



Assessment of Water Quality of Kallada River, Southern Western Ghats, India: A Statistical Approach

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Abstract

Western Ghats also known as Sahyadri is a mountain range that runs parallel to the western coast of Indian peninsula, perform important life sustaining functions. Approximately 245 million people live in the peninsular Indian states that receive most of their water supply from rivers originating in the Western Ghats. Water quality sustains ecological processes that support native fish populations, vegetation, wetlands and birdlife. Water is being polluted with increased population, agricultural needs and industrial purpose. The polluted water on drinking may cause serious effect in human beings, domestic animals and even in the case of aquatic organisms. The present study was carried out to assess the hydrochemical characterisation and irrigation suitability of surface water of the Kallada River Basin (KRB), draining the south-western flanks of Western Ghats in Kerala, India during pre-monsoon (May 2019), monsoon (September 2019) and post-monsoon (February 2020) seasons. The samples were analysed for various physico-chemical parameters such as pH, Turbidity, Conductivity, Total Dissolved Solids, Chlorides, Dissolved Oxygen, Bio-chemical oxygen, Total hardness, Calcium, Magnesium, Sodium and Potassium. Irrigation Water Quality Indices (IWQI) such as percentage sodium (% Na), Sodium Adsorption Ratio (SAR), Residual Sodium Carbonate (RSC), Magnesium Hazard (MH), Permeability Index (PI) and Kelley's Ratio (KR) were determined to assess the suitability for agriculture. The results show that majority of samples were suitable/ excellent for irrigation with some places in the study area belongs to the good, permissible and unsuitable categories. On the basis of these determined and calculated parameters, all the surface water samples excluding the coastal regions falls under 'Excellent' category during the three seasons based on SAR and RSC. The % Na and the resulting Wilcox diagram classify the majority of surface water samples as excellent to good category and nearly 30% under unsuitable category (lowland samples) in both monsoon and post-monsoon seasons whereas in pre-monsoon season most of the samples were under 'excellent to good' and 'permissible to doubtful' categories showing suitability of surface water for irrigation.

Keywords: Surface Water Chemistry, Irrigation Suitability, Cluster Analysis, Sodium Adsorption Ratio, Residual Sodium Carbonate, Southern Western Ghats