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Water Quality Assessment

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Abstract: *As the main source of water for Nashik city is River Godavari. It becomes a priority to keep Godavari River clear and free from impurities. The river Godavari is second largest river in India, which is 82 percent polluted considerably. Rapid growth of population and its repetitive activities along the river pose a concerned impact on the river system. The water quality and quantity are under constant pressure by the presence of different human activities like removal of vegetation, industrial activities, and encroachment, domestic and religious activities. These all activities resulted in degradation of water quality. These all problems are largely concentrated in and around urban areas. Physico-chemical parameters like pH, turbidity, BOD, COD, DO, TDS have been analyzed by standard method.The overall values showed good water quality at upper stream in the study area, but as it enters in urban area water quality becomes deteriorate at upper stream in the study area, but as it enters in urban area water quality becomes deteriorate. By conducting above mentioned test on godavari river we will get to know the various location across its journey, where the river godavari gets polluted. And necessary meaures can be implmented to avoid pollution of river Godavari..*

Keywords: Godavari river, pH, chemical oxygen demand, biological Oxygen demand, turbidity, dissolved oxygen, total dissolved solid.

I. INTRODUCTION

Water is a fundamental natural resource, essential for sustaining life, ecosystems, agriculture, and industries. It plays a crucial role in maintaining ecological balance, supporting biodiversity, and ensuring the well-being of human societies. Rivers, lakes, and groundwater serve as primary sources of water for drinking, irrigation, hydropower generation, and industrial purposes. However, rapid urbanization, industrialization, and agricultural activities have led to severe pollution of water bodies, threatening both human health and the environment. The discharge of untreated sewage, industrial waste, and agricultural runoff containing fertilizers and pesticides has significantly deteriorated water quality. Rivers, often considered the lifelines of civilizations, now bear the burden of pollutants that render them unsafe for consumption and other uses. In India, major rivers like the Ganga and Godavari are heavily contaminated, with nearly 70% of surface and groundwater sources polluted by inorganic, biological, and toxic substances. This degradation has far-reaching consequences, affecting biodiversity, freshwater ecosystems, and livelihoods dependent on clean water, such as agriculture and fishing. Water contamination weakens natural ecosystems, reducing their ability to support human health and food production. The presence of pollutants threatens aquatic habitats, making water unsuitable for drinking, irrigation, and industrial applications. The scarcity of clean water, particularly in non-monsoon months when water flow is reduced due to drought or limited dam releases, exacerbates ecological stress. Poor water quality directly impacts communities, increasing health risks associated with waterborne diseases and lowering overall quality of life. With global water quality predicted to decline in the coming decades, there is an urgent need for effective pollution control and sustainable water management. Regular monitoring and assessment of water quality can provide essential information for implementing conservation strategies. The preservation of water resources requires proactive measures, including wastewater treatment, pollution prevention, and responsible water usage across agricultural, industrial, and domestic sectors.

The availability of good-quality water is indispensable for preventing diseases and ensuring the sustainable development of societies. To protect this invaluable resource, there must be collective efforts from governments,

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industries, and individuals to reduce pollution and enhance water conservation practices. Without immediate and sustained action, the decline in water quality will continue to pose significant challenges, impacting health, agriculture, and ecological stability for future generations. Thus, safeguarding our water resources is critical to ensuring a sustainable and thriving environment.

Fig.1.1 Kushavart tirtha

II. OVERALL DESCRIPTION

Water Quality Assessment of Godavari River in Nashik City

The **Godavari River** is one of India's most significant water bodies, serving as a lifeline for Nashik and surrounding regions. However, rapid urbanization, industrial expansion, and religious activities have severely impacted its water quality. Various studies have assessed the river's condition, revealing alarming levels of pollution, particularly in urban stretches.

Factors Affecting Water Quality

The primary sources of pollution in the Godavari River include:

- **Industrial Waste:** Factories discharge untreated effluents containing heavy metals, chemicals, and toxins, degrading water quality.
- **Domestic Sewage:** Large volumes of untreated sewage enter the river, increasing biological oxygen demand (BOD) and reducing dissolved oxygen (DO) levels.
- **Agricultural Runoff:** Fertilizers and pesticides from nearby farms seep into the river, introducing harmful chemicals.
- **Religious Activities:** Ritual bathing, idol immersion, and offerings contribute to contamination, especially during festivals.

Water Quality Assessment

Studies analyzing **physico-chemical parameters** such as **pH, turbidity, BOD, COD, DO, and TDS** indicate that water quality deteriorates significantly as the river passes through Nashik. The **Water Quality Index (WQI)** assessments show that upstream sections have relatively better water quality, while urban areas experience severe contamination.

- **Upstream (Near Trimbakeshwar):** Water quality is relatively good, with lower pollution levels.
- **Urban Stretch (Nashik City):** High levels of pollutants, including organic waste, industrial effluents, and sewage.
- **Downstream:** Pollution continues to accumulate, affecting aquatic life and making water unsuitable for consumption.

Impact on Ecosystem and Public Health

The declining water quality has severe consequences:

- **Threat to Aquatic Life:** Reduced oxygen levels and toxic substances harm fish and other aquatic organisms.
- **Health Risks:** Contaminated water increases the risk of waterborne diseases such as cholera and dysentery.
- **Water Scarcity:** Pollution limits the availability of clean water for drinking and irrigation.

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Remedial Measures

To improve the Godavari River's condition, **effective pollution control strategies** are necessary:

- **Wastewater Treatment:** Establishing sewage treatment plants to prevent direct discharge into the river.
- **Industrial Regulations:** Enforcing stricter pollution control norms for industries.
- **Public Awareness:** Encouraging responsible waste disposal and conservation efforts.
- **River Cleaning Initiatives:** Government-led programs to remove pollutants and restore water quality

Objectives

- To investigate water quality of River Godavari at Nashik city.
- To calculate water quality aspects like pH, turbidity, BOD, COD, TDS, Dissolved oxygen

Applications of Hydraulic Bridges

Drinking Water Safety: Monitoring water quality ensures the river water meets safety standards for human consumption.

Helps in identifying contamination sources and implementing purification measures.

Agricultural and Irrigation Use: Farmers rely on river water for irrigation; assessing water quality helps determine its suitability for crops.

Industrial Applications: Industries using river water for manufacturing processes require quality assessments to prevent equipment damage and ensure product safety.

Selection of Sampling places:

In the present study, 04 sampling locations were selected along the Godavari river as given namely kushavart, Gangapur dam, Navshya Ganapati, Ramkund.

Various physico-chemical parameters such as temperature, pH, Turbidity, Total Dissolved Solids(TDS), Dissolved oxygen(DO), Biochemical Oxygen Demand(BOD), Chemical Oxygen Demand(COD), were determined at all the sampling stations. pH was determined using ,turbidity was estimated using ,TDS was determined by using ,DO was determined using ,COD was determined by using ,BOD was estimated by using . Selection of sampling stations is based on types of human activities and their intensity as well as area affected by urban waste. For water quality analysis water samples have been collected from the surface water along the river.

Sr. no	Sampling locations	Sampling stations	Taluka	Remarks
1	Kushawart	S1	Nashik	Origin of River with no anthropogenic impacts
2	Gangapur dam	S2	Nashik	Monitored by CPCB. Dam is source of drinking water
3	Navshya ganapati	S3	Nashik	Bathing activity and Puja material thrown
4	Ramkund	S4	Nashik	Mass bathing activities, Daskriyavidhi material thrown

Challenges and Limitations

High Pollution Levels:

The river receives untreated sewage, industrial effluents, making it difficult to pinpoint specific pollution sources.

Complexity of Pollutants:

The river contains biological, chemical, and heavy metal contaminants, requiring advanced testing methods.

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Regulatory and Enforcement Issues:
Existing pollution control laws often poorly enforced, allowing industries and municipalities to discharge waste in the river.

Sampling Constraints:
Water samples are often collected from **limited locations**, which may not represent the entire river's condition.

Technological Limitations:
Advanced **sensor-based monitoring systems** are expensive and not widely implemented.

Data Interpretation Challenges:
Water quality indices (WQI) provide **generalized scores**, but they may not capture specific pollution sources.

Funding and Resource Constraints:
Many water quality assessment projects face **budget limitations**, affecting the scope and accuracy of studies.

Sampling Places:

Kushavart Tirtha

Kushavart Tirtha is situated at the heart of Trimbakeshwar town 400 mts away from Trimbakeshwar Jyotirlinga. This 21 ft deep Kund was built in 1750 having natural aquifers. It is said to be the place from where sacred river Godavari remerges after disappearing at Bramhagiri hills, and hence the superior holiness of this Tirtha. At kushavart tirtha, activities like nirmalya visarjan, bathing, etc

Gangapur Dam:

In the study area, upstream of Gangapur dam there are two other dams constructed for water storage viz. Kashyapi and Gautami-Godavari dam. Kashypi Dam, is an earth fill dam on Kashyapi river a tributary of Godavari near Rajapur, Nasik, it is constructed on U/s of Gangapur Dam. During 2003, Sinhastha Kumbhmela, a sewage treatment plant is constructed with MBR technology. The plant is located at the back side of the Shiva Temple with a capacity of 1.0 MLD. The design of the plant was provided by IIT, Mumbai and the plant was constructed by MJP. Performance of this STP was evaluated by CPCB and it was then reported that status of STP is Operational (unsatisfactory) and disposal of treated sewage released in Godavari/ irrigation. Open defecation, washing of cloths and animals, nirmalya visarjan, farming at close proximity of river are observed in the villages nearby river course and at the back water of dams

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Navshya Ganpati:

The navshya Ganapati temple is famous temple of Ganapati, located on the bank of Godavari river. At navshya Ganapati, activities like washing of clothes and vehicle, ware observed. Nirmalya (offering) heaps are observednin river as well as on the bank of river. Proper collection facility for nirmalya was not observed at or nearby temple.

Ramkund:

Panchavati is one of the densely populated areas of Nasik where Ramkund is a unique place of religious importance at all the times, especially in the "Kumbhamela". It is a place for holy dip. Daily thousands of people take a dip in Ramkund. During kumbha parva Lakhs of people take holy dip in Ramkund. The belief is that God Rama use to take a bath in Ramkund and the river takes a turn in ninety degree at this place.

Nirmalya visarjan, religious activities, bathing and Asthi visarjan are daily activities at Ramkund. At U/s of Ramkund and Hanuman Ghat River receives sewage and industrial load. Whereas at this particular site religious activities are prominent. Stretch is mark with improper facilities for collection of Nirmalya and other solid 45 waste, bathing, washing of cloths, vehicles, Dashakriya vidhi and asthi visarjan. Also at Ram ghat there is "Bhaji Bajar" , throwing of vegetable waste, remains etc. has been observed It is also observed that temples don't have their own nirmalya collection facility. Plastic bags are observed in river, color of river water is objectionable. Washing of vehicles also reported by local residents on the occasions

III. CONCLUSION

In the study water quality of Godavari river in Nashik was evaluated, to evaluate water quality of Godavari river 4 sampling stations were determined,and 6 parameter were selected.

The physico-chemical analysis of water samples indicates that the river water sample has alkaline properties.

As pollutants are added in the river water at various stations, it has increased the biological oxygen demand.

TDS parameter showed good value at S1 hence the water is excellent and suitable for drinking.

Water quality parameters pH, DO, BOD were used to calculate water quality index for evaluation of water quality.

At the various stations value of pH is good. The classifications shows that the value of pH in stations S1 and S2 is less than 7 and at stations S3 and S4 the value of pH is more than 7.

As source of water is same, but as it travels from many places, its properties got changed.

As this water travels from many places, some untreated water from some places adds to this & some amount of contaminants added to it, which creates nuisance.

To avoid this, before bypass of this water, it should be treated.

Properties of this water should be tested & submitted to local authority.

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