

# CONCLUSIONS

Ponds are valuable fresh water resource for mankind. But they are under threat of high contamination mainly due to urbanization. The stagnant and polluted ponds have now become a breeding ground for vectors of various diseases. The physico-chemical features of a pond are important as they can directly or indirectly reveal the limnological processes. Here in this study two such ponds namely, Sama pond and Harni pond of Vadodara city, were critically analyzed for there limnological aspects and anthropogenic relationship. Limmnological assessment of these ponds was carried out on the basis of quality analysis for the surface water. Also soil analysis was carried out by taking samples from periphery of the pond. The biotic component was analyzed as representation of biodiversity which includes planktonic forms, molluscans etc. along with assessment of Coliform bacteria from the pond water. Fish population study was carried out for Sama pond through morphometric analysis.

The three different sites within the Sama pond were selected for the present study depending upon the anthropogenic activities taking place at the site. Site specific variation has been observed for few physico-chemical parameters. The highest value of pH was recorded during summer months at site-1 and site-3 and the minimum values were observed in winter and monsoon respectively at site-1 and site-2 and Acidity was highest in monsoon months at site-1 and at site-2. The Alkalinity was recorded highest at site-3 in the month of May. The Chloride values were high at site-3 in July and low at site-1 in the month of April. The water hardness was highest during monsoon and lowest in winter at site-3 and in summer at site-1 and site-2 both. The value of Total Solids (TS) was recorded highest at site-2 in the month of May and during second year maximum at site-1

during summer and at site-2 and 3 in winters. The minimum value of DO was recorded at site-2 in the month of November. The value of DO was observed in winter at site-1 and site-2 and in monsoon at site-3 while lowest at site-3 in (February) winter in second year. The maximum value of Total Phosphorus was recorded in July at site-3 and minimum values of Total phosphorus were observed in winter at site-1 and site-2.

The Sama pond was studied for complete two years (2007-08, 2008-09) for its water quality status. Alkaline pH was observed during the entire study period. The range of acidity in water was comparatively lower in first year than in the second year. The alkalinity was high during summer in first year while it was highest in monsoon during second year. During first year Calcium hardness was higher in monsoon while Magnesium hardness was low. Total Solids were found above the normal range for both the years. Highest values of Total Solids were recorded during summer for both the years. Dissolved oxygen was within normal range during both first and second year. Nutrients like nitrate was recorded high during summer while Total phosphorus was comparatively less in winter during both the years.

During the water quality assessment of Harni pond it was observed that the pH remained alkaline throughout the study period. The value of acidity was lowest in winter and highest in monsoon and that of alkalinity was minimum in winter and maximum in summer. Both the Total Solids and chloride were high in summer months.

Soil quality is very much important parameter for assessment of ecological state of the reservoirs. Here in this study comprehensive analysis of soil quality for both the ponds was carried out. For Sama pond the pH of soil for all the 3 sites was alkaline with very less variation during entire period of study. Water retention capacity of soil sample from site-3 shows more fluctuations, this may be due to more exposed slurring might be allowing atmospheric effect on the sample area. The dissolved organic matters was high with considerable monthly variations, may be attributed to more anthropogenic activities surrounding the site. The depletion in soil quality may be due to the influence of anthropogenic activities around the water sheets. The pH of soil was alkaline at almost all the 3 sites. There was increase in organic matter content and Total Phosphorus. Thus due to many factors nutrient content of the pond will increase. Alkaline soil absorbs more phosphorus from soil therefore; it is the positive factor for productivity. Water retention capacity prevents the percolation of water and helps in recycling of humus and maintains the water level of the pond. At Harni pond the pH of the soil is almost alkaline, the minimum pH was recorded in winter and maximum in monsoon, so there is a possibility of increasing Organic matter and Total Phosphorus. Maximum water holding capacity was observed during winter and the average water retention capacity was recorded above 50%. Total phosphorus was reported highest during winter.

In the present study, 33 species of phytoplankton and 14 species of zooplankton were recorded from Sama pond. Among this, in phytoplankton, chlorophyta is dominant group, while crysophyta and cyanophyta were subdominant. Largest

contribution is of zooplankton, the crustacean is dominant species found in almost all the samples. *Chlorella*, *Navicula*, *Euglena* and *Oscillatoria* species were also recorded. Other than *Bacillophyaceae*, *Chlorophytaeae* population was represented significantly. The study reveals the presence of zooplankton with copepods as dominating group.

Molluscan diversity was estimated by identification of the collected specimen or shells, class gastropoda and class bivalvia were observed from the study sites. The gastropods were more in number than bivalves. A total of 11 species of molluscan varieties were found. At each site the number of individuals varies from 0 to 35 of different species. Out of 11 species of fresh water mollusca three species viz., *Lymnae*, *Tharia* and *Planorbis* were identified to act as intermediate hosts in several diseases.

Average of total and standard length of fish population of Sama ponds is 15.17cm and 12.89 cm respectively. Positive correlation has been observed between total length and weight and standard length and weight of fish population of Sama pond. The growth pattern of fishes of Sama pond is allometric. The allometric growth of fish may be due to the type of water, pond stability and differences in plankton population, there is a need to investigate variation in fish growth parameters along with physico-chemical and biological water quality parameters, to find out whether variation in growth and well being of fish are influenced by fluctuations in water quality.

To understand the possible relation of pond quality parameters and overall health condition of inhabitants surrounding the pond, regular data collection was

done through health camps and the secondary data were collected from the Health department of Municipal Corporation. During the socio-economic survey it was revealed that the locals residing near the ponds are prone to diseases like malaria, gastroenteritis (GE), cholera and diarrhea, skin irritation. Among them more cases of GE and skin irritation were reported from the inhabitant population. Contact with water containing high amounts of blue green algae can cause skin irritation.

During the study period it was observed that comparatively Harni pond is subjective to lesser anthropogenic activities than Sama pond. Usually Harni pond is a site preferred for sewage and waste dumping. On the other hand Sama pond is having better access for human activity and various activity patterns were marked. Sama pond geographically located beside a highway, hence immense pressure of transportation is recorded along the site. This easy access made the pond subjected to more activities compared to Harni pond. The Harni pond is away from easy access from highway and comparatively lesser slum inhabitation. As this pond receives more amounts of general waste and untreated sewage from different sources, usually observed in hyper organic status, visible through more vegetation and greenness of water.