Synopsis

Limnology refers to the interactive science of aquatic organisms it is branch which deals with biological productivity of inland waters, Welch (1950). Globally water is broadly classified into fresh water and salt water. Fresh water is present in lentic & lotic form flowing & stagnant form in river, lake, streams etc the fresh water which is utilized by human is mostly come from rains and melting of glaciers, which fill are streams, lakes, river and ponds. The topography and climate seasons play important role in the life of living being. Water is a biological necessity for plants and animals it has unique properties as a medium for animal life for it contents many salts and other substances which are utilize during metabolic activities of animals. Water quality can have great influence on the ability of aquatic organisms to exist and grow in stream, pond, lake & reservoir.

Water is the most basic natural resources essential for the survival of life on the earth. It is also powerful agent for social economic cultural and development of human society but due to increase population explosion continuously the natural resources are verge on extinguish. In all these water is
the most precious life on the earth due to continuous utilization of water resources. Water scarcity is many countries is becoming and increasing constraint. As the summer season arises water scarcity becomes major problem for people as well as the society to face water crises.

As a due to water crises most of the human habitants migrate in search of good resource of water in areas where there is adequate supply of water. Total available water of the world has decreased 40 to 60%. Only 2.7% is available as fresh water fit for drinking, irrigation & such other purpose. It is small percentage which has to be utilized in proper way by recycling it for future use as surface water in towns & cities becoming increasingly polluted. In India agriculture sector is the largest consumer of water as about 83% of the water is used for agriculture alone. Which is because the quantity of water required for agriculture has increased progressively through the years. Today fresh water with drawl from lakes and rivers doubled since 1960 with 70% world wide used for agriculture. In the recent past the problem of sustained water supply was globally addressed through the construction of small medium and major reservoir also referred to as man made lakes across river their tributaries and streams and canals (I L.B.M.S. Kodakar). The present water crises of country has several reasons to blame of these are growing population, second increasing
industrialization coupled with poor management of water resources in spite of several schemes on rainwater harvesting two third of rainwater flows out of the sea. On this base lake, streams are very powerful concepts for storage water resources to be used in future crises as well as it is very useful for pisciculture, which will feed the need of growing population food crises and protein demands due to shortage of crop & pulses. In last few years lakes are facing the problem of poor quality of drinking water which has been chronic problem in ruler area where lake is the only traditional fishermen community. Associated with the lake need to be giving training in modern techniques for fish production to enhance protein availability for rural population. The water supply has been affecting health of people due to higher level of nutrients nitrates & phosphates reaching through the sewage water enters the lake associate with eutrophication. Direct human activities like washing bathing cattle wading may be prove to be much more effective factor for pollution in rural areas. It is very much necessary for the analysis for the lake water before the eco system becomes polluted leading stress on the ecosystem.

In order to utilize fresh water body it is very important to study the physico-chemical and biological parameter of the ecosystem. A lot of work on hydrobiology has been carried out by many workers both national and
international. On dams reverse water body, but many of rural areas lakes are still to be investigated. Biodiversity of inland water is an important source of food, income and livelihood. It maintains hydrological balance, retains, nutrients and sediments and provides habitats for various flora and fauna. But due to climate change, the inland water ecosystem has been affected. More than 20% of the world’s fresh water species have become extinct.

Biodiversity is important component of fresh water system & is controlled by temperature and hydrology. The maintains of biodiversity is important key to the retention of these eco systems survive. Palmer et.al (1997-2000). Field survey and observation are the only input in the distribution analyses of species.

Information on species diversity richness evenes and dominance species evaluation on biological components of the ecosystem is essential to understand detrimental changes in environment or determination of water quality Krishna Moorthy and Subramanian (1999).

**Topography of Area:** Tarangwadi lake is situated near Indapur Baramati road it is 50km away from Baramati region it’s an earthen type of lake mainly used for drinking, irrigation and pisiculture. The Bhima river flow from west to east
water from Khadakswasala dam is passed through bank canal km 202 Indapur branch canal.

Bijwadi lake is situated 5km away from Nimgaon ketki which is on Baramati Indapur road situated near sugar cane factory it is also named as gargao talab covered by rocky surface area water is mainly used for irrigation and pisciculture. The lake are surrounded by agricultural fields on its both sides. T1 Forest area (West) there is green house built and area is surrounded by walls. T2 Fisherman (Huts North) there is human inhabitants and fisherman. Huts where maximum catchments. T3 (East) water is supplied to drinking purpose.

B1 (East) the outlet of Bijawadi lake
B2 (South) near sugar factory, Mahtma Phule nagar, Karamveer Shankarrao Patil Sahakri Sakhar Kharkana
B3 near irrigation land.

In rural areas lakes are contaminated due to increase in human and animal waste so there is need to constant analysis of water quality. These water bodies may be checked by

**Physicochemical Parameters** such as rainfall, temperature, water temperature, TDS, pH, DO, BOD, alkalinty, hardness, phosphates, ammonia, nitrates, and
sulphates and biological parameters like phytoplankton, zooplankton and ichthyofauna macro invertebrates provides clear picture of ecological relationship in water body. Disease producing bacteria, protozoans, some warms larva of crustacean and some arthropod fauna zooplankton and phytoplankton are indicators of the sewage contamination pollution of water body.

**Material & Methods:** The Physico Chemical parameter like Rainfall, Temp, Air Temp, PH, D.O, BOD, TDS, Alkalinity Hardness Nitrates Sulphates Ammonia Phosphates Rainfall data is collected from Metalogical department of pune.

Air Temp and water temp are recorded by thermometer.

PH is recorded by PH meter and paper strip on the spot.

D.O, BOD Samples were collected from sampling station T1, T2, T3, B1, B2, B3 during July 2008-june 2010 in early Morning hours between 9am to 12.30am in Borosil glass bottles of 500ml plastic cans of 5lit from each sampling station D.O and BOD bottles were fixed on the spot.

TDS samples of water were detected by Dr. M.S. Kodarkar 1992 Alkalinity, Hardness, Nitrates Sulphates, Ammonia Phosphates were estimated by methods prescribed for the analization of water by (Trivedy and goel 1986)

Biodiversity of Aquatic animals consists of phytoplanktons, Zooplanktons, Macro invertebrates and Ichthyofauna, Phytoplankton’s study was estimated by collection of phytoplanktons by plankton. Sedimentation of water was made by lugols Iodine, phytoplankton were counted in 1ml sample by sedwig Rafter cell method and identified according to (fritsch 1975) Zooplankton were collected with the help of plankton Net of standard bolting silk cloth No 250 mesh size 0.03 to 0.04 mm by filtering 100 lit of water by a plastic bucket of 20 lit capacity finally the volume of sample was adjusted.

**Phytoplankton** are primary producers first encountered in water body reflect the average ecological condition and therefore they may be used as indicators of water quality Bhatt et al (1999), Saha et al (2000). The phytoplankton consists of both species pollution tolerant and pollution indicators species.

**Zooplanktons** are the second tropic states of an ecosystem whose main function is to act as secondary link in the food chain. Since zooplankton
community composition and structure is affected by eutrophication. This community can also be used as indicators of changing trophic status of an aquatic ecosystem Blancher (1984). Adequate knowledge of the zooplankton community’s and their population dynamic is the measure requirement for better understanding of life process in fresh water body. Eutrophication influences both the composition and productivity of zooplankton Bhora and Kumar (2000).

**Macrobenthos** inhabit of rivers and lakes and reservoir bottom and their distribution is directly related to food availability quantity sediment type. The macro benthos are playing an eminent role an occupy distinct place in food cycle some protozoans cause digestive disorder entamoeba histolytica is also found in water body by contamination with sewage they causes the amoebic dysentery.

**Ichthyofauna**, the fish fauna is an important aspect of fishery potential of water body considerable studies on fish diversity from different fresh water bodies of India have been carried out during the last few decades.
Result:

The Atmosphere temperature of Tarangwadi and Bijwadi lake of Indapur taluka dist. Pune.

1. During the both year July 2008- June 2010 ranged from 20.7°C to 36.8°C in early morning hours data between 7.00 am to 9.00 am all both Tarangwadi and Bijwadi lake.

   The water temperature ranged from 17.0°C to 33.5°C in years of Tarangwadi lake while in Bijwadi lake it ranged from 18.3°C to 33.7°C at both the year the water temp recorded between 10.00 am to 12.30 am during early morning hours both the lake.

2. The pH of the Tarangwadi Lake was slightly alkaline it ranged from 7.0 to 8.4 in both the species. While in Bijwadi lake it ranged from 6.6 to 8.3 in both the year July 2008 to June 2010 it was slightly acidic in nature.

   The presence of minerals carbonates make the pH alkaline which is suitable for phytoplankton’s.

3. The TDS total dissolve solids of Tarangwadi lake range from 178mg/l in the month of June to 310 in both the year while in Bijwadi lake it ranged from 190 to 330 mg/l in both the years. The limit of 500mg/l of TDS has been
describing for drinking water WHO 1984 as the Indian standard Prasad & Swati (2003). The TDS was maximum in summer while is minimum in winter season.

Alkalinity:

Alkalinity of Tarangwadi Lake ranged from 71 to 168 mg/l in both the year while in Bijwadi lake it ranged from 100 to 188 mg/l according to Jackson (1961) alkalinity below 50 mg/l indicate low photosynthetic rate in the present study the total alkalinity in the reservoir always high indicating high photosynthesis the high alklanity was recorded in summer season low alkalinity recorded in the monsoon season.

5. The hardness of Tarangwadi lake ranged from 142 to 268 mg/l in both the years while in Bijwadi lake it ranged from 152 to 318 mg/l in both the years. The maximum values where during monsoon season while minimum values were during winter.

6. The DO (Dissolved Oxygen) of Tarangwadi lake range from 7.0 to 10.4mg/l in both the year while in Bijwadi lake it ranged from 6.7mg/l to 9.7 mg/l in both the years the DO was high in summer seasons while low in rainy seasons DO in water at given temperature depends upon factors like temperature of water.
7. BOD (Biological Oxygen Demand) of Tarangwadi Lake ranged from 3.0 mg/l to 6.3 mg/l in both the years while in Bijwadi lake it ranged from 2.4 mg/l to 6.1 mg/l in both the years. The Biological Oxygen demands is in an important parameter. It was observed that BOD values were high in summer season while low in monsoon season.

8. The ammonia value ranged from 0.54 mg/l to 1.25 mg/l in both the years at Tarangwadi lake while in Bijwadi lake it ranged from 0.64 mg/l to 1.45 mg/l in both the year.

9. Nitrates, the nitrates value ranged from 0.070 to 0.35 mg/l in Tarangwadi lake in both the year. While in Bijwadi lake it ranged from 0.079 to 0.59 mg/l in both the year.

10. Sulphate ranged from 10.15 to 19.60 mg/l in both the years at Tarangwadi lake while in Bijwadi lake it ranged from 14.20 to 23.65 mg/l in both the year.

11. Phosphate, the phosphate ranged from 0.04 to 0.130 mg/l in both the year at Tarangwadi Lake while in Bijwadi lake it ranged from 0.06 to 0.137 mg/l in both the year.
Biodiversity

The biodiversity of phytoplankton of Tarangwadi lake recorded four groups Chlorophyceae, Bacillariophyceae, cyanophyceae, dinophyceae. While in Bijwadi lake it recorded 5 groups Chlorophyceae, Bacillariophyceae, cyanophyceae, dinophyceae, Euglenophyceae.

Zooplankton Diversity of Tarangwadi lake consists of 4 odour Rotifer, copepoda, Cladocera, ostracod among the order was the copepoda was maximum in Tarangwadi lake followed by Cladocera rotifer and ostracodes.

Copepoda > Cladocera > rotifer > ostracodes

While in Bijwadi lake Rotifer were dominant followed by Cladocera followed by copepoda and ostracoda

Rotifer > Cladocera > Copepoda > ostracodes

The biodiversity of ichthyofauna recorded 12 species of fishes from 9 families 6 order family cyprindae, siluridae, bagridae, cobitinae, channidae, notopteridae, chiclidae, belonidae and mastaembelidae. The most dominant species was families was cyprindae order cypriformes recorded 4 species from Tarangwad lake during the year 2008 – 2010 in Bijwadi lake the ichthyofauna recorded 9 species of fishes from 6 families 3 order families cyprindae, chiclidae, channidae, noemachelinae, mastaembelidae, channidae. The most
dominant species was from family cyprinidae recorded 5 species belonging to order cyriniformes among this fishes some are local while others are seeded for fish farming.

The microinvertebrates include phylum arthropoda, mollusca, phylum arthropoda includes insects prawn and crabs. Insects recorded 6 order odonata, hemiptera, coeleoptera, diptera, plectoptera and ephemeroptera at Taranjwadi lake. While in Bijwadi lake insects recorded 5 order odonata, hemiptera, coeleoptera, diptera, plectoptera.

The prawns recorded 2 species crabs recorded 4 species molluscan recorded 9 species from Tarangwadi Lake total 15 species from total species of arthropoda from Tarangwadi lake while in Bijwadi lake prawns recorded 3 species crabes recorded 4 species moluscans recorded 9 species from Bijwadi lake Total 16 species from Bijwadi lake.

The Thesis is composed of six chapters

The first chapter compress of general introduction the subject limnology and importance of water as an essence of life. This chapter throws light on total and importance of water in future days. It will give us idea construction and importance of lakes for future need of water scarcity. The sub
topic compresses of importance of biodiversity and need to protect biodiversity for survival of ecosystem study area it provides a well known data about the geographical and climatic region of the area. Indapur the sub topic includes total information of Tarangwadi and Bijwadi lake with maps and satellite picture.

Second chapter is the material method it comprises physicochemical parameters included in the study of rainfall, temperature, water temperature, TDS, PH, alkalinity, hardness, phosphate, nitrate, sulphates ammonia experiments that have been carried out are placed with their tables, graphs of both Tarangwadi and Bijwadi lakes.

Third chapter is the study of Biological parameters included as phytoplankton, zooplankton, of both Tarangwadi and Bijwadi lake with tables and graph.

Fourth chapter is Biodiversity of Aquatic animals physico chemical & biological parameter

fifth chapter include summary and conclusion of the present study work, lastly reference will do given.

Sixth chapter is Bibliography.