

An Analysis of Water Quality in Surface Water of Kalu River Basin, Sri Lanka in the First Inter-Monsoon Season 2024

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Abstract

The Kalu River is the major urban water source for the Rathnapura and Kaluthara districts. It originates from the Sri Pada Mountain of the wet zone, and it collects rainfall from the western slopes and falls into the sea at Kaluthara after traversing about 129 km with a catchment area of approximately 2766 km². The river experiences frequent floods and large-scale inundation during wet season, particularly in cultivated areas and industrial zones. Therefore, it brings a high amount of agrochemicals, pollutants through several industries, along with pollution from the annual Sri Pada pilgrimage. This study was conducted to analyze water quality in Kalu River for physical, chemical and biological parameters during the first inter-monsoon season, coinciding with Sri Pada pilgrimage in 2024. Water samples were collected from 30 selected points along the river basin, focusing on potential pollutant zones. Parameters tested included temperature, turbidity, salinity, TDS, color, Electrical Conductivity, pH, chloride, alkalinity, total hardness, total phosphate, sulphate, nitrite, nitrate, fluoride, total iron, free ammonia, total coliforms, and *Escherichia coli*. The average river temperature was recorded at 29 °C and pH values fell within the standard range. Salinity, TDS, and electrical conductivity values were acceptable in 99% of samples, while color ranged from 22 to 960 Hazen units. The total hardness, chloride, and alkalinity values were within acceptable limits for drinking water. Sulphate, nitrite, nitrate and fluoride concentrations were found to be very low. All these parameters were within the safe ranges according to SRI LANKA STANDARD 614: 2013 and ISO 9308-1 2014 specifications for potable water quality. However, turbidity, color, total Phosphate, total Iron, and free ammonia posed a risk limit for % of the samples. Among the sampling locations, 100% of samples were contaminated with total coliform and *Escherichia coli*, exceeding standard levels. This highlights the need for targeted conservation and management strategies in drinking water quality treatments.

Keywords: *Water quality, Kalu River, Surface water*