

# Water Quality Assessment in Govindgarh Lake of Rewa District (M.P.) – A Review

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**Abstract**—Water should be safe and whole some form drinking purpose. Various national and international agencies have prescribed standards for various beneficial uses in terms of water quality parameter. Water Quality Index (WQI) represent integrated effect of various parameters considering due to concentration of parameter and its significance by a single number for particular use of water. WQI thus provides meaningful information about water quality to general public and policy maker also. Present work deals with the various physico, chemical and bacteriological parameters of lake water in Rewa district. The results obtain will compared with the guidelines governed by Bureau of Indian Standards and World Health Organization. All these results would be helpful to improve the quality of lake water in future and it indicates the suitability of water for industrial, domestic and agriculture purposes. These results therefore directly help us in increasing the production of fisheries in lake water and hence improve the economy of the Rewa District.

**Keyword-** Water Quality, Physico-chemical parameters, bacteriological parameters, heavy metals, Govindgarh lake, Rewa, WHO guidelines.

## I. INTRODUCTION

Water is vital for sustaining life on Earth. Of all the matter on the Earth none is more basic than water. It is said that “Water is more precious than gold and more explosive than dynamite”. Water is thus an essential depends on it.

Water should be safe and wholesome for drinking purpose. Various national and international agencies have prescribed standards for various beneficial uses in terms of water quality. Water Quality Index present integrated effect of various parameters considering due to weight age to concentration of parameter and its significance by a single number for particular use of water. Thus provides meaningful information about water quality to generate public and policy makers also. The terms standard applies to any definite rule principle on measure established by authority.

“A criterion designates a means by which anything is tried in forming a correct judgment concerning it”. It seems obvious that progress toward improving man’s health and welfare could result only from better control over his environment. The provision of better quality water was one logical step in direction.<sup>13</sup>



Figure 1. View of Govindgarh Lake of Rewa District

The present study deals with the Govindgarh lake situated at a distance of 20 km from Rewa city. This is one of the famous lakes in Rewa district and is famous for the favorable condition it offers to the aquatic life present in lake water. The area of this lake is about 13000m<sup>2</sup>. This lake is very important as a safety purpose because it plays a very important role in the economy of the city as most of the fishes comes to the city from this lake. On the basis of information it was found that in 2008-09 the production of fishes was around 25kg per hectare but unfortunately due to wastes from human settlement and industrial effluents pollutes majorities of our lakes and rivers to a greater extent. Water pollution severely effect aquatic life and cause massive killing of fish and distraction of other aquatic life due to industrial pollutants. This will cause decline in the economy of the city as it would consider being the main source of fish production in the city.

## II. LITERATURE REVIEW

Pathak Vandana et al carried out their research work on the physico chemical parameters of water in Ganga and Yamuna in Allahabad. Allahabad is one of the main holy city of our country. Due to continuous increase in population and human activities like washing or bathing clothes near the banks of river and by dumping of harmful wastes in the river helps in degrading the drinking quality of river water. In this study monthly changes in physical and chemical parameters such as water temperature, turbidity, pH, dissolved oxygen, biochemical oxygen demand, chemical oxygen demand, calcium, magnesium hardness, alkalinity and biological parameters such as total coliform and fecal coliform were analyzed for a period of about April 2011 to December 2011. The results obtained in Ganga and Yamuna river water at Sangam in Allahabad district were not found in within the desirable limits of drinking water but found suitable for

irrigation and pisciculture purpose. The results obtain would be helpful for the management of river water in future.<sup>7</sup>

S. Anand et al studied on the physico chemical and bacteriological analysis of Vaigai river water. In this study 6 sampling sites were selected to check the quality of river water. The results obtain were found that the total dissolved solids were relatively higher than the total suspended solids. Along with the content of magnesium was higher than that of calcium. The concentration of chlorides in most of the samples is in the range of 14.88 to 21.41 mg/L. The biochemical oxygen demand and chemical oxygen demand values for the sampling station were found to be between 7.9 to 8.7 mg/L and 15 to 25 mg/L. Thus the physico chemical parameters obtained were found below to the prescribed limit of World Health Organization in the Vaigai river water. From this investigation it is concluded that most of the Vaigai river water samples are not suitable for the purpose of drinking. Hence the water should be treated well before consumption.<sup>8</sup>

Gupta M.K. et al makes an analysis on the water quality of river Ken in Banda district. From this investigation it was found that water of river Ken has total hardness and turbidity values more than the permissible limit. These high values will directly makes an impact on human health. The present investigation was designed to analyze water of river Ken for various physico chemical and biological parameters in terms of mass bathing impact in summer season, year 2012. Correlation analysis was done to evaluate the relationship between 16 water quality parameters such as pH, electrical conductivity, turbidity, TDS, total solid, DO, BOD, COD, chloride, sulphate, phosphate, nitrate, total alkalinity, total hardness, calcium hardness, fluoride, total coliform of the surface water samples collected from 7 different villages situated on the bank of river Ken in Banda district U.P. The results obtained were compared with the drinking water quality standards prescribed by Bureau of Indian Standards and WHO. After the analysis it was found that most of the selected parameters were found beyond the permissible limits of the prescribed standards.<sup>3</sup>

Sabhapandit Pranab et al carried their research work on ground and surface water in Gohpur Sub-Division of Sonitpur district. According to WHO about 80% of the diseases of human beings are caused by water. Since these diseases are directly related with the human health, therefore it is necessary to bring awareness among the present and future generation about the consequences of water pollution. In this study 34 samples from different locations such as dug wells, bore wells, hand pumps and ponds were collected in 2008. The samples were then analyzed for various physico chemical parameters such as chloride, sulphate, nitrate, sodium, potassium, calcium, magnesium, iron, copper, cadmium, chromium, lead and zinc using standard methods. The results obtain were found that most of the samples have values above or below the prescribed limit given by the Bureau of Indian Standards for drinking purpose as the water from the different locations will be used as a drinking purpose. Overall analysis revealed that 11 samples were fit for drinking purpose with respect to the parameters studied.<sup>9</sup>

Kaushik C.P. et al studied seasonal variations in Basanter river water upstream Basanter bridge. River Basanter in Samba city of Jammu & Kashmir is a source of freshwater in city and neighbouring villages located upstream and downstream. In this study various physico chemical parameters such as temperature, turbidity, TDS, pH, electrical conductivity, DO, total alkalinity, calcium, magnesium and sodium were analyzed in pre monsoon and post monsoon in 2011. The results obtained were compared with the World Health Organization for their suitability as a drinking purpose. The results obtain were found to be within the permissible limits prescribed as the river water was free from pollution as there was no industrial and anthropogenic activities upstream the river.<sup>4</sup>

Dana A. Mohammed et al assessed the water quality in the Halabja-Sulaimani-Kurdistan region of Iraq. As we all know that groundwater plays a very important role in our environment. In the environment it supports rivers, lakes and wetlands especially during summer season as there is little input from rainfall. The flow of groundwater into rivers as seepage through the river bed known as base flow, would be essential for the health of wildlife and plants that live in the water. The water quality monitoring was done for 6 months in the year 2007. The physical and bacteriological evaluation of the well waters in the present study based on standards given for drinking water by WHO guidelines. Water in all the sources were saturated by oxygen and healthy with regard to BOD. The results obtain would tell us that cation were dominated by calcium followed by magnesium, sodium and potassium in order of drinking concentrations.<sup>2</sup>

S. Laishram studied ground water quality of Imphal west district. In this study ground water samples from 10 different locations of Imphal west district of Manipur were collected during pre monsoon period and analyzed for physico chemical parameters such as pH, temperature, TDS, electrical conductivity, total hardness, calcium, magnesium, sodium, potassium and chloride. The results obtain would tell us that the samples represented by S-1 to S-5 are fit for drinking purpose from physico chemical point of view while remaining other samples from S-6 to S-10 are unfit for drinking purpose. Apart from this further investigation will also be done to check whether heavy metals are present beyond desirable limit of BIS standards for drinking water. But all the samples from S-1 to S-10 are fit for irrigation purpose.<sup>10</sup>

S. Bindhu studied ground water quality of Kanyakumari district Tamil Nadu. In this study various physico chemical and bacteriological characteristics of ground water samples collected in Dharmapuram village, Kanyakumari district was assessed. For this analysis 30 samples were collected from different locations. The results obtain revealed that all analyzed parameters were within maximum desirable limit with an exception of 2 samples. Despite this it was evident from the analysis that in tested ground water samples the bacteriological quality was not under acceptable level and 50% to the samples were antimicrobial wilt coliforms. Along with this other microbial genera were also showed their existence in 30% samples. Therefore it clearly indicates that the natural and extend of microbial contamination in the ground

water samples of the selected villages of Kanyakumari district.<sup>11</sup>

P. Swarna Latha et al assess the quality of ground water in Greater Visakhapatnam with the help of various physico chemical characteristics. In this study ground water samples from selected bore wells in Greater Visakhapatnam area have been studied. A total of 50 samples were collected in the month of May during the year 2005. The samples were analyzed for various water quality parameters by adopting APHA standard methods and the parameters were compared with the Bureau of Indian Standards. After the analysis it was found that most of the ground water samples are under hard water category. Some of the samples also show high TDS value which is mainly due to the seepage of surface water from the open drains in the study area. This study would be helpful to local authorities for taking remedial measures to control the ground water pollution.<sup>6</sup>

L. Muthulakshmi studied physico chemical characteristics of ground water in Sivasaki region. Since from last few decades rapid industrialization, urbanization and population growth has resulted in huge amount of solid waste generation in city and towns. Owing to infiltration of rain water, the solid waste leachate produced at the dumping sites ultimately finds its way into the ground water contamination. The present investigation was carried out at 20 different locations in and around Sivasaki town Tamil Nadu. Various physico chemical parameters such as pH, temperature, electrical conductivity, total hardness, temporary hardness, TDS, total alkalinity, chloride, sulphate, sulphite, DO, COD, BOD, were examined through water analysis. The results obtained were compared with the standard limits prescribed by Bureau of Indian Standards and World Health Organization. The results indicate that the water of tube wells and hand pumps of this town as well as nearby areas has higher concentration for all the parameters. The high values of these parameters may have health implication and therefore this will need attention.<sup>5</sup>

Dohare D. et al studied analysis of ground water quality parameters: R Review, As we all know that due to human activities and industrialization ground water is contaminated. Therefore analysis of ground water is necessary to protect the ecosystem. The assessment of ground water quality was carried out in different parts of Indore city. The present work was aimed to assess the water quality index of Indore city and its industrial area. For the calculation of physical chemical analysis 27 parameters were selected viz pH, colour, TDS, electrical conductivity, total hardness, total alkalinity, calcium, chromium, zinc, manganese, nickel. The results obtained were compared with the Indian Standard of drinking water IS 10500-2012. The study of various physico chemical and bacteriological parameters of different parts of Indore city suggests the evaluation of water quality parameters also with the water quality management practices carried out periodically to protect the water resources.<sup>1</sup>

Tiwari Ajay et al studied on Bichhiya river and Govindgarh lake in Rewa to assess its physical parameters. As we all know that all life on earth depends on water. Fresh water is a critical, finite, vulnerable, renewable natural resource on earth and

plays an important role in our life. In this study various physical parameters such as pH, temperature, transparency and current speed were analyzed in Bichhiya river and Govindgarh lake of Rewa district. The present study aims at acquiring the first hand knowledge of the water quality of Bichhiya river and Govindgarh lake in order to assess its production potential. The study provides sufficient data and also helps to understand water characteristics and indicate that water of Bichhiya river and Govindgarh lake can serve as a good habitat. All the parameters are quite suitable for the growth of fish.<sup>12</sup>

### III. OBJECTIVE OF PRESENT STUDY AREA

- To analyze water quality of lake by collecting samples from selected sites and assessment of physico, chemical and bacteriological characteristics of lake water.
- To estimate the water quality index through formulation of appropriate used methods.

### IV. WATER QUALITY ASSESSMENT OF GOVINDGARH LAKE

It is necessary and important for us to test the water before using it as a drinking, domestic and irrigation purposes or industrial purpose. Water quality must be analyzed for various physico chemical and bacteriological parameters. Heavy metals will also be analyzed as these are harmful for the aquatic life present in the lake water. Selection of parameters is mainly depends upon the purpose we are going to use the water and up to which extent of quality and quantity we needed. Most of the water streams contain dissolved, suspended, floating and bacteriological impurities. Some physical tests are performed to check pH, turbidity, temperature, colour, odour etc. while some chemical tests are performed to check BOD, COD, DO, alkalinity, hardness etc. Apart from all these some tests are also performed for bacteriological parameters such as E. coli and Total Coli form Bacteria and heavy metals will also be analyzed. Once all these parameters will analysed then we should come to know about the purity of water and up to which extent we can make the use of it. All these parameters are strictly monitored in the developed countries.

It is one of the major sources of water supply to a considerable part of the city. Water from lake is used by the residents of Rewa city majorly for drinking purpose here considerable good quality of water is required to make it safe and potable. There may be various sources of contamination to the lake that may result in increased concentration of various physico-chemical parameters of concentration. As a result various water born diseases is labelled to attack the health of the people therefore analysis of various parameter required.

## V. CONCLUSION

This paper deals with the various physico, chemical and bacteriological parameters of lake water in Rewa district. The results obtain will compared with the guidelines governed by Bureau of Indian Standards and World Health Organization. These results would tell us the type of contamination in lake water and what type of protection they needed to protect them. These results therefore directly help us in increasing the production of fisheries in lake water and hence improve the economy of the Rewa District.

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