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Spatial distribution of soil and water quality in Eldeniya - East grama niladhari division

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Water is becoming a consequential part of the daily life of humans. Therefore, mapping of soil and water quality parameters is required for regular monitoring of them to provide the necessary evidence to make decisions on managing water and soil quality today and in the future. Furthermore, mapping soil and water quality parameters is necessary for environmental monitoring, agricultural management, land use planning, water resource management, and conservation efforts. This research analyzes soil and water quality parameters in the Eldeniya-East grama niladhari division, Gampaha district. Fifty-six samples of soil and water were collected from the selected area. Water quality parameters pH, conductivity, nitrate content, phosphate content, and hardness were analyzed, and soil quality parameters pH, nitrate content, soil organic matter content, Na⁺, K⁺, and Ca²⁺ content in the soil were analyzed. Then their spatial distribution was represented as contour maps. pH was analyzed using a pH meter and the pH of water samples lies between 3.79 – 7.18. Except for one, all the other water samples gave acidic pH. Suggesting that Eldeniya-East has almost all acidic water sources. The conductivity of water samples was measured using a conductivity meter and the obtained values lie between 54.0 μ S/cm – 403.0 μ S/cm. All the samples gave extremely low conductivity values. Water-soluble phosphate was not detected in the water samples. This suggests that water sources within this area are not contaminated with excessive amounts of phosphates. Nitrate content was measured using an ion-selective nitrate electrode and the obtained values lie between 59.5 ppm to 168.0 ppm. According to EPA, this area's water sources have nitrate contents higher than the safe levels for drinking water. The calcium hardness of water samples lies between 0.00 – 59.92 mg CaCO₃/L, and Mg²⁺ was not detected. According to Sawyer and McCart's classification, all water samples are categorized as soft water. The pH of the soil samples lies between 3.07 – 6.68 where all are acidic pH values. Considering obtained soil and water pH values, it can be said that the study area has a considerable acidic nature. Nitrate content in soil samples lies between 52.2 – 217.0 ppm and a linear relationship exists between soil nitrate content and the water nitrate content. SOM of soil samples was measured using the Walkley–black method, and SOM lies between 0.000 – 12.930 %. According to the results, this area contains water-soluble calcium in a range of 0 - 2 mg/L, water-soluble sodium in a range of 6 - 18 mg/L, extractable sodium in a range of 1 - 56 mg/L, water-soluble potassium in a range of 1 - 12 mg/L and extractable potassium in a range of 9 – 108 mg/L. This analysis, which has been conducted as a pilot project covering only one grama niladhari division can be further extended to map the entire country which then can be used for the continuous investigation of soil and water quality parameters.

Keywords: Mapping, Water, Soil, Samples, Distribution