Studies on Heavy Metal Concentration and Evaluation of Water Quality Index in Selected Sites of River Tamiraparani, Tamil Nadu, India

K. Sabari Sorna Devi, S. Sajen and R. Soranam[*]

Sri Paramakalyani Centre of Excellence in Environmental Science
Manonmaniam Sundaranar University, Alwarkurichi-627 412, India
E-mail: soranamr@gmail.com

Abstract: The study sites were chosen based on the appropriate utility of river water for the purpose and practically cover the full length of the river. Water quality index has been developed for the water samples by an inclusive analysis for physicochemical parameters which comprises temperature, pH, electrical conductivity, total dissolved solids, total hardness, alkalinity, dissolved oxygen, phosphate and nitrate. Correlations between the physicochemical parameters were carried out. Trace metal concentrations such as lead (0.19 to 0.30 μg/g), Chromium (1.41 to 1.72 μg/g), Mercury (0.10 to 0.70 μg/g) and Cadmium (1.00 to1.35 in μg/g) were analysed near the urban areas indicating the moderate metal pollution in the study areas. The PCA with variance matrix rotation was operated to the heavy metals data set to construct a correlation matrix of different variables and to support in the identification of causes of several impurities. The strong factor loadings of Cd (0.947) and Pb (0.893) are governed by PCA, which accounts for 78.83 % of the total variance. The loading effects are proportional to the concentration of ions in water. The higher index value indicates the quality of river water is depriving in S5 (Vannarapettai) and S6 (Vallanadu) due to anthropogenic activities. If this situation continues, the water will become insecure for human consumption; consequently river water quality must be monitored on a regular basis.

Keywords: River Tamiraparani, Water quality index, Pearson correlation, Heavy metal examination