

**Estimation of groundwater vulnerability using gis and drastic model in pugu, Dar es
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The shortage of surface water to meet demand for the growing economy is a pre requisite for a shift to high consumption of groundwater. Primarily the main objective of this study was to identify sources of pollution and highlight areas potential to groundwater contamination by using DRASTIC Model under GIS environment. Total of sixty five boreholes were mapped of which total of twenty one samples were taken to the laboratory for water quality analysis. The aerial photographs for year 1995 and 2010 were analyzed to be used on the assessment of land use changes in the area. Sources of pollution in the area were identified as both point source and non-point source. Data for vulnerability study using DRASTIC model was extracted from Drilling and Dam Construction Authority report (DDCA) and recharge rate was estimated using empirical methods. Seven layers of the DRASTIC parameters (Depth to water, net Recharge, Aquifer media, Soil media, Topography, Impact of vadose zone and hydraulic Conductivity) was prepared and overlaid to produce vulnerability map. The results of analyzed water samples indicated high values of concentration compared to the TBS guidelines. High values of $\text{NH}_4\text{-N}$, Cl and hydraulic conductivity concentration of up to 2.06mg/L, 1510.45 mg/L and 3360 respectively) were caused by point and diffuse sources of pollution identified in the area like leachate, sewerage systems, animal husbandry, agriculture and pit latrines. The vulnerability map produced classified an area into different classes of vulnerability, in which about 50 percent of the area was at high vulnerable zone, while 10 percent lies in very high vulnerability zone.