Spatial and Temporal Variation of Groundwater Quality at the Waste Management Site of Kotavila, Matara District

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Open dumping is the most common way of disposing of municipal solid wastes in developing countries. Municipal solid waste in Matara town is disposed of to an open dumping site in Kotavila waste management complex (WMC), threatening to ground water pollution. The study area lacks scientific studies to back claims of residents on environmental pollution by the WMC. The objectives of this study were to determine the water quality parameters in the groundwater (pH, Electric Conductivity, Hardness, Chloride, Sulphate, Nitrate, Dissolved Oxygen, Chemical Oxygen Demand) and the temporal variation of the above parameter and to prepare the groundwater quality maps to identify the possible groundwater pollution. Groundwater samples were collected from wells, natural ponds and paddy fields (12 sampling points) near WMC. These parameters were measured for 4 months (November 2019 - February 2020). Water quality maps were prepared using ArcGIS (10.6 version). The study revealed that the groundwater pH was ranged between 4.1 to 6.65 and nitrate was ranged between 51.06 mg l^{-1} to 95 mg l^{-1}, which exceeded the WHO recommendations. Temporal variations of the parameters were noted in several months. The spatial distribution reveals that sampling point 7 showed the lowest groundwater level. Further, the water quality parameters recorded in sampling point 7 were also poor. According to the results of this study, the measured water quality parameters were within the recommended limit except for pH and nitrate and observed concentration gradients of chemical parameters towards the (sample point 7) north direction from the open dumping site. However, heavy metal contents of well water are essential to be measured to reach a firm conclusion about water pollution due to open dumping.

Keywords: GIS, Ground water quality, Open dumping