

Identification of potential groundwater recharge zones at Makutupora basin, Dodoma Tanzania

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Abstract

This paper presents results of identifying potential groundwater recharge zones at the Makutupora basin using GIS and remote sensing techniques. The study was based on integration of seven factors known to contribute towards groundwater existence, namely lineaments and drainage density, elevation, slope, lithology, rainfall, and land use/land cover. For each factor, a thematic layer was prepared, reclassified into five classes, and assigned weight based on its contribution to groundwater existence. All weighted thematic layers were overlaid by the weighted sum analysis method using spatial analyst tool in ArcGIS 10.4® to produce spatial distribution of potential groundwater recharge zones. The potential groundwater recharge zones were classified into five classes, ranging from not suitable to more suitable. This study reveals coverage of potential groundwater recharge as: 2% very good zone, 11% good, 40% average, 45.5% poor, and 1.6% very poor. The Southwest, Northeast, and some small sections of the North of the basin are predominantly between good and very good groundwater recharge potential; while the rest of the basin ranges from poor to very poor. These results have provided some useful information to enable exploration of groundwater wells and foster sustainable planning and use of groundwater resources in this area.

Keywords: Groundwater, GIS, Makutupora, recharge, remote sensing

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