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An assessment of water quality in inland surface water bodies: A case study in Kaduwela area

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The primary objective of the research is to assess the water quality of inland surface water bodies in the Kaduwela area. Six sampling locations were selected around Kaduwela, which includes two enclosed bodies and four flowing streams/canals. About thirty water samples were collected from June to September 2017, at 21 days' interval for the analysis, and were checked for sixteen direct water quality parameters namely Electrical Conductivity (EC), Dissolved Oxygen (DO) Concentration, pH, color, temperature, turbidity, Biochemical Oxygen Demand (BOD), Total Solids (TS), Total Suspended Solids (TSS), hardness, nitrate, phosphate, nitrogen ammonia, ferrous, *E. coli*, and total coliforms. The analysis was done according to "Standard Method for the Examination of Water and Waste Water: APHA, AWWA and WEF, 21st Edition, 2005". Common carp (*Cyprinus carpio*) and Rainbow trout (*Oncorhynchus mykiss*) are the most common fish found in the water bodies. Principal Component Analysis (PCA) and Factor Analysis (FA) were used to understand the correlation between parameters. By the statistical analysis, strong positive correlations between BOD and temperature, and negative correlations between DO and BOD were observed. Color shows a strong correlation to turbidity and TSS. That suggests the color can be used as a good indicator of the turbidity in inland surface water bodies. With less rainfall the temperature, BOD, nitrate, pH, EC, TS, and nitrogen ammonia concentrations seem to be increased, while the color, turbidity and DO were decreased. According to the analyzed results location 4 was the most polluted inland water body out of the selected ones, due to the entry of industrial effluents with high levels of ionic matter which lead to high range of EC and low levels of DO. Location 1 was considered to be good compared to other locations. A higher ferrous concentration was noted in location 3. Runoff from agricultural fields and commercial buildings causes the deterioration of water quality in location 5. Due to development activities and residential discharges location 6 has become polluted. Overall the six locations which were selected around the Kaduwela area were not up to drinking water quality standards. By changing the living standards of the people and pre-treating water before discharge into water ways, pollution can be reduced. Therefore, introducing best management practices to mitigate pollution can safeguard the water quality to protect and maintain the aquatic ecosystem for future generations.

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