

GROUNDWATER RECHARGE POTENTIAL ZONES IN TANK CASCADE SYSTEMS OF ANURADHAPURA, SRI LANKA USING GEOSPATIAL TECHNIQUES

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Abstract: Many regions of Sri Lanka experience frequent droughts due to climate change. The increasing demands for groundwater resources along with decreasing availability in the dry zone of Sri Lanka emphasize the need for implementation of sustainable groundwater management practices. This study is an approach to better assess groundwater recharge potential zones using geospatial techniques and Multi Influencing Factors (MIF). Since cascade systems can moderate the effects of extreme weather events by capturing runoff and storing rainwater in numerous tanks, it is better to assess the potential zones for groundwater recharge in these cascade systems. Cascade systems in Malwathu Oya, Yan Oya and Ma Oya river basins within the Anuradhapura district area were selected for the study. The geo-environmental variations such as geomorphology, geology, soil type, slope, lineament density, drainage density, and land use layers were created as thematic layers and converted into raster data. Based on the MIF and literature, weights were assigned to the relevant thematic layers and overlay analysis was performed to create groundwater potential (GWP) zones. These potential zones were categorized as 'high', 'moderate', and 'low' GWP zones concerning the assigned weights. From the total area of selected cascades within the Anuradhapura district, cascades in the Malwathu Oya basin showed a higher percentage of high (9.33%) and moderate (34.19%) potential zones. Further, when analysing the GWP zones separately for the selected three river basins within the Anuradhapura district area, Ma Oya basin showed a higher percentage of high (37.84%) and moderate (55.95%) GWP zones. Yan Oya showed 30.11% of high and 47.51% moderate GWP area and Malwathu Oya showed 16.21% of high and 59.37% of moderate GWP zones area. Based on the study Ma Oya has the highest groundwater potential zones compare to Yan Oya and Malwathu Oya within Anuradhapura District. These results suggest that the high-potential zones will have a key role in future groundwater management projects for sustainable management.

Keywords: GIS; Groundwater; Multi influencing factors; Malwathu oya