

WATER QUALITY ASSESSMENT OF GORAMA DAM OF HANUMANA REWA (M.P.)

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ABSTRACT: Gorama (stop dam) is an anthropogenic construction on the confluence of two small rivers Gorama and Pidrya in the between village Dadar Pidriya and Bijhauri on the right hand side of N.H.7 in Hanumana tahsil of Rewa district at 24°43' 13" N and 80°2'53" S. Rewa has 7495 sq. Km of territory and occupies about 2.5% of total geographical area of the state. It stretches about 150 Km from north to south and 83 Km. from east to west. Study on hydrological status of Gorama Dam water was made to assess the portability of water from January 2017 to December 2018. Some physico-chemical parameters were considered such as surface water temperature, turbidity, pH, dissolved oxygen, hardness, alkalinity, phosphate and nitrate contents. The unmanaged and unwanted activities of surrounding population of the area are deteriorating the dam water quality continuously.

KEYWORDS:- Physico-chemical parameters, monthly variation, Gorama Dam

INTRODUCTION:-

The water is found in the form of vapour, liquid and snow. The retaining of water in atmosphere (Vapours of water) depends on the fluctuation of temperature and wind speed. The water of atmosphere reaches to the earth's surface through the process of precipitation and from earth surface it reaches to the atmosphere and transpiration (Hydrological cycle).

Water is an inert compound therefore it transport various essential elements unchanged into the cells of biotic components. The water has the properties of cohesion and adhesion due to which high surface tension is advantageous for the existence of many organisms in the water surface.

The water has high specific heat which enhances the water bodies to resist more fluctuation of temperature than the land. Due to this reason the aquatic organisms are not adapted for wide range of temperature and are vulnerable to temperature changes. Water has also high

latent heats of vaporization and fusion which is helpful to various organisms found in water bodies.

Water is essential for life on earth without it, life is impossible. Water, due to its great solvent power, is constantly threatened to get polluted easily. The requirement of water in all forms of lives, from micro-organisms to man, is a serious problem today because all water resources have been reached to a point of crisis due to unplanned urbanization and industrialization Singh, *et. al.*, (2002).

Aquatic ecosystem is the most diverse ecosystem in the world. The first life originated in the water and first organisms were also aquatic where water was the principal external as well as internal medium for organism. The inter-relationship between the physico-chemical parameters and plankton production of dam water and its relation with fluctuation of zooplankton are of great importance and basically essential fish culture. Fishes are dependent on physico-chemical parameters. Any changes of these parameters may affect the growth, development and maturity of fish. Different casual influences, which determine the quality of water, show a characteristic change from season to season.

The water body is a eutrophic dam where the amount of nutrient is very high and oxygen depletion is prominent (Varughese *et al.*, 2004). Anaerobic conditions predominate throughout extensive areas of highly eutrophic lakes observed by Hutchinson (1975). Hypolimnion is often observed with the phenomenon of frequent oxygen depletion with the consequent increase in BOD, COD reported by Pani and Misra (2000). Johri (1990) studied the limnological and water quality status of two lakes of Bhopal. Saxena (1990) assessed the limnological and water quality status of Lower Lake of Bhopal.

The present study was made on water quality and occurrence of some zooplankton with respect to physico-chemical parameters in Gorama dam of Hanumana Rewa (M.P.). In present people are used for it domestic and bathing purpose. this pond has enormous weed and macrophytes which are polluting the pond water and also dumping of household waste, plastic, polythene, sewage effluents etc. on the side of pond is making the

pond water polluted. Polluted water causes several water borne disease in human and other animals.

MATERIAL AND METHODS:-

Gorama (stop dam) is an anthropogenic construction on the confluence of two small rivers Gorama and Pidrya in the between village Dadar Pidriya and Bijhauri on the right hand side of N.H.7 in Hanumana tahsil of Rewa district at 24°43' 13" N and 80°2'53" S. Rewa has 7495 sq. Km of territory and occupies about 2.5% of total geographical area of the state. It stretches about 150 Km from north to south and 83 Km. from east to west. Besides being a source of water for irrigation and also the water of this Dam used for artificial breeding of Indian Major Carp in the Chinese Hatchery. The present study conducted from January 2017 to December 2017.

Water samples were collected monthly in the morning at 8 am to 10 am from surface layer of the dam. Physico-chemical and biological analysis of water samples were made following standard methods suggested by APHA, AWWA, WPCI (2005).

RESULT AND DISCUSSION:-

The data on physic-chemical analysis of Gorama dam has been given in table no. 1

Water temperature (°C):-

During the presents study period water temperature ranged from 19.6 ±0.16 °C to 30.54 ±0.11 °C Jayabhaye et. al; (2006), Salve and Hiware (2006), observed that during summer, water temperature was high due to low water level and clear atmosphere. Similar results were obtained in the present study.

pH:-

The pH values ranges from 7.22±0.1 to 8.1±0.08. The maximum value was recorded from June and Minimum in the month of January. pH was alkaline throughout study period.

Dissolved Oxygen (mg/l):-

The value of DO fluctuate from 7.32±0.19 mg/l to 9.5±0.16 mg/l. The maximum values were recorded in

the month of April (Summer) and minimum value in the month of December (winter). The high DO in summer is attributed to increase in temperature and duration of bright sunlight. The long days and intense sunlight during summer seems to accelerate photosynthesis by phytoplankton's, utilizing CO₂ and giving off oxygen. This accounts for the greater quality of O₂ recorded during summer. The quantity is slightly less during winter as reported by Masood Ahmed and Krishnamurthy (1990).

Hardness (mg/l):-

The value of hardness fluctuates from 165.2 ±2.39 mg/l to 256 ±1.58 mg/l. The maximum value was recorded in the month of June (summer) and minimum in the month of December (winter).

Alkalinity (mg/l):-

Total alkalinity ranges from 158 ±1.58 mg/l to 209.8 ±1.92 mg/l. The maximum value was recorded in the month of July (monsoon) and minimum value in the month of December (winter).

Phosphate (mg/l):-

The value of phosphate ranged from 0.18±0.02 mg/l to 0.332±0.01 mg/l. The maximum value was recorded in the month of August (monsoon) and minimum values in the month of April (summer). The high values of phosphate in August (monsoon) months are mainly due to rain, surface run-off, agricultural run-off; washing activities that contributed to the inorganic phosphate content. Similar results were reported by Arvind Kumar ((1995).

Nitrate (mg/l):-

The value of nitrate ranges from 0.031 ±0 mg/l to 0.0472 ±0 mg/l. The maximum value was recorded in the month of August (monsoon) and minimum in the month of January (winter). Swaranlatha and Narsingrao (1998) reported that nitrates are in low concentration in summer and high during monsoon which might be due to surface run-off and rain. Similar results were obtained in the present study.

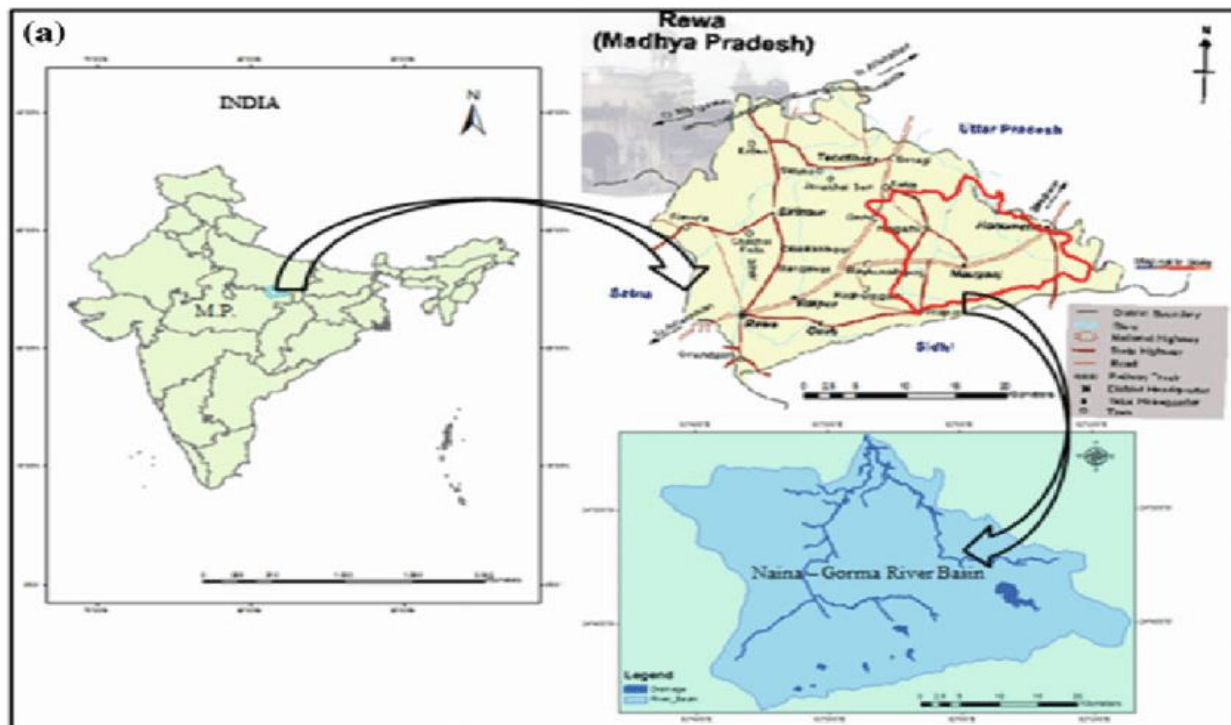


FIG.1. MAP OF GORAMA DAM STUDY SITE

Table No. 1- Monthly Variation of Physico-chemical parameters of water samples of Gorama dam of Hanumana Rewa (M.P.)

Months 2017	Temp °C	pH	Dissolved Oxygen(mg/l)	Hardness (mg/l)	Alkalinity (mg/l)	Phosphate (mg/l)	Nitrate (mg/l)	
January	19.6±0.16	7.22±0.1	8.48±0.33	165.2±1.3	204±1.58	0.324±0.02	0.031±0	
February	20.52±0.13	7.354±0.16	8.64±0.27	177.8±1.3	211.2±2.39	0.28±0.02	0.0468±0	
March	26.68±0.13	7.58±0.21	8.56±0.23	167±1.58	200.6±2.07	0.26±0.02	0.0422±0	
April	29.54±0.11	7.786±0.2	9.5±0.16	252±1.58	184±2.24	0.18±0.02	0.0432±0	
May	29.76±0.17	7.84±0.2	8.3±0.16	247±1.58	174.6±2.07	0.22±0.02	0.039±0	
June	30.54±0.11	8.1±0.08	9.4±0.2	256±1.58	197±1.58	0.22±0.02	0.034±0	
July	27.56±0.11	7.772±0.11	8.5±0.16	251.4±1.34	209.4±2.07	0.254±0.02	0.0472±0	
August	27.68±0.16	7.64±0.17	7.58±0.29	224.2±2.77	183±2.22	0.332±0.01	0.0316±0	
September	26.66±0.11	7.424±0.08	7.42±0.19	201.6±1.14	200±1.58	0.26±0.02	0.0316±0	
October	25.4±0.16	7.34±0.12	7.36±0.11	172±3.16	196.8±1.92	0.294±0.02	0.032±0	
November	22.5±0.16	7.16±0.11	7.6±0.29	168±3.16	200.8±1.92	0.31±0.02	0.0324±0	
December	20.44±0.11	7.136±0.06	7.32±0.19	165.2±2.39	158±1.58	0.29±0.02	0.0356±0	
Range	Min	19.6±0.16	7.32±0.19	7.32±0.19	165.2±2.39	158±1.58	0.18±0.02	0.031±0
	Max	30.54±0.11	9.5±0.16	9.32±0.19	256±1.58	209.8±1.92	0.332±0.01	0.0472±0

CONCLUSION:-

The present study indicates that the Gorama dam is not good. The unmanaged and unwanted activities of surrounding population of the area are deteriorating the dam water quality continuously. Due to the increase in environmental temperature and accumulation of sewage these are two main factors which are responsible for creation and problem of eutrophic condition of dam.

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