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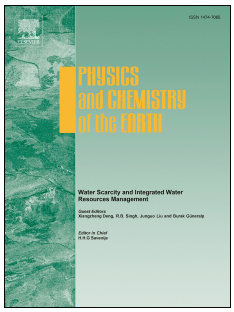

An assessment of groundwater potential and vulnerability in the Upper Manyame Sub-Catchment of Zimbabwe

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An assessment of groundwater potential and vulnerability in the Upper Manyame Sub-Catchment of Zimbabwe.

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Abstract

Severe depletion and pollution of groundwater resources are of rising concern in the Upper Manyame Sub-Catchment (UMSC); Zimbabwe's most urbanised sub-catchment. Despite groundwater playing a pivotal role in the provision of potable water in the sub-catchment, it is under serious threat from anthropogenic stressors which include sewage effluents and leachates from landfills, among others. Inadequate scientific knowledge pertaining to the spatio-temporal variability of groundwater storage and vulnerability in the UMSC is further compromising its sustainability. Therefore, comprehensive assessments of UMSC's Groundwater Potential (GP) and vulnerability are crucial for its effective management. This study assessed GP and vulnerability in the UMSC using Geographic Information Systems and Remote Sensing techniques. Groundwater conditioning factors: geology, slope, land-use, drainage density, topographic index, altitude, recharge and rainfall were used to develop GP zones. Validation of the GP map was done by correlating estimated GP with historical borehole yields. An assessment of groundwater vulnerability was done at micro-catchment level (Marimba) using the GOD model; a three parameter Index Overlay Model. Marimba is the most urbanised and has the