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Assessment of Water Quality of Wastewater Before and After Wetland Treatment

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Abstract—

Rapid urbanization and industrial growth have significantly increased the generation of untreated or partially treated wastewater, posing severe threats to aquatic ecosystems and public health.

This study assesses the water quality of wastewater before and after treatment through a wetland treatment system. **Keywords—** Rapid urbanization, Public health, Aquatic ecosystems, Water quality.

I. INTRODUCTION

Water pollution has emerged as one of the major environmental challenges worldwide due to rapid urbanization, industrial development, population growth, and the increasing demand for freshwater resources. The continuous generation of domestic, municipal, agricultural, and industrial wastewater has placed significant pressure on natural water bodies and existing wastewater treatment infrastructure. The discharge of inadequately treated wastewater into rivers, lakes, and other aquatic ecosystems can lead to the deterioration of water quality, depletion of dissolved oxygen, nutrient enrichment, ecological imbalance, and risks to human health.

BOD and COD are particularly important indicators of organic pollution, while TSS and turbidity help assess the removal of particulate matter. Nutrient parameters such as nitrate and phosphate are relevant because excessive concentrations may contribute to eutrophication in receiving water bodies. Changes in dissolved oxygen and pH also provide insight into the biological and chemical conditions of the treated water.

II. LITERATURE REVIEW

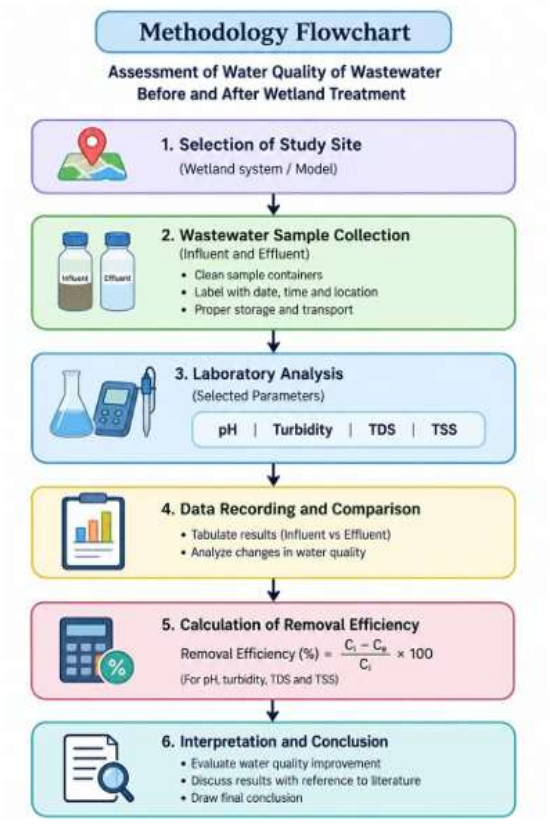
1. Wu et al. (2023) Wu et al. (2023), in their review article Constructed Wetlands for Pollution Control, published in Nature Reviews Earth & Environment, examined the global application and treatment performance of constructed wetlands. The study analyzed data from field-scale wetland systems and reported that treatment performance depends on wetland design, temperature, hydraulic retention time, and pollutant loading. Hybrid constructed wetlands showed substantial removal of organic matter,

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nitrogen, and phosphorus. The study highlighted the importance of suitable design and operational management for improving wastewater quality.

2. Liu et al. (2024) Liu et al. (2024), in their review article Current Problems and Countermeasures of Constructed Wetland for Wastewater Treatment, published in the Journal of Water Process Engineering, discussed the major challenges associated with constructed wetland systems. The authors highlighted issues such as clogging, temperature variations, land requirements, and differences in plant performance. The study also discussed potential improvements through additional aeration, suitable plant selection, and regular monitoring. These findings demonstrate the importance of evaluating wetland performance under specific operating conditions.

III. METHODOLOGY



IV. OBJECTIVE

1) To collect wastewater samples before and after wetland treatment for water quality assessment.

2) To analyze the physicochemical parameters of wastewater, including pH, temperature, turbidity, total dissolved solids (TDS), and total suspended solids (TSS).

3) To compare the water quality parameters of untreated and treated wastewater.

4) To calculate the percentage removal efficiency of selected pollutants after wetland treatment.

5) To evaluate the effectiveness of the wetland system in reducing organic matter and suspended pollutants.

6) To assess the potential of wetland treatment as an environmentally friendly and sustainable method of wastewater management.

V. CONCLUSION

The project entitled “Assessment of Water Quality of Wastewater Before and After Wetland Treatment” aims to evaluate the effectiveness of wetland systems in improving wastewater quality. In this study, wastewater samples collected before and after wetland treatment are analysed for four important parameters: pH, turbidity, Total Dissolved Solids (TDS), and Total Suspended Solids (TSS).

REFERENCES

1. Wu, H., Wang, R., Yan, P., et al. (2023). Constructed wetlands for pollution control. Nature Reviews Earth & Environment, 4, 218–234. https://doi.org/10.1038/s43017 023-00395-z

2. Liu, S., Zhang, Y., Feng, X., & Pyo, S.-H. (2024). Current problems and countermeasures of constructed wetland for wastewater treatment: A review. Journal of Water Process Engineering, 104569. https://doi.org/10.1016/j.jwpe.2023.104569

3. Wang, L., Ma, L., Wang, J., et al. (2024). Research progress on the removal of contaminants from wastewater by constructed wetland substrate: A review. Water, 16(13), 1848. https://doi.org/10.3390/w16131848

4. Ali, M., Aslam, A., Qadeer, A., et al. (2024). Domestic wastewater treatment by Pistia stratiotes in constructed wetland. Scientific Reports, 14, 7553. https://doi.org/10.1038/s41598-024-57329-y

5. Singh, K. K., & Vaishya, C. R. (2025). Wastewater quality evaluation in terms of wastewater quality index using hybrid constructed wetland for treatment of dairy and municipal wastewater. Water Environment Research, 97(2), e70024. https://doi.org/10.1002/wer.70024

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