



# WATER QUALITY ASSESSMENT OF GODAVARI RIVER

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**Abstract:** Water is an essential natural resource required for human survival, agriculture, industry, and ecological balance. Rivers serve as major sources of freshwater, but increasing urbanization, industrial discharge, agricultural runoff, and domestic waste have led to significant deterioration in water quality. The project titled Water Quality Assessment of the Godavari River focuses on evaluating important physical and chemical parameters of river water to understand its overall condition and usability. This study involves the analysis of key water quality parameters such as pH, turbidity, temperature, Total Dissolved Solids (TDS), Biological Oxygen Demand (BOD), and Chemical Oxygen Demand (COD) using standard laboratory testing procedures. These parameters are essential indicators of water quality, as they help determine the presence of dissolved substances, suspended particles, and organic pollution levels in water. Monitoring these characteristics provides valuable information about the environmental status of the river and its suitability for domestic and other purposes. The project emphasizes the importance of systematic sampling, accurate laboratory testing, and comparison with standard permissible limits to assess water quality conditions. Regular monitoring of river water helps in identifying pollution sources, creating environmental awareness, and supporting sustainable water resource management for the future.

**Keywords:** *Godavari River, Water Quality Assessment, Biochemical Oxygen Demand, Chemical Oxygen Demand, Total Dissolve Solid of Godavari, Turbidity, Urbanization Impact, Wastewater Management, Godavari Pollution*

## 1. INTRODUCTION:

Freshwater resources are essential for sustaining human life, agriculture, industry, and ecological balance. Among these resources, rivers play a vital role as primary sources of drinking water, irrigation, and domestic use while also supporting biodiversity and cultural activities. However, rapid urbanization, population growth, industrial discharge, agricultural runoff, and improper waste disposal have significantly affected river water quality in many regions. Continuous monitoring and assessment of river water are therefore necessary to understand pollution levels and ensure safe and sustainable utilization of water resources.

The Godavari River is one of the major and sacred rivers in India, often referred to as the "Dakshin Ganga." Originating from Trimbakeshwar in Maharashtra, the river flows through several states and supports millions of people for drinking, agriculture, industrial activities, and religious practices. In urban areas such as Nashik, the river is subjected to various anthropogenic pressures including domestic sewage discharge, religious activities, urban runoff, and agricultural influences, which can degrade water quality and pose risks to human health and

aquatic ecosystems. Water quality assessment involves the analysis of important physical and chemical parameters such as pH, turbidity, temperature, Total Dissolved Solids (TDS), Biological Oxygen Demand (BOD), and Chemical Oxygen Demand (COD). These parameters help in determining the level of contamination, organic pollution, and overall suitability of water for different purposes. Therefore, systematic evaluation of these indicators is essential for effective water resource management and environmental protection.

## 1.2. OBJECTIVES:

The main objectives of this study basically as follows:

- 1) To assess the water quality of the Godavari River in the Nashik region using important physico-chemical parameters.
- 2) To analyze key parameters such as pH, turbidity, temperature, Total Dissolved Solids (TDS), Biological Oxygen Demand (BOD), and Chemical Oxygen Demand (COD).
- 3) To compare observed water quality conditions with standard permissible limits for evaluating suitability for domestic and environmental use.
- 4) To identify the impact of anthropogenic activities such as sewage discharge, religious practices, and urban runoff on river water quality.
- 5) To create awareness regarding the importance of monitoring and protecting river water resources.

## 1.3. SCOPES:

The scope of the study is as follows:

- 1) The project covers the evaluation of pollution sources such as domestic sewage, solid waste disposal, and human activities near riverbanks.
- 2) It provides a comparative understanding of water quality conditions at different sampling points.
- 3) The findings may help in environmental monitoring, academic research, and sustainable river management planning.

## 2. METHODOLOGY:

The methodology adopted for the water quality assessment of the Godavari River involved systematic sample collection, laboratory testing, and comparative evaluation with standard water quality guidelines. The study area included important river stretches in Nashik such as Trimbakeshwar (origin region), Kushavart Kund, Tapovan, Ramkund, and downstream locations

influenced by urban activities and tributary confluences. Water samples were collected from multiple selected points using clean and sterilized sampling bottles to avoid contamination. Sampling was performed carefully to ensure representative water conditions at each location. Parameters analyzed in this study included temperature, pH, turbidity, Total Dissolved Solids (TDS), Biological Oxygen Demand (BOD), and Chemical Oxygen Demand (COD), which are widely accepted indicators of water quality.

Temperature was measured at the site during sample collection, while pH was determined using a digital pH meter. Turbidity was analyzed using a nephelometric turbidity meter. TDS was measured using a TDS meter to determine dissolved mineral concentration. BOD was determined using the incubation method over a specific period, indicating organic pollution levels, whereas COD was measured using chemical oxidation methods to evaluate total oxygen demand due to organic and inorganic matter. The obtained results were compared with standard permissible limits recommended by regulatory agencies such as BIS and WHO to evaluate the suitability of river water for domestic and environmental purposes. Observations were then interpreted to understand pollution levels and the impact of human activities on water quality.

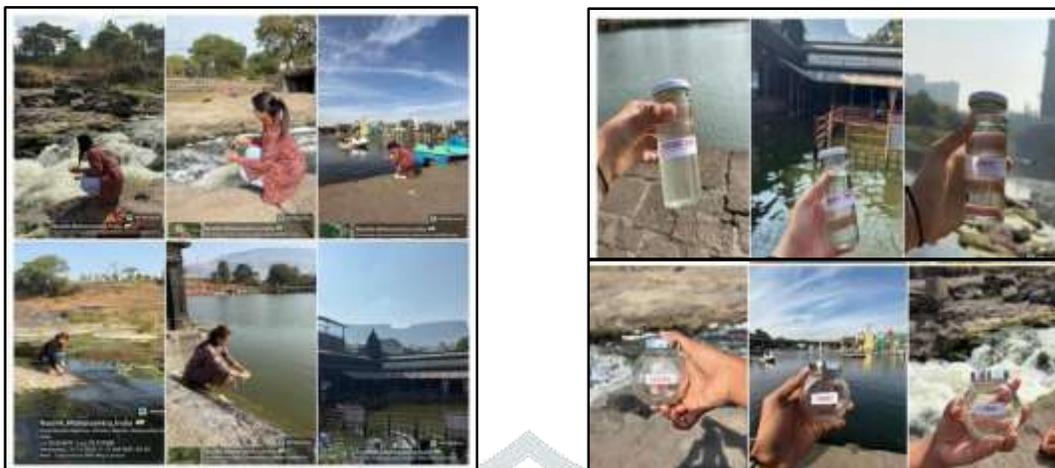


Fig-1 Collection of water samples.



Fig-2 laboratory test performance.

**3. RESULT AND DISCUSSION: TABLE NO: 1**

SR. NO	LOCATION	TDS (PPM)		pH		TURBIDITY (NTU)		TEMPERATURE		BOD (Mg/l)	COD (Mg/l)
		SENSOR	LAB	SENSOR	LAB	SENSOR	LAB	SENSOR	LAB	LAB	LAB
1	Uagmsthan, Trimbak	236	235	6.86	6.82	1.3	1.2	23.50° C	23.53° C	2.7	24.1
2	Kushvart, Trimbak	203	201	6.86	6.56	1.3	1.3	23.56° C	23.53° C	6.9	37.5
3	Someshwar,	354	360	7.13	7.15	1.6	1.7	23.62° C	23.63° C	7.8	46.5
4	Ramkund, Panchavti	435	434	7.51	7.50	2.1	2.1	23.51°C	23.56°C	9.1	53.6
5	Tapovan, Nashik	439	444	7.75	7.72	2.8	2.7	23.55°C	23.51°C	9.4	52.7
6	Nandini, Nashik	437	431	7.55	7.57	6.7	6.9	23.53°C	23.58°C	12.7	67.3

**3.1. DISCUSSION:**

The analysis of water samples indicated variations in physico-chemical parameters across different locations of the river. Upstream regions near the origin showed comparatively better water quality, while urban and religious activity zones exhibited increased turbidity, TDS, BOD, and COD values due to sewage discharge, human activities, and waste disposal. The findings highlight the influence of anthropogenic factors on river health and demonstrate the importance of regular monitoring. Comparison with standard limits suggests that certain stretches of the river require treatment before domestic use, emphasizing the need for improved waste management and pollution control measures to maintain ecological balance.

BOD rises from 2.7 mg/L to 12.7 mg/L, while COD increases from 24.1 mg/L to 67.3 mg/L, indicating a significant rise in organic and chemical pollution load. Higher BOD suggests greater microbial oxygen demand due to sewage, domestic waste, and human activities, whereas elevated COD reflects chemical contaminants. Downstream sites show values exceeding desirable limits for safe use, meaning the water quality deteriorates along the flow path and becomes unsuitable for drinking or domestic purposes without proper treatment and purification.

**4. CONCLUSION:**

The overall water quality assessment of the Godavari River samples indicates noticeable variation among locations. Upstream samples showed comparatively acceptable parameter values, while samples collected from urban and religious activity zones recorded higher turbidity, TDS, BOD, and COD levels beyond desirable limits. These results confirm the impact of sewage discharge and human activities on river health. Therefore, most downstream water requires proper treatment before domestic use, and continuous monitoring with pollution control measures is essential for sustainable river management. The future scope for improving dissolved oxygen levels in water involves adopting both natural and technological treatment methods. Aeration techniques such as mechanical aerators, diffused air systems, and waterfall structures can enhance oxygen transfer into water bodies. Controlling sewage discharge through proper wastewater treatment plants and reducing organic pollution at the source will significantly lower BOD and COD, allowing oxygen levels to

recover naturally. Plantation along riverbanks and constructed wetlands can also improve self-purification capacity. Regular monitoring using sensors can help identify pollution hotspots early. Community awareness and strict environmental regulations will further support sustainable water quality management and help restore aquatic ecosystem health over time.

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