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Variation of Geochemical Characteristics in Groundwater by Developing Water Quality Indices in Monaragala District, Sri Lanka.

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Sri Lanka is divided into different climatic zones as wet zone, dry zone, and intermediate zone. Groundwater is the main source for drinking and cultivation purposes in dry one since long period. Chronic Kidney Diseases with uncertain etiology (CKDu) is one of the health implications among farming communities in dry zone,Sri Lanka. A detailed hydrogeochemical investigation was carried out in Monaragala district in order to characterize the groundwater in dry zone. Moreover,to determine the groundwater suitability for community consumption was evaluated by using Water quality Index (WQI),Water Pollution Index (WPI), and Heavy Metal Pollution Index(HPI). Ninety-five groundwater samples were collected covering Dug well(64) and Tube well(31) for major cation, anion, and heavy metals. According to the results, Na^{+} and Ca^{+} was the dominant major cation in groundwater, while they serried as Na^{+}> Ca^{+2}> Mg^{+}> K^{+}. Dominant anions were HCO3^{-} and Cl^{-} while serried as HCO_3^{-} > Cl^{-} > SO_4^{-2} > NO_3^{-} > F^{-} > PO_4^{-3} and Fe^{+2} was the dominant heavy metal and they were serried as Fe^{+2}> Mn^{+2}> Zn^{+2}> Al^{+3}> Cu^{+2}> Ni^{+}> As^{+3}> Cr^{+3}> Pd^{+2}> Cd^{+2}. According to the Sri Lankan Standard 614:2013 for drinking water TDS, F^{-} and Hardness of groundwater were exceeded the permissible levels as 46.31%, 40%, and 37.8% respectively. WQI of groundwater ranged from 0.65 to 43.27 with mean value of 5.79 indicating that 99% groundwater sample quality of the Monaragala district was excellent for drinking purpose. The mean value of WPI of the samples was 0.32 and varied between 0.08 and 1.30. Out of 95 samples, only 1.05% samples were categorized under “Highly polluted water” category, while 3.15% under “Moderately polluted water”, 12.63% for “Good water” category and 83.15% samples were under the “Excellent water” category. Further, HPI of water samples ranged from 0.60 to 4.32 with 5.64 of mean value. HPI indicated that overall groundwater sample in Monaragala district was not contaminated with the heavy metals (HPI<100). In conclusion, although groundwater in Monaragala district is suitable for human consumption according to developed water quality indices the geochemical characteristics revealed that there may be a potential threat to groundwater quality due to agricultural activities.