Water Quality Assessment of Nilona Reservoir

Kunal D. Manwar[1] Priya Narayan Lokhande[2] Pornima Dattatray Nawade[3]
Vaishnavi Narayan Jambhulkar[4] Abhishek Sanjayrao Dafare[5]
[1,2,3,4,5]Department of Civil Engineering
[1,2,3,4,5]Jawaharlal Darda Institute of Engineering and Technology, Yavatmal, India

Abstract — Physical, chemical, biological studies were conducted at Nilona dam in (Maharashtra State, India).It is positioned on the east side of Maharashtra. Nilona dam is situated at Sawargad village of Yavatmal. This paper aims to study the water quality of Nilona dam. Water is to determine the nutrient status of the water with reference to drinking water quality as well as irrigational purpose. Also observe the seasonal variations of selected water parameters. The physical and chemical parameters were analyzed. The data revealed that there were fewer variations in the water quality with respect to their physico chemicals, heavy metals, and Irrigational characteristics. The overall systematic analysis of the present water quality parameters undertaken and results received through the study showed that the status of water quality is quite normal and within the permissible limit as mentioned ISI. Basically this entire premise of the study area is in the remote and tribal natural area, hence, the pollution load is minimum. The Nilona dam in the rural region is relatively clean. There is no industrial pollution in this area as this study deals with the social and other important aspects like drinking, domestic, agricultural, irrigation and fishing etc.

Keywords: Chemical Parameters, Nilona Dam, Water Quality Parameters

I. Introduction

Water is one of the most important and abundant compound of ecosystem. Water is mostly essential for plant growth, and play an important role in living system nearly 3/4th earth surface is covered by water. Water is a precious resource for human beings and we are perhaps aware that 22nd March is celebrated as world water day. Water resources are of critical importance to both the natural ecosystem and human development. It is essential for agriculture, industry, and human existence. The healthy aquatic ecosystem is depended on the physico chemical and biological characteristics. It is therefore necessary that the quality of drinking water should be checked at regular intervals because due to use of contaminated drinking water, the human population suffers from a variety of Waterborne Diseases.

Physico-chemical parameter study is very important to get an exact idea about the quality of water and we can compare results of different physico-chemical parameter values with standard values. It is very essential and important to test the water before it is used for drinking. Ground water is the major source of drinking and agriculture water in rural and urban areas. The quality of ground water depends on various chemical constituents and their concentration. It is very essential and important to test the water before it is used for drinking. Water must be tested with different physical chemical parameters. Water does contain different types of floating, dissolved, suspended and microbiological as well as biological impurities. Some physical tests should be performed for testing of its physical appearance such as pH, turbidity, TDS, temperature, colour, odour while chemical tests should be performed for its BOD, COD, dissolved oxygen, alkalinity, hardness, and other characteristics.

II. Objective

In this study various tests are to be conducted and obtained results are compared with the Standard result (WHO Guidelines) and suggest water is suitable for drinking purpose or not.

III. Methodology

For this study our work is divided into mainly four parts such as data collection, sample collection, test conduct and validation of result.

A. Data Collection:

First of all data collection will be conducted. Data collected with the help of online websites, books and well known search engines such as google scholar, google book for publishing articles on water quality assessment.

B. Sample Collection:

The objective of sampling was to collect a small portion of material which can be transported to the laboratory. The water samples were collected in plastic bottles in the month of October 2022 after monsoon from the reservoir. The bottles have been clean, rinsed with tap water and each sample bottle clearly labeled with waterproof ink and other relevant details recorded.

In the present study, total four sample were collected from site

1) sample1 (inlet flow)
2) sample2 (storage reservoir)
3) sample3 (tank outlet)
4) sample4 (outlet)

Fig. 1: Large view of Nilona dam

Fig. 2: Sample collection

C. Test Performed and Result Validation:

The water samples were collected from reservoirs for physical and chemical characterization. The physical and chemical parameters were analyzed as per standard methods for examination of water The various tests carried out include determination of PH, Turbidity, Chloride, DO, BOD, COD, Temperature, Colour.

D. PH:

The pH value of the water sample is determined by pH meter. Standard value of pH ranges from 6.5-8.5. and the observed value of pH is 6.8.

E. Turbidity:

Turbidity is the cloudiness of water. Turbidity is measured by an instrument called Nephelometric, turbidometer. Standard value of turbidity ranges from 1-5 NTU and the observed value of turbidity is 1.2 NTU.

F. Chloride:

Almost all natural water contains chloride. Standard value of chloride is up to 120 mg/l and the observed value of chloride is 30.5 mg/l.

G. DO

Dissolved oxygen is considered to be one of the most important parameters of water quality in streams, rivers, and lakes. DO was measured with the help of DO meter. Standard range of DO is 5-6 ppm and the observed value of DO is 1.8 ppm.

H. Biological Oxygen Demand

Biological demand represent the quantity of oxygen consumed by microbes during the aerobic process of decomposition of organic material. Standard range for BOD is up to 30 ppm and the observed value of BOD is 22 ppm.

I. Chemical Oxygen Demand

The Chemical Oxygen Demand is a parameter that measures all organics: the biodegradable and non-biodegradable substances. Standard range for COD is 3-900 mg/l and the observed value is 1000 ppm.

J. Temperature

Temperature affects the chemical, biological reactions in water. Temperature was measured with the help of a thermometer. Standard range for the temperature is 10-25°C and the observed value is 22°C.

K. Colour:

Pure water has no colour and standard range for colour is 5-25 TCU and the observed value is 7.8 TCU.

Fig. 3: COD test of water sample

IV. RESULTS AND DISCUSSION

The results of physicochemical analysis of Nilona dam in the month of October 2022 are summarized in table 1. Result of physicochemical analysis of Nilona dam; the colour of water is yellowish green. Temperature of the water sample is 22°C. The Turbidity range is 1.2 NTU. Observed dissolved oxygen values is 1.8 ppm. Chloride content was found to be 30.5 mg/l. The observed BOD, COD value is 22 ppm and 1000 ppm

Sr.no	Parameters	Nilona Dam	Standard values by WHO
1	Temperature	22°C	10-25°C
2	COD	1000 ppm	3-900 ppm
3	BOD	22 ppm	30 ppm
4	PH	6.8	6.5-8.5
5	DO	1.8 ppm	5-6 ppm
6	Turbidity	1.2 NTU	1-5 NTU
7	Chloride	30.5 mg/l	120 mg/l
8	Color	7.8 TCU	5-25 TCU

Table 1: Average value of water quality parameter of Nilona dam.

V. CONCLUSION:

Various tests are conducted on sample collection from Nilona reservoir physical and chemical parameters is found is within permissible limit, so water of Nilona reservoir is suitable for drinking purposes and little treatment is required.

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