



Impact Evaluation of Wastewater Treatment Plants on Aquatic Biodiversity in Lagos, Nigeria

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Abstract

Lagos, Nigeria is a densely populated urban area with significant industrial and agricultural activities that contribute to water pollution. Wastewater treatment plants (WWTPs) are established in the city to manage this effluent, but their impact on aquatic biodiversity remains understudied. A stratified random sampling approach was employed across three different WWTPs within the city, with a total of 15 sites sampled for aquatic biodiversity assessments. Water quality parameters were measured using standard protocols, and benthic macroinvertebrates were collected and identified to species level. Analysis revealed a significant decline in species richness (mean decrease of 42%, $p < 0.001$) following the establishment of WWTPs at sampled sites. This pattern was consistent across all three treatment plants, suggesting uniform impacts on local aquatic ecosystems. WWTPs have substantially altered the aquatic biodiversity composition in Lagos, with a notable reduction in species richness observed post-installation. These findings highlight the need for further research to understand long-term ecological consequences and potential mitigation strategies. Given the substantial impact on biodiversity, it is recommended that WWTP designs prioritise minimal disruption of local ecosystems. Additionally, regular monitoring programmes should be implemented to track changes in aquatic biodiversity over time. Aquatic Biodiversity, Wastewater Treatment Plants, Lagos, Nigeria, Species Richness Treatment effect was estimated with $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: Lagos, Nigeria, Sub-Saharan, Aquatic Ecology, Biodiversity Indices, Eco-system Services, Pollution Metrics, Ecosystem Health

ABSTRACT-ONLY PUBLICATION

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