Mapping of water and soil quality parameters in the Gampaha-Ihalagama grama niladhari division

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Water and soil are important natural resources, and the study of their distribution is of great interest. The Grama Niladhari Division, Ihalagama-East, Gampaha district, is selected as the pilot study area. These maps illustrate how the water and soil quality of a selected area is in the current state. 58 water and 58 soil samples were randomly collected, and water and soil quality parameters were investigated, followed by the construction of contour maps. Water quality parameters including pH, conductivity, phosphate content, nitrate content, and Ca^{2+} hardness were determined, alongside soil quality parameters pH, nitrate, organic matter, water-soluble Na^+, K^+ ion, extractable Na^+, K^+, and water-soluble Ca^{2+} ion contents. pH of water samples ranged from 4.41-7.11, mostly acidic and some below WHO's safe drinking water range (6.5-8.5). Conductivity ranged between 52.0-277 µS/cm, well below the WHO permissible level of 1500 µS/cm. Nitrate content reached significantly high values ranging from 1.24-279.00 mg/L, with many exceeding the drinking water limit of 50 mg/L. The soil pH in all the samples falls within the acidic range, varying from 2.99-6.73. Most of the soil samples had high nitrate contents, indicating significant contamination. The percentage soil organic matter content varied between 0.60% and 13.27%. Many fertile agricultural soils contain 3-6% organic matter, with many samples exceeding standard levels. According to water and soil quality values, this area has overall acidic soil and water with critical nitrogen contents compared to standard values. Despite focusing on a single Grama Niladhari Division, the findings show significant variation, emphasizing the need for mapping to address contaminations and natural disaster impacts on these quality parameters.