Utilizing Geographic Information Systems (GIS) and Satti's Analysis Hierarchy to Select Appropriate Zones and Locations for Establishment Wells (With Special Reference to Kolugala Pahalagama Grama Niladhari Division)

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This study primarily aimed to identify suitable locations for well establishment in the Kolugala Pahalgama Grama Niladhari Division (GND) with the utilization of Geographic Information Systems (GIS) and Satti's Analysis Hierarchy. The main problem addressed was the decline in well water yield. This research involved the collection of primary data on sample well locations, garbage pits, and quarter water levels, and integrated various thematic layers including geology, elevation, slope, drainage density, soil type, and land use to pinpoint groundwater potential zones. Additionally, weights were assigned to these factors using Satti's Analytic Hierarchy Process. The findings of the study revealed that the GND had 9.64% very good, 42.17% good, 39.76% moderate, and 7.23% poor groundwater potential zones. Among the examined wells, 6% were categorized as very good, 56% as good, and 38% as moderate in terms of groundwater potential. The average annual water levels in these zones varied, with very good zones having an average depth of 12 feet 6 inches, good zones at 8 feet 5 inches, and moderate zones at 7 feet 4 inches. It is noteworthy that 34% of the wells were situated in suitable regions, while 66% were in unsuitable areas. Eighteen wells had notably lower water levels than others due to their proximity to certain limiting factors. Furthermore, the study identified 29 hectares as unsuitable zones and 54 hectares as suitable zones for the establishment of wells. The ultimate conclusion of the research emphasized that slope angle played a significant role in defining groundwater potential zones geographically.

Keywords: *Garbage pits, GIS, Kolugala Pahalagama GND, Satti's analysis Hierarchy, Wells*