

Assessment of surface water pollution using physico-chemical parameters in Lunawa Lagoon, Sri Lanka

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The objective of this study is to evaluate the surface water quality of the Lunawa Lagoon in terms of physio-chemical parameters. The water quality was surveyed from October 2015 to March 2016 by using eight different sample points. A total of six water quality parameters, namely, water temperature, pH, Electrical Conductivity (EC), Dissolve Oxygen (DO), Salinity, and Turbidity, were measured in-situ, while laboratory analysis included five chemical parameters namely, nitrate, phosphate, Total Dissolve Solids (TDS), Biological chemical oxygen demand (BOD), and Chemical oxygen demand (COD). To identify natural and human impacts, the study deployed a questionnaire survey using 50 samples in accordance with the random stratified sampling method; spatial variation was analysed using Invers Distance Interpolation (IDW). Arc GIS 10.1 was performed to prepare spatial distribution maps. Temporal variation was analysed and correlation calculated using MS Excel 2013. The study revealed that the pH level ranged between 7.1 and 7.7. Water temperature had an average of 29.4°C to 29.6°C. DO average level was 1.4mg/l to 3.2mg/l across the sites, and the turbidity range was 27.4 to 7.3NTU. The salinity average range was 10.4ppm to 28.4ppm. The nitrate concentration was high in the southern part and the phosphate concentration was high in the northern part of the lagoon. The BOD and COD averages in the lagoon were 281.81mg/l and 44.81mg/l respectively. There were high negative correlations between pH and rainfall ($r = -0.81$), EC / rainfall ($r = -0.83$) and high positive correlation between turbidity and rainfall ($r = 0.99$), dissolve oxygen / rainfall ($r = 0.92$). According to the Water Quality Index in the lagoon, this water is not suitable for drinking, bathing, aquatic, and agricultural purposes.

Keywords: *correlation, GIS, interpolation, Lunawa Lagoon, Water Quality Index*