MATERIALS AND METHODS

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Materials and Methods

3.1 Preface

Aquatic resources are subjected to adverse impact from three major factors, fertilizer and pesticide dependent intensive modern agriculture, industrialization and population explosion. The influence of these factors vary in magnitude depending upon geographical location. Proper sampling and analysis methodologies can correctly determine the nature of pollution of water bodies. Water quality assessment generally involves Physico-chemical and biological parameters and reflects on abiotic and biotic status of the ecosystem. Chandni dam was undertaken for present investigation.
3.2 Materials

3.2.1 Sampling stations.

To get overall limnological picture of a water body sampling stations were fixed taking into consideration a variety of factors like catchment, topography, pollution sources, agricultural and washing activities inlet and outlet etc. There are four sampling stations namely sampling station A, B, C and D. These are as follows.

1) Sampling station A

The sampling station A is located on the North side of the dam is Kandalgao (Dahitane). This is the place where cloth washing and bathing domestic animals, disposal of domestic sewage are regularly done.

2) Sampling Station B

The sampling station B is on west side of the dam Present towards Dudhi (Bavachi). This is the slightly polluted site where village Pimpalwadi is located. There is an evidence of raw sewage being added to the lake.

3) Sampling Station C

The Sampling station C is on South side of the dam is Pimpalwadi (Brdhmgaon). Domestic animals are visited to dam from this site.

4) Sampling Station D

The sampling station D present towards East side of dam is Wakadi (Shirsav). This is the site where there is little human activity.

3.2.2. Sampling schedule and Procedure

A) Sampling to study Physico-chemical parameters

Surface water sample were collected directly in two-liter capacity plastic containers by gently wading the container in the upper layer of the water. The
analysis of water temperature, dissolved oxygen, dissolved CO$_2$ was made on site, as they are liable to change during transport to the laboratory. For the analysis of other parameters the samples were brought into laboratory and stored in refrigerator till the completion of analysis. The analysis was completed within 72 hours after collection of water. For dissolved oxygen analysis samples were collected in 300 ml capacity B.O.D. bottles and oxygen was fixed on site and brought to laboratory for further analysis.

B) Sampling for Zooplankton study

The zooplanktons were collected with the help of zooplankton net. Initially about 50 liters of water sample is filtered and concentrated to 50 ml. This concentrated 50 ml samples were preserved in 4% formalin. These samples were used for microscopic analysis.

There are about total 20 fish co-operative society in Paranda Tashil out of 20 only important are one co-operative society in district.

Chandani dam is a minor irrigation am used for fisheries activities by the “Shri SaiBaba Magasvargiya Matsuavaivsal Cooperative Society Ltd”.

Wakadi. Tq. Paranda. Dist. Osmanabad. The available data on fisheries of the dam is not adequate and reliable. Hence the present work was undertaken to study the fishery activities performed by the fishermen so that this would help them to develop the dam.

METHODS

3.3 Physico-Chemical analysis

Physico–chemical analysis of water sample of selected four sites was carried out for different parameter as described in APHA (1989 and 1998), Trivedi and Goel (1984) and Kodarkar (1992), and IAAB (2006)

3.3.1 Temperature

The temperature of the water bodies were measured at the sampling station in the morning hour by thermometer ($0$-$100^\circ$C). The water sample was taken in a measuring cylinder and its temperature was recorded immediately by immersing
thermometer up to the level of mercury in capillary columns in water for sufficient
time so as to get a constant level of reading.

3.3.2 pH

pH is the negative log of hydrogen ion concentration. A neutral solution
has a pH of 7, less than 7 renders it acidic and pH more than 7 it is alkaline. pH
was measured with the help of field pH-meter( Hanno model champ).

3.3.3 Transparency

Transparency or light penetration in a body of water is one of the most
important characteristic of water quality. Transparency of water largely depends
on the optical properties which are influenced by particular impurities present in
it. Transparency is dependent on turbidity which directly proportional to the
amount of suspended matter. The transparency of water to light was measured
using Sacchi disc.

3.3.4 Turbidity

The turbidity of water was measured with the help of Nephelometer of
range 0.5-40 to as low as .05-1 NTU.

3.3.5 Total Dissolved Solids

Presence of total dissolved solids in the sample water was estimated by
evaporation dish at 103ºc. The amount of total dissolved solid was calculated by
determining residue. The calculation was carried out by with the following formula

\[
\text{Total Dissolved solids (mg/lit.)} = \frac{\text{Wt. of residue} \times 1000}{\text{ml. of Sample}}
\]

3.3.6 Dissolved Oxygen (D.O.)
Dissolved oxygen present in natural waters depends on physico-chemical and biological activities in the water body. Its solubility is related to pressure and temperature. The dissolved oxygen was determined by Azide modification of Winklers Idometric method (APHA 1989). The sample was collected in 300 ml capacity ground stoppered glass B.O.D. bottles without any bubbling. Then 2 ml of each saturated manganese sulphats and alkaline iodide Azide solution were added. The precipitate was dissolved by adding 2 ml of conc. $\text{H}_2\text{SO}_4$ in sample water and the liberated iodine was titrated against standard Sodium Thiosulphate (0.025N) solution using starch as an indicator. The calculation was carried out with the help of following formula.

\[
\text{DO (mg/lit)} = \frac{0.1 \times \text{ml. Titrant} \times 1000}{100 \times \text{ml of Hypo} = 0.1 \text{mg of DO}}
\]

3.3.7 Dissolved carbon dioxide

The dissolved carbon dioxide was calculated by titrating the water sample against 0.44 N NaOH and resultant change in pH from acidic to neutrality to alkalinity was detected by phenolphthalein. The calculation was carried out with the following formula.

\[
\text{DcO}_2 \text{ (mg/lit) } = \frac{\text{ml of titrant} \times \text{Normality of titrant} \times 44 \times 1000}{\text{ml of sample}}
\]

3.3.8 Hardness
Hardness of water was determined by EDTA method as described in APHA (1989). The pH of the sample was increased to 10 with help of ammonium with the buffer solution. Erichrome Black T indicator was added in this alkaline water sample, which forms a wine red complex of calcium and magnesium. The solution was titrated with std. EDTA solution. The EDTA breaks the complex and forms blue colored compound. The end point was permanent blue color. The amount of EDTA solution required was noted. The hardness of water sample was calculated by using following formula.

\[
\text{ml of EDTA} \times \frac{1000}{\text{ml of sample}} = \text{Hardness (as CaCO}_2\text{mg/ltr)}
\]

**BIOLOGICAL ANALYSIS**

Physical and chemical characteristics of water bodies affect the abundance, species composition, stability, productivity and physiological condition of aquatic organism. Biological method is used for assessing water quality such as pollution but pollution has traditionally been chemical oriented and biological aspect have in a subsidiary position because of number of complication in analysis and interpretation, collection of biological data. Biological analysis of water includes collection, counting and identification of aquatic organisms. **Biologically monitoring of water includes, Plankton Analysis**

The two hundred liters water samples were filtered through the net number 25 bolting silk. The samples collected were concentrated to a 50 ml volume and preserved in 4% formalin. Each replicate of phyto and zooplankton samples was identified under research microscope using suitable keys, standard texts and monographs given by Pennak (1978), Tonapi (1980), APHA (1985) Macrophytes or Aquatic weed, IAAB (2006)

**Macrophytes studies**

Macrophytes in shallow water were collected directly while those from deeper water with the help of long handled hook. On collection the specimen was
the thoroughly washed an excess water soaked with filter paper, kept in polythene, bags and brought to the laboratory in ice box. Kodarkar IAAB (2006) The plants were identified with the help of published literature.

**Ichthyofauna**

Fishes were collected from reservoir with the help of local fisherman for two years. Fishes were cleaned with clean warm water to remove dirt, microorganisms and blood strains and preserved in 10% formaldehyde solution. A systematic identification of fishes were done with the help of standard literature (Day 1878, Talwar and Jhingran, 1991, Khanna 1992 and srivastava et al 1994)