International Journal of Contemporary Research In Multidisciplinary

Research Article

Water Analysis from the Nagapur Dam in Beed District (MS)

Siddiqui Qurratulayen [1], Shaikh Yasmeen A[2], Raut Ranjit R [3*]
[1,2] Department of Zoology, Dr. Rafiq Zakaria College for Women, Chhatrapati Sambhajinagar, Maharashtra, India
[3] Department of Zoology, Yogeshwari Mahavidyalaya, Beed, Maharashtra, India

Corresponding Author: *Raut Ranjit R

Abstract

The analysis of water Parameters like pH, dissolved oxygen, temperature, turbidity, and nutrient levels directly influences the habitat suitability for various aquatic species. It also aids in monitoring ecological health and ensuring sustainable water management practices for preserving aquatic life. Every sample was taken quarterly, i.e. first sample was taken in April 2024, the second was taken in August 2024, and the third was taken in December 2024. All the samples were analyzed, and the limits of every parameter were studied in each report. Here we have determined many parameters such as Turbidity, Temperature, Total Dissolved Solids (TDS), Total Hardness (CaCO3), Total Alkalinity (CaCO3), Calcium (Ca), Magnesium (Mg), Chemical Oxygen Dissolved (COD), Bio Chemical Oxygen Dissolved (BOD), Dissolved Oxygen (DO), Chlorides (Cl), Sulphate (SO4), Silicates, Nitrogen (N), Phosphorous, and iron.

Manuscript Information

- **ISSN No:** 2583-7397
- **Received:** 03-11-2024
- **Accepted:** 09-12-2024
- **Published:** 22-12-2024
- **IJCRM:**3(6); 2024: 236-239

- **Plagiarism Checked:** Yes
- **Peer Review Process:** Yes

How to Cite this Article

Siddiqui Q, Shaikh YA, Raut RR. Water analysis from the Nagapur Dam in Beed District (MS). Int J Contemp Res Multidiscip. 2024;3(6):236-239.

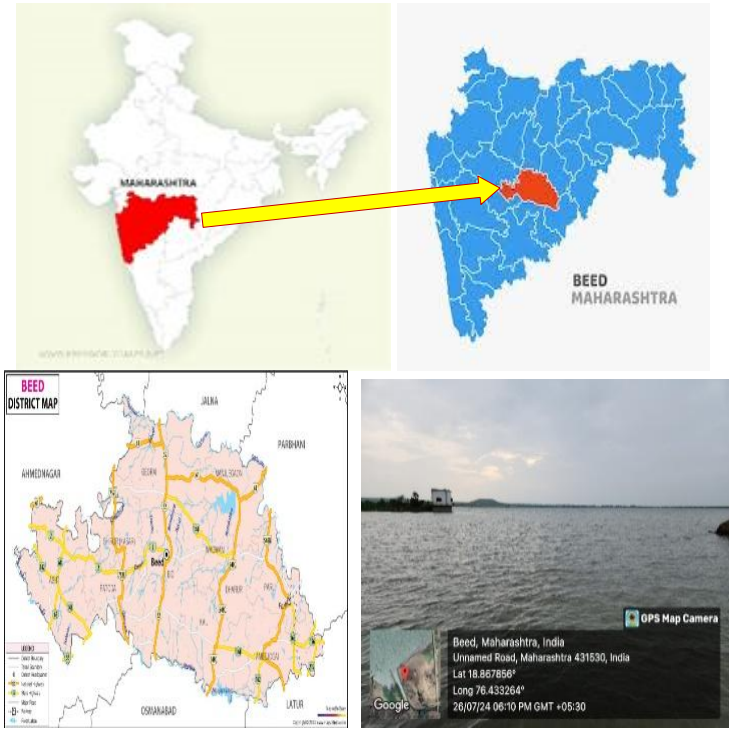
KEYWORDS: Water parameters; Nagapur Dam, etc.

1. INTRODUCTION

Water quality assessment plays a crucial role in understanding the health of aquatic ecosystems. Parameters such as pH, dissolved oxygen (DO), temperature, turbidity, and nutrient concentrations are fundamental in determining the suitability of water for aquatic fauna (Wetzel, 2001). Pollution, eutrophication, and anthropogenic activities have significantly. Impact on water bodies, leading to loss of biodiversity (Chapman & Kimstach, 1996).

Nagapur Dam in Beed District, Maharashtra, is a crucial water reservoir that supports various aquatic species. However, seasonal variations and human interventions may influence the water quality, directly affecting the faunal diversity. This study aims to analyze the physicochemical parameters of the dam water and assess its impact on aquatic biodiversity.

Fig. 1: Water sample collection for the analysis



2. MATERIALS AND METHODOLOGY

2.1 Study Area: Nagapur Dam, located in Beed District (MS), serves as a primary water source for irrigation, domestic, and aquatic life sustainability. The geographical coordinates and environmental conditions of the dam influence the water parameters.

2.2 Sample Collection: Water samples were collected quarterly in April, August, and December 2024 to account for seasonal variations. Standard methods were employed for sample collection and storage (APHA, 2017).

2.3 Analytical Methods

The following parameters were analyzed using standard laboratory procedures:

- Temperature– Measured using a digital thermometer.
- Turbidity– Determined using a nephelometric turbidimeter.
- Total Dissolved Solids (TDS) – Analysed using a gravimetric method.
- Total Hardness (CaCO3) – Determined by EDTA titration.
- Total Alkalinity (CaCO3) – Evaluated through acid titration.
- Calcium (Ca) & Magnesium (Mg) – Measured using complexometric titration.
- Chemical Oxygen Demand (COD) & Biochemical Oxygen Demand (BOD) – Assessed through oxidation and incubation techniques.
- Dissolved Oxygen (DO) – Estimated using Winkler's method.
- Chlorides (Cl), Sulphates (SO4), Silicates – Analyzed through spectrophotometry.
- Nitrogen (N), Phosphorus (P), and Iron (Fe) – Determined using Kjeldahl's method and colorimetric analysis.

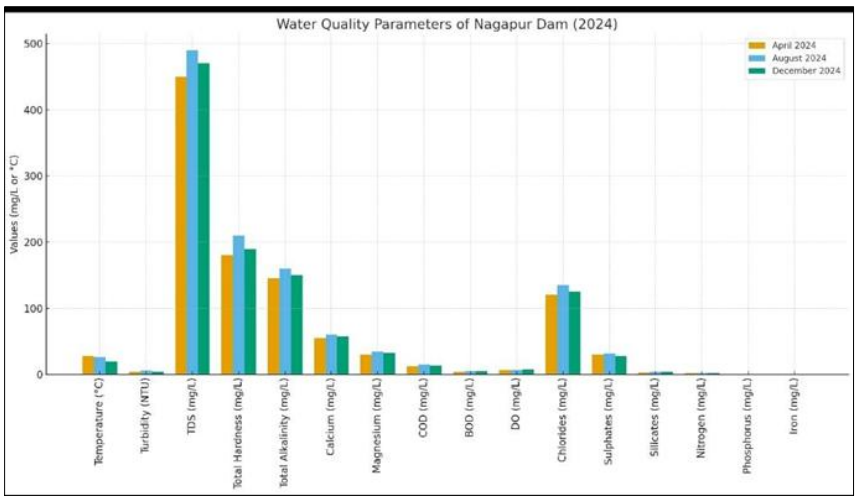
3. RESULTS

Water samples collected from the study site during April, August, and December 2024 were analyzed for various physicochemical parameters. The results obtained are presented in Table 1. Seasonal variations were observed in most of the parameters, although all values remained within the BIS (IS:10500:2012) permissible limits for drinking water quality.

Table 1: Seasonal Variation in Physicochemical Parameters of Water (2024)

Parameter	April 2024	August 2024	December 2024	Standard Limit (BIS, 2012)
Temperature (°C)	28.5	26.2	19.8	-
Turbidity (NTU)	4.2	6.1	3.9	<5
TDS (mg/L)	450	490	470	500
Total Hardness (mg/L)	180	210	190	300
Total Alkalinity (mg/L)	145	160	150	200
Calcium (mg/L)	55	60	58	75
Magnesium (mg/L)	30	35	33	50
COD (mg/L)	12	15	13	<20
BOD (mg/L)	4.5	5.2	4.8	<6
DO (mg/L)	7.2	6.8	7.5	>5
Chlorides (mg/L)	120	135	125	250
Sulphates (mg/L)	30	32	28	200
Silicates (mg/L)	3.5	4.0	3.8	-
Nitrogen (mg/L)	2.1	2.6	2.3	<10
Phosphorus (mg/L)	0.5	0.7	0.6	<1
Iron (mg/L)	0.2	0.3	0.25	<0.3

Graph 1: Water Quality Parameters (2024)



The temperature ranged between 19.8°C (December) and 28.5°C (April), showing higher values in summer and lower in winter. Turbidity increased slightly during the monsoon (6.1 NTU) due to surface runoff and suspended particles, but remained within acceptable limits. TDS and Total Hardness showed moderate seasonal variation, highest during the monsoon season (490 mg/L and 210 mg/L, respectively) but still below permissible limits. Alkalinity was maximum in August (160 mg/L), indicating slightly higher buffering capacity during the monsoon period. Calcium and Magnesium concentrations followed a similar trend, showing a marginal increase in August. COD and BOD values were highest in August (15 mg/L and 5.2 mg/L), suggesting moderate organic load during the monsoon. Dissolved Oxygen (DO) ranged from 6.8 to 7.5 mg/L, indicating well-aerated water throughout the study period. Chlorides and Sulphates remained within permissible limits, showing a slight monsoonal rise likely due to runoff and soil leaching. Nutrients such as Nitrogen and Phosphorus showed higher values during the monsoon (2.6 and 0.7 mg/L, respectively), possibly due to fertilizer inflow from surrounding catchments. Iron content varied between 0.2–0.3 mg/L, remaining at the threshold level prescribed by BIS.

4. DISCUSSION

The results indicate that most of the parameters fall within permissible limits set by BIS (2012), making the water suitable for sustaining aquatic fauna. The slight increase in turbidity and nutrient levels during the monsoon (August) suggests possible runoff from agricultural fields, leading to increased organic and inorganic load (Boyd, 2015; Salve et al., 2022).

The DO levels remained above the critical threshold of 5 mg/L, indicating sufficient oxygenation for aquatic organisms. However, seasonal variations in COD and BOD reflect fluctuations in organic matter decomposition and microbial activity (Hutchinson, 1957). Higher BOD levels during the monsoon suggests increased microbial degradation due to organic influx.

Calcium and magnesium levels support the presence of mollusks and crustaceans, which depend on these minerals for exoskeleton formation. Similarly, nitrogen and phosphorus concentrations, although within limits, indicate potential

eutrophication risks if agricultural runoff persists (Carpenter *et al.,* 1998).

5. CONCLUSION

The water analysis of Nagapur Dam reveals that its physicochemical parameters support a diverse range of aquatic fauna. Seasonal variations influence certain parameters, particularly turbidity, nutrient levels, and organic matter content. However, the dam remains a conducive habitat for aquatic life. Continued monitoring is recommended to prevent potential eutrophication and ensure sustainable water management practices.

ACKNOWLEDGEMENTS

Authors are thankful to the Principal, Capt. Dr. Maqdoom Farooqui Sir, Dr. Rafiq Zakaria College for Women, Navkhanda, Jubilee Park, Chhatrapati Sambhajinagar, for providing the laboratory and equipment to conduct the research.

REFERENCES

1. American Public Health Association (APHA). Standard Methods for the Examination of Water and Wastewater. 23rd ed. Washington (DC): APHA; 2017.
2. Boyd CE. Water Quality: An Introduction. Springer; 2015.
3. Bureau of Indian Standards (BIS). Indian Standard Drinking Water – Specification (IS 10500:2012). New Delhi: BIS; 2012.
4. Carpenter SR, Caraco NF, Correll DL, Howarth RW, Sharpley AN, Smith VH. Nonpoint pollution of surface waters with phosphorus and nitrogen. Ecol Appl. 1998;8(3):559–68.
5. Chapman D, Kimstach V. Water Quality Assessments: A Guide to the Use of Biota, Sediments, and Water in Environmental Monitoring. 2nd ed. UNESCO/WHO/UNEP; 1996.
6. Hutchinson GE. A Treatise on Limnology. Vol. 1: Geography, Physics, and Chemistry. Wiley, 1957.
7. Salve JA, Raut RR, Kurhe AR. Study of some physico-chemical parameters of Godavari River water from Kamalpur, Taluka Shrirampur, District Ahmednagar. In: National Conference on Innovations in Science and Technology for Sustainable Future. Res J. 2022;302:216 9.
8. Wetzel RG. Limnology: Lake and River Ecosystems. Academic Press; 2001.

About the Corresponding Author

Mr. Ranjit R. Raut (M.Sc. Biotechnology, M.Sc. Zoology, M.Phil., Ph.D. Ongoing) is a Ph.D. Research Scholar in Zoology at Yogeshwari Mahavidyalaya, Ambajogai, Maharashtra. With over eight years of research experience, he has published 50+ papers, authored five books, registered five patents, and received the Young Scientist Award.