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RAPID SCREENING OF GROUNDWATER SOURCES BY INTEGRATED WATER QUALITY INDEX

A. Navoda Erangani[1], P. Rukshagini[2, 4*], Pushpa Wijekoon[3], S.K. Weragoda[2], R. Weerasooriya[4]

[1]*Environmental Science, Faculty of Science, University of Peradeniya, Peradeniya, Sri Lanka*
[2] *Water Safety Plan Advisory Unit, National Water Supply and Drainage Board, Katugastota, Sri Lanka*
[3]*Department of Statistics and Computer Science, University of Peradeniya, Peradeniya, Sri Lanka*
[4] *National Institute of Fundamental Studies, Kandy, Sri Lanka*

To date over 3.8 million people in the dry zone of Sri Lanka suffer without safe water for drinking and domestic requirements. Presently WHO or EPA standards is being used to assess the source water quality. Sometimes this assessment is cumbersome and the synergy among different parameters is often neglected which results unambiguous well screening. This research is aimed to develop an integrated water quality index (IWQI) for rapid well screening. A sample study was conducted in Mihintale Aquifer. Most of the physical chemical parameters were measured by on-site and laboratory assessments. The Inverse Distance Weighted (IDW) technique was used to extrapolate data for spatial mapping. IWQI calculations were done by using RStudio 3.1.3 based on 15 parameters (pH, EC, TDS, alkalinity, hardness, Na, Mg, K, Ca, Mn, Fe, F^-, Cl^-, NO_3^-, and SO_4^{2-}) with weighted arithmetic water quality index method. The calculated IWQI values were ranged from 18 to 152, and these values were categorized into five different classes (Very Good 0 – 25, Good 26 – 50, Poor 51 – 75, Very Poor 76 – 100, and Unsuitable > 100). Using hierarchical cluster analysis, water samples were classified according to their IWQI values, and the groupings were visualized by creating a dendogram. According to this cassification, the well waters in Mihintale Aquifer belong to "Very Poor" category with mean of 81 IWQI. Since IWQI is a single number rapid screening of source water can be carried out easily. However, refinment of IWAQ is needed by incorporating different chemical species present in water systems.

Keywords: Groundwater, Integrated water quality index, Sri Lanka, Water Quality Standards