(116)

Identification of Deep and Shallow Groundwater Potential Zones using GIS Techniques; Case Study: Monaragala District, Sri Lanka

Wickramarathna R.L.[1]*, Illeperuma I.A.K.S.[1], Indrajith W.G.T.[2]

[1]*Department of Remote Sensing and GIS, Sabaragamuwa University, Belihuloya, Sri Lanka*
[2]*National Water Supply and Drainage Board, Ratmalana, Sri Lanka*
*rlwickramarathna823@gmail.com

Abstract

One of the most crucial steps in the management of groundwater sources sustainably is the delineation of the zones with potential for groundwater. However, in addition to taking a lot of time and money, groundwater investigations can be difficult and complex in many locations. To get sufficient results, it needed to demarcate shallow and deep groundwater potentiality separately. Sri Lankan districts have various problems due to a lack of water. With population growth and urbanization, surface water is insufficient to meet the water requirement. This study focused on groundwater potential mapping in Monaragala district covered with the total are 5708 km^2 in Sri Lanka. The fuzzy overlay and weighted overlay method integrated with GIS were mainly used to determine potential zones for deep and shallow groundwater. The final results from the two overlaying methods were compared to identify most accurate locations. Six parameters, namely aquifer type, soil depth, soil group, rainfall, proximity to surface water bodies, and slope, were evaluated for the shallow groundwater studies. Proximity to lineament, geology and shallow groundwater parameters were assessed for profound groundwater potentiality. The final output resulting maps were categorized into five main categories such as extremely low, low, moderate, high and extremely high by considering obtained potential values. The deep groundwater potential map demonstrates that the high groundwater potential areas are located around the lineaments, prominently areas having mountain ranges. Therefore the effect of the lineament is very high for deep groundwater availability. High shallow groundwater potential areas are located in smaller regions from Katharagama, Thanamalwila and Siyambalanduwa. Obtained results were validated using existing 220 tube well data and 100 dug well data.

Keywords: Fuzzy overlay, Geology, GIS, Groundwater, Weighted overlay

Proceedings of the 27th International Forestry and Environment Symposium 2023 of the Department of Forestry and Environmental Science, University of Sri Jayewardenepura, Sri Lanka

144