Abstract No: 118 ***Earth and Environmental Sciences***

PHYSICO-CHEMICAL CHARACTERISTICS OF INLET AND OUTLET WATER IN WATER TREATMENT PLANTS ALONG THE MAHAWELI RIVER BETWEEN KOTMALE AND VICTORIA RESERVOIRS

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Mahaweli River, the longest river in Sri Lanka, delivers approximately 165,392 m^3 of drinking water daily to the Kandy district. The network of 14 major water treatment plants (WTPs) is positioned between Kotmale and Victoria reservoirs to extract water from the river. The river is notably contaminated due to industrialisation, rapid urbanisation, agriculture, and the discharge of domestic wastewater. The present study aimed to evaluate water quality by analysing physico-chemical parameters (pH, conductivity, dissolved solids, anions, and cations) at both inlets and outlets of the 14 WTPs. During September 2022 and February 2023, 58 water samples were collected and analysed following the methods prescribed by APHA. Concentrations of anions and cations were analysed using IC and ICP/MS, respectively. The maximum and minimum values of the measured parameters at both the inlets and outlets fell within the permissible limits recommended by NEA No.47 of 1980 and SLS 614:2013 guidelines, respectively. However, statistically significant disparities between the inlet and outlet water in NO_3^-, SO_4^{2-}, F^- and Cl^- concentrations of two distinct seasons were observed. It was evident that the levels of pollutants, such as those originating from industrial (e.g., textile and laundry) waste discharge and agricultural and urban runoff, are more likely to escalate during the wet season. A significant variation was observed among water treatment plants within the same season due to inherent geological variations, anthropogenic activities, and diverse contaminating sources. Notably, the regions characterised by intense urbanisation between Paradeka and Balagolla exhibited higher contamination levels of anions and cations. In contrast, Nanuoya exhibited the most substantial contamination, primarily due to the effluent of Gregory Lake, Nuwara Eliya. Acquiring a comprehensive understanding of the variations in physico-chemical parameters along the Mahaweli River is vital for effective water management practices.

Financial assistance from the University Research Council, University of Peradeniya (*Grant No 280:2022*) *is acknowledged.*

Keywords: Drinking water, Kandy, Mahaweli River, Physico-chemical parameters