

**Assessment of Water Quality of an Urban Wetland: Bellanvila-Attidiya, Colombo, Sri Lanka**

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**Abstract**

The rapidly urbanizing land-use pattern in Colombo has limited the role of wetlands to sink various pollutants. It has affected their crucial ecological functions. The present study was conducted to assess the surface water quality in the Bellanvilla-Attidiya wetland using twelve key water parameters to examine the suitability of wetland waters for aquatic life. Based on the random sampling technique, ten locations were selected from the wetland area. Surface water samples were collected from January-April (dry months) and September-December (wet months) of 2023. Pollution status and the suitability of the wetland water for aquatic life were assessed using the water pollution index (WPI). Temperature, pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), salinity, and dissolved oxygen (DO) were measured onsite using portable meters. In the laboratory, nitrate-N, ammonia-N, orthophosphate, total phosphate, chemical oxygen demand (COD), and chlorophyll-a (Chl-a) were analyzed using standard analytical methods. Monthly average rainfall data for the study period were procured from the Department of Meteorology, Sri Lanka, corresponding to the meteorological station nearest to the study site. Results were compared with ambient water quality standards for aquatic life in Sri Lanka. COD and DO were not within the standard levels among the tested parameters. Although surface water contamination is possible due to increased surface runoff during the wet months, pearson-correlation results revealed that the monthly average rainfall has significant negative correlations ( $p < 0.05$ ) with concentrations of nitrate-N ( $r^2 = -0.880$ ), ammonia-N ( $r^2 = -0.802$ ), and COD, ( $r^2 = -0.483$ ) which can be attributed to dilution impacts. The WPI was reported as  $2.1 \pm 0.23$  and  $1.2 \pm 0.1$ , respectively, during dry and wet months. Therefore, the wetland area can be categorized as highly polluted (WPI > 1 - highly polluted) and unsuitable for aquatic life. There was a significant difference in WPI between wet months and dry months ( $P < 0.05$ ). Further, the monthly average rainfall of the study area has a strong negative correlation ( $p < 0.05$ ,  $r^2 = -0.800$ ) with WPI values suggesting increased pollution levels in water during dry months. It is recommended that immediate intervention measures, such as reducing urban runoff and controlling pollutant discharge, be implemented to mitigate further degradation of water quality and protect the ecological integrity of this vital urban wetland ecosystem.

**Keywords:** *Bellanvila-Attidiya wetland, Water pollution index, Aquatic life, Wet months, Dry months*