

## PHYSICO-CHEMICAL STUDIES OF PANSHEWADI DAM WATER IN KANDHAR TALUKA DISTRICT NANDED (M.S.) INDIA

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**INTRODUCTION**-The Panshewadi dam is one of the most important aquatic reservoir from Kandhar taluka in Nanded district, Marathwada situated at  $77^{\circ} - 11' - 0''$  longitude and  $18^{\circ} - 47' - 0''$  latitude. The freshwater sources in India are mainly contributing for augmenting the crop productivity in agriculture. Therefore, it has become obligatory to analyze at least the important water parameters when ecological studies on aquatic ecosystems are carried out. It is necessary to know the physico-chemical properties of water to study the rearing practices of the fish in water bodies. The Panshewadi dam is one of the minor irrigation projects of Maharashtra State. The main scope of this dam is irrigation, fish culture and drinking purposes.

**MATERIALS AND METHODS**-The water samples were collected for physico-chemical analysis from three stations. At regular intervals of one month a period of one year from June 2007 to May 2008. The samples are well mixed and stored in two litre plastic cans. Sample collection was usually completed during morning hours between 6.00 am to 9.00 am every for further analysis. The Water temperature, Water transparency, Dissolved Oxygen and Hydrogen ion concentration ( $P^H$ ) were estimated on the spot at the time of sampling while other parameters were estimated in the laboratory. Standard methods as prescribed APHA (1992), Kodarkar et. al, (1998), were followed for examination of various physical and chemical parameters of water. Water transparency was measured by Secchi disc having a diameter of 20 cm and divided into black and white quadrants. The depth at which the Secchi disc was visible was determined.

**RESULTS AND DISCUSSION**-The seasonal variation in physico-chemical parameters are given in table no. 1 and 2 respectively. The temperature of water were found to be in the range between  $22.5$  to  $35^{\circ}C$ . the temperature of water was maximum in the summer season and minimum in the winter season at

all the three station. The temperature of water is one important physical parameter which directly influence some chemical reaction in aquatic ecosystem. The significant correlation between ambient temperature and water temperature was observed by Shinde (1995), recorded the temperature range of Tansa River from  $20$  to  $32^{\circ}C$ . The low oxygen values coincided with high temperature during the summer months. (Mazharsultan and Dawood Sharief (2004), Deshmukh J. U. and Ambore N. E. (2006)) The water transparency depends on the microorganisms present in water bodies and suspended organic and inorganic matter present in water. In the present study it ranged from  $30.2$  to  $80.9$  cm. The water transparency values were maximum in the season of summer and minimum in the season of monsoon. During the end of September or in the month of October, the rainy season is practically over, the suspended matter settles down and water becomes more transparent as the turbidity decreases. Similar results were observed served by Pulle (2000). Sakhare and Joshi (2003) observed the transparency value varied from  $73$  to  $117$  cm. from Hilegaon reservoir in Osmanabad district, Maharashtra.

The total solids values were found to be in the range between  $270$  to  $395$  mg/l. It was maximum in the season of monsoon and minimum in the season of summer. The total dissolved solid values were found to be in the range between  $186$  to  $284$  mg/l. It was maximum in the season of monsoon and minimum in the season of summer. The total suspended solids values were found to be in the range between  $73$  to  $150$  mg/l. It was maximum in the season of winter and minimum in the season of summer. Similar results were observed by Paka and Narsingrao (1997). The higher values of total solids during monsoon may be attributed to an increased load of soluble salts from the catchment areas due to the surface runoff. The high contents of total dissolved solids elevates the density of water, influences osmoregulation in fresh

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water organisms. The highest record of water temperature coincided with annual maximum record of suspended solids, which absorb more heat in solution (Zutshi (1992), Jameson and Rana (1996)). The dissolved oxygen is the most important parameter which can be used as an index of water quality, primary production and pollution. The dissolved oxygen is some time referred to as measure of the pulse of an aquatic ecosystem. The dissolved oxygen was varied from 2.8 to 9.7 mg/l during study. The dissolved oxygen values were maximum in the month of January and minimum in the month of May. Dissolved oxygen in water at a given temperature depends on factors like temperature of water. The dissolved oxygen almost all plants and animals need for respiration. The workers such as Prasad and Saxena (1980), carried out their work in river and lakes and reported that damming of rivers might cause oxygen depletion, the high temperature and low dissolved oxygen during summer create favourable condition for the development of blue green algae. Nisar Shaikh and Yeragi (2004) observed values of dissolved oxygen ranged from 5.2 to 11.7 mg/l in Tansa River of Thane district, Maharashtra. In the present study the P<sup>H</sup> range was recorded 7.2 to 7.80. The high P<sup>H</sup> range was recorded in the month of May and low range in the month of January. According to Abdur Rafeeq and Khan (2002), recorded the P<sup>H</sup> range

between 7.0 to 8.5 in Godavari River near Kandakurthi village, Nizamabad district, Andhara Pradesh. N. Subhashchandra Meitei et.al, (2004) recorded the P<sup>H</sup> range between 7.2 to 7.8 in Purna River, Parbhani district, Maharashtra. Tiwari and Chauhan (2006) from Kitham lake, the low P<sup>H</sup> value observed during the monsoon was due to heavy freshwater in flow in to the water body. The total hardness ranged from 130 to 172 mg/l. The calcium levels varied form 62 to 98 mg/l. The magnesium levels varied from 10.24 to 24.4 mg/l. The maximum values was during monsoon, winter, while minimum values was during winter. Hiware and Jadhav (2001) found the values of total hardness were 48.75 during summer and 34.5 mg/l during rainy season. The average values of calcium and magnesium hardness never exceeded the standard limits of WHO (1984) i.e. 200 mg/l and 100 mg/l. The major cation present in natural waters as calcium and magnesium. Its main source being leaching of rocks in the catchment. The calcium is not known to indicate or produce any hazardous effect on human health. The calcium and magnesium hardness are the two elements, which form the most abundant ions in fresh water. The physico-chemical parameters of water are important determinants of an aquatic ecosystem although they are greatly influenced and modified by climate and vegetation (Hutchinson 1975).

Table 1 : Monthly variations in Physical parameters of Panshewadi dam water (2007-08)

| Parameter | Water Temp. (°C) |      |      | Water Transparency (cm) |      |      | Total Solid (mg/l) |     |     | Total Dissolved Solid (mg/l) |     |     | Total Suspended Solid (mg/l) |     |     |
|-----------|------------------|------|------|-------------------------|------|------|--------------------|-----|-----|------------------------------|-----|-----|------------------------------|-----|-----|
|           | I                | II   | III  | I                       | II   | III  | I                  | II  | III | I                            | II  | III | I                            | II  | III |
| June      | 33.5             | 32.5 | 32.0 | 42.2                    | 44.4 | 40.5 | 340                | 352 | 358 | 236                          | 246 | 250 | 104                          | 106 | 108 |
| July      | 28.0             | 27.5 | 28.5 | 39.7                    | 40.2 | 38.5 | 356                | 360 | 365 | 245                          | 255 | 258 | 111                          | 105 | 107 |
| August    | 26.0             | 26.5 | 25.5 | 33.9                    | 34.2 | 32.5 | 370                | 372 | 380 | 232                          | 262 | 275 | 118                          | 110 | 105 |
| September | 24.5             | 24.0 | 25.0 | 30.2                    | 30.9 | 31.2 | 385                | 391 | 395 | 265                          | 278 | 284 | 120                          | 113 | 111 |
| October   | 28.0             | 27.0 | 27.5 | 38.4                    | 37.8 | 37.0 | 360                | 367 | 363 | 272                          | 280 | 268 | 98                           | 87  | 95  |
| November  | 29.5             | 29.0 | 28.5 | 40.0                    | 42.0 | 44.0 | 351                | 355 | 348 | 240                          | 247 | 252 | 111                          | 108 | 96  |
| December  | 26.5             | 26.0 | 27.0 | 49.0                    | 51.2 | 50.1 | 368                | 372 | 378 | 227                          | 222 | 235 | 141                          | 150 | 143 |
| January   | 24.0             | 22.5 | 23.5 | 51.9                    | 52.7 | 54.0 | 290                | 295 | 285 | 210                          | 202 | 199 | 80                           | 93  | 86  |
| February  | 23.0             | 23.5 | 22.5 | 55.5                    | 57.0 | 58.1 | 275                | 287 | 270 | 189                          | 186 | 195 | 86                           | 101 | 75  |
| March     | 26.0             | 27.0 | 26.2 | 60.3                    | 61.2 | 63.5 | 295                | 290 | 298 | 212                          | 205 | 209 | 83                           | 85  | 89  |
| April     | 31.0             | 30.5 | 30.0 | 68.7                    | 69.5 | 70.7 | 308                | 305 | 310 | 235                          | 229 | 232 | 73                           | 76  | 78  |
| May       | 35.0             | 34.0 | 34.5 | 79.2                    | 80.2 | 80.9 | 328                | 335 | 340 | 242                          | 237 | 245 | 86                           | 98  | 95  |

Table 2 : Monthly variations in Chemical parameters of Panshewadi dam water (2007-08)

| Parameter | Dissolved Oxygen (mg/l) |      |      | p <sup>H</sup> |      |      | Total Hardness (mg/l) |     |     | Calcium (mg/l) |    |     | Magnesium (mg/l) |        |        |
|-----------|-------------------------|------|------|----------------|------|------|-----------------------|-----|-----|----------------|----|-----|------------------|--------|--------|
|           | I                       | II   | III  | I              | II   | III  | I                     | II  | III | I              | II | III | I                | II     | III    |
| June      | 4.8                     | 5.4  | 5.8  | 7.40           | 7.52 | 7.45 | 148                   | 152 | 158 | 90             | 82 | 86  | 14.152           | 17.08  | 17.568 |
| July      | 5.6                     | 6.5  | 6.2  | 7.26           | 7.32 | 7.30 | 158                   | 160 | 164 | 84             | 80 | 78  | 18.056           | 19.52  | 20.984 |
| August    | 6.25                    | 5.54 | 6.10 | 7.29           | 7.24 | 7.18 | 165                   | 170 | 162 | 88             | 82 | 84  | 18.788           | 21.672 | 19.032 |
| September | 6.72                    | 6.50 | 6.78 | 7.34           | 7.20 | 7.12 | 172                   | 164 | 158 | 72             | 78 | 76  | 24.4             | 20.984 | 20.608 |
| October   | 6.9                     | 6.99 | 7.2  | 7.35           | 7.25 | 7.20 | 152                   | 148 | 144 | 82             | 86 | 84  | 17.58            | 15.128 | 14.64  |
| November  | 7.0                     | 7.8  | 7.4  | 7.8            | 7.10 | 7.3  | 142                   | 144 | 140 | 70             | 76 | 74  | 17.568           | 16.592 | 16.104 |
| December  | 7.6                     | 8.2  | 8.6  | 7.2            | 6.9  | 7.11 | 135                   | 138 | 130 | 74             | 78 | 68  | 14.884           | 14.64  | 15.128 |
| January   | 8.8                     | 9.2  | 9.6  | 7.10           | 7.15 | 7.20 | 140                   | 142 | 138 | 62             | 68 | 70  | 19.032           | 18.056 | 16.592 |
| February  | 7.5                     | 7.1  | 7.8  | 7.6            | 7.18 | 7.25 | 132                   | 138 | 134 | 70             | 74 | 68  | 15.128           | 15.616 | 16.104 |
| March     | 6.0                     | 6.5  | 5.8  | 7.48           | 7.56 | 7.42 | 136                   | 142 | 130 | 82             | 86 | 84  | 13.176           | 13.664 | 11.224 |
| April     | 4.8                     | 5.2  | 5.0  | 7.62           | 7.58 | 7.53 | 142                   | 148 | 146 | 96             | 90 | 92  | 11.224           | 14.152 | 13.176 |
| May       | 3.5                     | 3.0  | 2.8  | 7.76           | 7.80 | 7.71 | 148                   | 136 | 140 | 98             | 92 | 98  | 12.2             | 10.736 | 10.248 |

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