied. The Copepods with an average of about 49.30% and 49.54% of the total zooplankton in ponds (T1) and (T2) respectively dominated other zooplankton groups. They have been followed by rotifers and cladocerans. The zooplankton constitutes about 6.22% and 6.37% of the total plankton during the study period in both the ponds (T1) and (T2) respectively. Zooplankton showed its minimum and maximum density during September, 1988 and March, 1989 respectively in both the ponds.

7. Chlorophyceae, Myxophyceae and Bacillariophyceae populations have been studied. Among these groups, chlorophyceae, the green algae with an average of about 36.44% and 35.66% of the total phytoplankton in ponds (T1) and (T2) respectively dominates during study period and followed by Bacillariophyceae (35.32% and 35.56%) and Myxophyceae, the blue-gren algae (28.24% and 28.78%). The phytoplankton with an average of 93.78% and 93.63% of total plankton in ponds (T1) and (T2)
respectively dominated over zooplankton in both the ponds.

8. Phytoplankton cycle, as observed, is short. Therefore, several peaks of phytoplankton have been noticed in both the ponds (T1 and T2) during the study period. Though extreme peaks of phytoplankton have been in the months of September, 1988 and August, 1989 in both the ponds. Zooplankton peaks have been noticed during March–April, 1989 in both the ponds. The monthly variations of phytoplankton and zooplankton are given in tables and figures.

9. Inverse correlation between phytoplankton and zooplankton in the managed (T1) and unmanaged (T2) ponds has been observed.

10. Zooplankton peak appear to follow that of phytoplankton peak in the managed (T1) and unmanaged (T2) ponds to indicate the trend of cyclical alternative abundance.

11. Influence of conducive environmental factors on the phytoplankton and zooplankton cycles indicates the adequate supportive biomass at primary and secondary level of food chain for the growth of fish in both the ponds (T1) and (T2).

12. The stocking of three major carp species was done in the ratios of 4:3:3 (Catla, Rohu and Mrigal) in both the ponds. Fishes were stocked at fingerling size (95–160 mm) instead of
fry and advanced fry size. The stocking rate of 6000 per hectare has been followed. The length of species measured during the study period has been taken as furcal length (FL).

13. The average growth increment has been maximum in *Catla catla* (*Catla*), less in *Labeo rohita* (*Rohu*) and least in *Clarias mrigala* (*Mrigal*) in both the ponds (T1) and (T2) during the study period. Average weight of *Catla*, *Rohu* and *Mrigal* have been 1805.0 gm/1050.5 mg, 1485.6 gm/310.5 gm and 1070.4 gm/821.6 gm at the end of study period in the managed pond (T1) and unmanaged pond (T2) respectively.

14. At the end of 12 months period of the study, on the basis of average growth of fishes the total production has been 5464.44 kg/ha and 2820.22 kg/ha in the managed pond (T1) and the unmanaged pond (T2). But at the end of study period of 18 months, the total fish biomass, on the basis of average growth of fishes, has been 8932.66 kg/ha and 5638.88 kg/ha in the managed (T1) and unmanaged (T2) ponds respectively.

15. Certain environmental factors such as pH, respiratory gases such as dissolved oxygen and free carbon dioxide have played a vital role on the productivity of both the experimental ponds (T1) and (T2) during the period of study.

16. The lower range of dissolved oxygen and pH as well as fluctuation of free carbon dioxide with much higher seasonal peaks
in the unmanaged pond (T2) has reflected on the delayed rise of the fish growth curve.

17. Almost stagnant growth in unmanaged pond (T2) appears to be influenced during July-August-September, 1988 by the precipitation resulting in unfavourable turbidity.

18. Comparatively the steady rise of the fish growth curve in the managed pond (T1) right after the stocking period and more prominently from September, 1988 onwards could be due to healthy aquatic environment as well as extraneous nitrogen input through feed and fertilizers.

19. The favourable peaks of plankton during post monsoon and during winter with higher values in managed pond (T1) and comparatively lower values in unmanaged pond (T2) justifies the differential growth of fish and total biotic productivity in the two experimental ponds.

20. Water management is another crucial input in aquaculture by upholding the cycles of essential ecological parameters to support the sustained growth of biotic production and productivity.

21. The overall fish quantum, depending upon the primary and secondary level productivity supporting nutrient status of the unmanaged pond (T2) is obviously more in managed pond (T1)
resulting from added nutrients in the form of manure and feed.

22. Thus, in addition to the maintained aquatic environment health, the supplementary nutrient input could enhance the overall biomass productivity of ponds.