

Analyzing Seasonal Variation of Water Quality Parameters of Kelani River

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Raw water quality of a surface water body directly affects the purification process and the final water quality of drinking water. When considering Sri Lanka, the Kelani River plays a vital role in fulfilling people's water necessities, as it provides water for more than 80% of the population of the capital city, Colombo. The current study focuses on the Kelani River in order to identify the models of variation of raw water quality parameters and to investigate patterns and trends of parameter variation. The main objective was to forecast the variation of water quality parameters with special reference to the Kelani River. The water quality was analyzed with different parameters including pH, Turbidity, Electrical Conductivity, Total Coliform and *Escherichia coli*, and data gathered for five years (2012 - 2017) at five different intakes. Analysis was carried out by R studio software. Time Series techniques were used to perform the tests, and all decisions were made under p-value of 0.05. *ARIMA* and *SARIMA* models were used to identify the best fitting model for the variation of quality parameters with time. Results were forecasted for a 6 month time period using the above fitted models. Based on obtained results, the seasonality of the water quality parameters changed from one intake to another. When analyzing the pH, *Ambathale* and *Biyagama* showed seasonality while other three intakes showed non seasonality. Electrical Conductivity had a seasonal variation at *Biyagama* and *Pugoda* intakes, while *Escherichia coli* showed seasonality for *Ambathale* intake only. Frequent long-term monitoring of physicochemical parameters of surface water resources is vital for the better management of water resources as well as aquatic habitats and the environment. Based on the results of this study, a better prior understanding about the behavior of raw water quality parameters can be obtained, and this prior understanding can be used to manage the water purification process and final water quality.

Keywords: Kelani River, Water Quality, Time Series Analysis, *ARIMA*, *SARIMA*