

## Hydrogeochemical and Isotopic Evidence of Groundwater Evolution and Characterization in Upper Walawe Basin, Sri Lanka

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A detail hydrogeological investigation was carried out in the Walawe River Basin (WRB), the 4<sup>th</sup> largest river basin in Sri Lanka that flows to the southern lowlands, to identify the groundwater evolution and recharge in the metamorphic hard rock aquifers. The basin is one of the most economically and geologically important river systems. Due to rapid increase of the population and the expansion of agricultural the demand for water in the WRB is rapidly increasing. Water samples were collected from rivers (6), deep (16) and shallow wells (15), and natural springs (3) for hydrogeochemical and isotopic measurements. Gibbs' and elemental ratio plots indicated that groundwater in the region is strongly influenced by rock-water interactions, whereas silicate weathering and ion exchange processes being the leading processes that control the groundwater geochemistry. Ca-HCO<sub>3</sub> type water was found to be the prominent water type while irrigation suitability calculations indicated that low sodium hazard of groundwater. The water isotope data suggested that the groundwater in the basin is recharged from the northeast monsoon rain while some deep groundwater showed a trend of evaporation. The result of this study highlights that the groundwater of the basin is highly vulnerable due to over exploitation and urgently need better water resource management.

Keywords: Environmental Isotopes, Rock-Water Interactions