5. Conclusion

Ichthyofaunal study in Bhandardara reservoir during the period Jan 2011 to Dec 2011 and Jan 2012 to Dec 2012. The report presents the result of monthly variation of physicochemical Parameters, monthly variation of diversity and density of Phytoplankton, zooplankton and diversity of fishes.

Physico-chemical parameters

In order to ensure sustainable management and optimum exploitation of the aquatic resources, it is necessary to set safe limits for the pollution impact indicators. The goal of all types of monitoring programs is protection of the environment and its resources. Data collected from monitoring programs explains existing conditions and helps recording of changes in these conditions over time. In the want of prior knowledge of environmental conditions, monitoring establishes a baseline for future comparisons. The implementation of a biological criterion approach that directly measures biological integrity is, therefore, essential to account the status and trends in freshwater ecosystems. Freshwater ecosystem monitoring programs are usually long-term, data intensive programs that establish points of reference for environmental conditions, and then attempt to document and identify change in these conditions over a long period of time. Long-term examination of the above water quality parameters explained that, in general, the pre-monsoon is the season at which certain parameters exceeded the limits of standards.

Plankton

The plankton on which whole of aquatic life depends directly or indirectly are governed by a number of physical, chemical and biological conditions, their interactions, and tolerance of organisms to variations of these conditions. Limnological studies are therefore significant in the understanding of aquatic community structure, algal biodiversity, tropic and pollution status, nature and degree of anthropogenic impacts on aquatic systems. This information is essential to the conservation of precious water resources as well as wildlife in relation to such systems. Therefore, quantitative and qualitative aspects of algal component, and its seasonal dynamics in relation to water
To summarise, physiochemical parameter are within the permissible limit as per WHO and ISI standards. The normal treatment at filtration unit makes the reservoirs water potable for drinking.

The reservoir occupy fraction of the landscape. In rural area these small water bodies are important resources for human use. They have intrinsic ecological and environmental values. Beside, human usage, they are used for many commercial purposes including fishing and irrigation. The reservoir help to regulate stream flow recharge ground water aquifers and moderate droughts. They moderate temperature and affect the climate of the surrounding area. They provide habitat to aquatic and semi aquatic plants and animals, which in term provide food to many terrestrial animals, adding to the diversity of landscape.

**Phytoplankton density and water quality parameters**

The three-year average phytoplankton density of the Lake and that at different stations suggested that the nutrient impact on the system in general was quite low, characteristic to oligotrophic systems. In general, algal density fluctuations across different stations were significant during the pre-monsoon and northeast monsoon but insignificant during the southwest monsoon. Throughout the seasons *Chlorophyta*dominated at all stations. Another significant tendency noticed was the dominance of Desmids over Chlorococcales among Chlorophyta throughout the seasons at most of the stations which suggested a normal trophic structure expected of a typical unpolluted freshwater system. The Lake is famous for its endemic fish fauna.

The system therefore offers a typical system for depth study of Desmids and their interrelationships with endemic fish fauna. Correlation studies of hydrobiology with physicochemical parameters revealed that the relationship between phytoplankton density in general and that of the specific groups are highly complex and often controlled by interactions of different factors, some of which are unidentified. However, certain groups were found to be positively correlated with certain parameter, while certain other groups were found negatively correlated with certain parameters. In developing definite and clear trends of interaction between different factors and hydrobiology of water body three-year monitoring is minimal. In developing such trends a long term monitoring is essential.
Rotifers dominated the zooplankton community during much of the growing season. However, copepods predominated the zooplankton community during mid-July and early September. It appears that there was a rotifer bloom in mid-June when a rotifer density of nearly 1.5 million per square meter was reported. Cladocera and Copepods were also most abundant during June. The large-bodied cladocera, *Daphnia pulicaria*, remained present throughout the growing season. Thus, it appears that some biological control of the lake’s phytoplankton community occurred throughout the growing season. Typically when *D. pulicaria* is found in a lake, it is only at measurable densities in the spring or possibly the fall.

In the present investigation 20 species of rotifer from two orders Ploimida and Gensiotrocha were observed. Out of 20 species recorded, 9 families belonged to Ploimida and 4 families to Gensiotrocha, were encountered. Rotifers particularly order Ploimida was dominant than the order Gensiotrocha. Order Ploimida represent 14 species and these species are from 9 families. Gensiotrocha represents 7 species from 4 families In rotifer 4 species belonging to Epiphanidae family, 2 species to Lecanidae, Natommtidae, Philodinidae, 3 species toFlosecularidae and 1 species each to Colurellidae, Proalidae, Scarididae, Trichocercidae,Asplanchninidae, Gastropodidae, Conochilidae and Testudinellidae family.

It showed seasonal variations and the density was higher in summer [38%] > winter [35%] > rainy [27%]. Rotifer constitute the tendency in order such as Ploimida [54%] >Gensiotrocha [46%]. In the rotifers The temperature of water samples ranged from 21.9 0C in winter to 26.9 0C in summer. The decrease in water temperature is allows well mixing of water column. The pH ranged from nearneutral [7.2] during rainy to alkaline [7.9] during winter, with maximum [8.2] in summer. Thereduced buffering capacity of this system total alkalinity [58.6 ppm] allows strong changes in pH[Merino et al. 2008]. High and low values of DO and pH are associated with pulses and decrements of plankton, respecting zooplankton.Electric conductivity [EC] ranged from 71 to 128 µmho cm-1. This ionic concentration canberanged as being intermediate. According to Talling&Talling [1965] classification, it belong toclass-I [<600 µmho cm-1]. COD values were ranged from 20.3 to 33.3 ppm, with minima valueduring rainy and maxima in summer. It coincided with a period of low densities.

Depending on the study it can be concluded that the diversity and density of zooplanktons from Bhandardara Reservoir exhibited by four major groups (Rotifera, Cladocera, Copepod and Ostracoda) with 17 genera showed seasonal variability in density due to different parameters
which impact on them. The temperature, higher standing crop of primary producers leading to availability of food in the form of bacteria, nanoplankton and suspended density least predation due to higher quantity of water, higher alkalinity and less quantity of water (dilution effect) taneously dissolved oxygen and hardness of water were also favorable for planktonic growth.

Zooplankton density was least in the monsoon seasons. This was due to dilution effect, high turbidity and less photosynthetic activity by the primary producers. Maximum population of Rotifera observed in winter season and Ostracoda dose did not show any seasonal remarkable fluctuations, representing their preferred avoidance behavior and occurrence at the bottom of the water.

Thus study has determined that abundance of zooplankton has been governed by the cumulative effect of physico-chemical and biological variables. The summer species has a very short flight period, indeed, it is encountered only in mid-August. The Megachilidae often called leafcutter have a long and slender glossus. The species of this family are easily recognized for their pollen collection device: a brush of hairs on the ventral. This consists of stiff hair, tilted backwards, but a representative parasite of this family does not meet this description.

The above observations in the present study indicate the higher values of some parameters of the samples. They minimize the suitability of these samples for drinking purposes without treatment. But, after the filtration and disinfection, naturally present impurities can be removed in water, which provide its suitability for drinking and domestic purposes.

Bhandardara a hilly and triabal area, is located in the sahyadari mountain range of west maharastra. Despite the heavy rainfall in the area, the rocky characteristic of the land has lessened the water holding capacity of the soil in the region. Consequently the people in this area have less number of earning sources. Beside as the area was declared a wild life sanctuary in 1986 the major source of livelihood the fishing is also banned. It has badly affected the health and living standard of the people in this area. The present work will prove a database for the agencies which work on sustainable development of Ichthyofaunal diversity and fisheries. The work also suggest that illegal and unscientific Fishing practices need to banned. It recomended the scientific training of monitoring physiochemical parameter, scientific managements practice and fish farming training to the local people. In addition introduction of exotic fisher to the reservoir would be a good step towards improving the Ichthyofaunal diversity, production status of the reservoir and
also in the enhancement of the earning of the people. Eventually the research work will assist in the socioeconomic upliftment of the fisherman community and in the holistic development of the area on a wider scale.

**Suggestion:**

- Illegal and unscientific practices of fishing should be restricted in this area by local fishermen.
- For conservation of reservoir develops agencies for regularly checking the physical chemical parameters to save aquatic ecosystem.
- For conservation and development of the reservoir the scientific management is essential to introduce exotic species to rise production yield of reservoir.
- Give a fish farming training to local people and encourage them artificial fish farming for enhancement the earning of the local people.

**ABBREVIATIONS USED**
µm  micro meter
µs/cm  Micro Siemens per centimeter
Acid  Acidity
Alk  Alkalinity
AT  Atmospheric Temperature
BW  Bottom-water
BOD  Biological Oxygen Demand
BT  Bait
Ca  Calcium
Chlo.  Chloride
CO₂  Carbon dioxide
COD  Chemical Oxygen Demand
DO  Dissolved Oxygen
DO  Dissolve Oxygen
DW  Distill water
EC  Electrical Conductivity
Env.  Envoirment
FD  Food fish
km  Kilo meter
L  Litre
LM  Local migrant
LV  Larvivouras fish
MD  Medicianl fish
mg/l.  miligram per liter
PF  Predatory food fish
pH  PotentialHydrogenii
R  Resident
SW  Surface-water
TDS  Total Dissolved Solids
Temp  Temperature
TH  Total Hardness
TS  Total Solids
TSS  Total Suspended Solids
WF  Weed fish
WHO  World Health Organisation
WM  winter migrant
WT  Water Temperature
µS  Micro Siemens