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Abstract : This Paper deals with the Physico-chemical Parameters of Hosahalli Water Tank in Shimoga District, Karnataka. Monthly Changes in Physical and Chemical Parameters such as Water Temperature, Turbidity, Total Dissolved Solids, pH, Dissolved Oxygen, Free Carbon dioxide and Total Hardness, Chlorides, Alkalinity, Phosphate and Nitrates were analyzed for a periods of one year from 1st January 2007 to 31st December 2007. All Parameters were within the permissible limits. The results indicate that the tank is Non-polluted and can be used for Domestic, Irrigation and Fisheries.

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I. INTRODUCTION

Tank irrigation is one of the oldest and significant sources of irrigation in India and is particularly in south India (Palanisamy, 1998). The tanks occupy vital role in the irrigation as well as local ecosystem in the semi-arid and regions of South India. This perennial tank provides multiple uses like source of drinking water for uncountable rural and urban communities and livestock, fish culture, recharge of ground water, control of floods etc., (Gurunathan, 2006). As water is one of the most important compounds of the ecosystem, but due to increased human population, industrialization, use of fertilizers in the agriculture and man-made activity. The natural aquatic resources are causing heavy and varied pollution in aquatic environment leading to pollute water quality and depletion of aquatic biota. It is therefore necessary that the quality of drinking water should be checked at regular time of interval, because due to use of contaminated drinking water, human population suffers from varied of water borne diseases. It is difficult to understand the biological phenomena fully because the chemistry of water reveals much about the metabolism of the ecosystem and explain the general hydro - biological relationship.

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The Present Study involves the Analysis of water described by its Physical, Water Quality in Terms of Physico-chemical parameters of Hosahalli System Tank, Shimoga Dist., Karnataka. It is located in 13° 52'27"N latitude and 75° 33'09" E longitude and this tank is having an area of 67.51 acres and the area is having 500 acres of command. This tank water is basically for agriculture, fisheries and partially domestic activities. This system tank is connected to left bank canal of Tunga Anicut Project, the area under the project is in semidry zone, The mean annual rainfall in the study area is 814.90 mm during the period from 1991-2007.

II. MATERIALS AND METHODS

The Water Samples from Hosahalli Tank were collected from two different stations in the morning hours between 10 to 12 am in Polythene bottle regularly for every month. The Water samples were immediately brought in to Laboratory for the Estimation of various Physico-chemical parameters, like water temperature and pH were recorded at the time of sample collection by using Thermometer and Pocket Digital pH Meter. While other Parameters Such as DO, TDS, Free CO₂, Hardness, Alkalinity, Chlorides, Phosphate and Nitrate were estimated in the Laboratory by using Indian Standard Procedures (Titration method, Atomic Absorption Spectrophotometer (AAS) Thermo M5 Model) (Trivedy and Goel, 1986, APHA 1985).

III. RESULTS AND DISCUSSION

Month	Temperature in °C	Turbidity NTU	TDS mg/l	pH
Jan	21	10.25	210.0	8.06
Feb	24	11.61	215.1	8.02
Mar	26.2	14.25	220.2	8.40
Apr	24	8.50	156.0	8.30
May	27	8.00	120.0	8.00
Jun	26	4.50	256.4	7.90
July	24	7.80	225.0	8.10
Aug	23.5	6.10	120.0	7.99
Sept	24	4.00	130.0	7.80
Oct	24	3.90	165.0	7.50
Nov	22	6.70	210.8	7.90
Dec	20	8.00	168.3	8.06

Table 1: Physical parameters of Hosahalli tank, Shimoga district.

a) Climate

The area under the project is in semidry zone, there is a rapid increase in temperature after the month of January, April is the hottest month. The climate of the year is divided into four seasons viz hot season from March to May; South-west monsoon from June to September; Post-monsoon from October to November; winter from December to February with an average wind speed of 4.22 km/hr. The maximum and minimum wind velocity in the tank area was observed in the months of July and May are 7.80 and 0.1 km/hr respectively.

b) Water Temperature

Generally, the weather in study area is quite cool, however the water temperature plays an important factor which influences the chemical, bio-chemical characteristics of water body. The maximum temperature of 27° C was recorded in May and a minimum of 20° C was recorded in month of December in the year 2007. Water Temperature in summer, was high due to low water level, high temperature and clear atmosphere (Salve and Hiware, 2008).

Month	Free CO ₂	Dissolved oxygen	Hardness	Alkalinity	Chlorite	Phosphate	Nitrate
Jan	0.7	9.25	78.5	110.0	22.0	0.9	2.20
Feb	0.5	9.00	81.0	115.0	31.0	1.28	2.31
Mar	0.9	13.20	94.0	122.0	29.2	1.85	2.80
Apr	3.7	14.75	142.0	118.0	30.5	2.90	10.1
May	4.5	16.00	136.0	165.0	32.5	1.60	10.5
Jun	8.1	14.25	128.0	130.0	30.0	2.90	9.7
July	8.8	9.30	105.0	115.0	34.0	3.80	8.2
Aug	4.4	8.30	79.0	138.0	27.0	5.75	12.8
Sept	16.7	8.00	97.0	145.0	29.6	0.71	5.40
Oct	10.7	7.75	70.0	120.0	21.0	0.90	4.5
Nov	14.8	7.25	87.0	113.0	23.0	0.16	5.2
Dec	18.0	8.90	89.0	130.0	30.0	4.70	2.1

Table 2: Chemical parameters of Hosahalli tank, Shimoga district (values are in mg/l)

c) *Turbidity*

The turbidity of water fluctuates from 3.90 to 14.25 NTU. The maximum value of 14.25 NTU was recorded in the month of March, it may be due to human activities, decrease in the water level and presence of suspended particulate matter and minimum value of 3.90 NTU in the month of October.

d) *Total Dissolved Solids*

The total dissolved solids fluctuate from 120 mg/l to 256.4 mg/l. the maximum value (256.4 mg/l) was recorded in the month of June. It is due to heavy rainfall and minimum value (120 mg/l) in the month of May.

e) *pH*

pH was alkaline values ranges from 7.5 to 8.4. The maximum pH value (8.4) was recorded in the month of April (summer) and minimum (7.5) in the month of October. Most of bio-chemical and chemical reactions are influenced by the pH. The reduced rate of photosynthetic activities reduces the assimilation of carbon dioxide and bicarbonates which are ultimately responsible for increase in pH, the low oxygen values coincided with high temperature during the summer month (Kamble, S. M. et al.). The factors like air temperature bring about changes the pH of water. The higher pH values observed suggests that carbon dioxide, carbonate-bicarbonate equilibrium is affected more due to change in physico-chemical condition (Karanth, 1987; Tiwari et al., 2009).

f) *Dissolved Oxygen*

The value of DO fluctuates from 7.25 mg/l to 16 mg/l. The maximum values (16 mg/l) was recorded in the month of May and minimum values (7.25 mg/l) in the month of November. The high DO in summer is due to increase in temperature and duration of bright sunlight has influence on the % of soluble gases (O_2 & CO_2). The long days and intense sunlight during summer seem to accelerate photosynthesis by phytoplankton, utilizing CO_2 and giving off oxygen. This possibly accounts for the greater qualities of O_2 recorded during summer. (Krishnamurthy R., et al, 1990)

g) *Free Carbon dioxide*

The value of free CO_2 ranges from 0.5 mg/l to 28.6 mg/l. The maximum value (18 mg/l) was recorded in the month of December (winter) and minimum value (0.5mg/l) in the month of February. This may be depends upon alkalinity and hardness of water body. The value of CO_2 was high in December. This could be related to the high rate of decomposition in the warmer months.

h) *Hardness*

The value of hardness fluctuates from 70 mg/l to 142 mg/l. The maximum value (142 mg/l) was recorded in the month of April (summer) and minimum value (70 mg/l) in the month of October. (Hujare, M. S,

2008): was reported total hardness was high during summer than monsoon and winter. High value of hardness during summer can be attributed to decrease in water volume and increase of rate of evaporation of water.

i) *Alkalinity*

Total alkalinity ranges from 110 mg/l to 165 mg/l the maximum value (165 mg/l) was recorded in the month of May (summer) and minimum value (110 mg/l) in the month of January (winter). The alkalinity was maximum value in April (summer) due to increase in bicarbonates in the water. (Hujare, M. S. 2008) also reported similar results that it was maximum in summer and minimum in winter due to high photosynthetic rate.

j) *Chlorides*

The values of chlorides range from 22 mg/l to 32.5 mg/l. The maximum value (32.5 mg/l) was recorded in the month of May (summer) and minimum value (22 mg/l) in the month of January. In the present study maximum value of chloride reaches in summer (Swarnalatha and Narsing rao, 1990).

k) *Phosphate*

The value of phosphate fluctuates from 0.71 mg/l to 5.75 mg/l. the maximum value (5.75mg/l) was recorded in the month of August (monsoon) and minimum value in the month of September (winter). The high values of phosphate in August (monsoon) months are mainly due to rain, surface water runoff, agriculture run off; washer man activity could have also contributed to the inorganic phosphate content.

l) *Nitrates*

The values of nitrate ranges from 2.1 mg/l to 12.8 mg/l. the maximum value (12.8mg/l) was observed in the month of August and minimum (2.10 mg/l) in the month of December.

IV. ACKNOWLEDGEMENT

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REFERENCES RÉFÉRENCES REFERENCIAS

- 1) APHA (1985): Standard Methods for Examination of Water and Wastewater, 20th Edition, American Public Health Association, Washington D. C.
- 2) Gurunathan, A. Shanmugam, C.R, (2006): Customary Rights and their Relevance in Modern Tank Management: Select Cases in Tamil Nadu, Paper prepared for the workshop entitled 'Water, Law and the Commons' organized in Delhi from 8 to 10 December 2006

by the International Environmental Law Research Centre (ILERC).

- 3) Hujare, M. S. (2008): Seasonal variation of physico-chemical parameters in the perennial tank of Talsande, Maharashtra. *Ecotoxicol. Environ. Monitor.* 18(3): 233-242.
- 4) Karanth, K.R (1987): *Groundwater Assessment Development and Management* Tata McGraw Hill publishing company Ltd., New Delhi, 725p.
- 5) Krishnamurthy R.(1990): Hydro-biological studies of Wohar reservoir Aurangabad (Maharashtra State) India. *J. Environ. Biol.* 11(3), 335-343.
- 6) Palanisamy, K. and R. Balasubramanian (1998): Common Property and Private Prosperity: Tank vs. Private Wells in Tamil Nadu, *Indian Journal of Agricultural Economics*, vol.53, No.4, Oct – December.
- 7) Salve, V. B. and Hiware C. J. (2008): Study on water quality of Wanparakalpa reservoir Nagpur, Near Parli Vajjnath, District Beed. Marathwada region, *J. Aqua. Biol.*, 21(2): 113-117.
- 8) Swaranlatha, S. and A. Narsingrao (1998): Ecological studies of Banjara lake with reference to water pollution. *J. Envi. Biol.* 19(2): 179-186. 13. Arvindkumar, (1995): Some Immunological Aspects of the Fresh water Tropical Wetland of Santhal. Pargana (Bihar) India, *J. Envi. Poll.*2 (3): 137-141
- 9) Trivedi, R.N.Dubey,D.P and Bharti, S.L.(2009):Hydro-geochemistry and groundwater quality in Beehar River Basin, Rewa District, Madhya Prakesh,India,Proc.International conference on Hydrology and Watershed, JN & T Hyderabad,pp.49-59
- 10) Trivedy, R. K. and Goel P. K. (1986): *Chemical and biological methods for water pollution studies*, Environmental Publication, Karad, Maharashtra.

