

# Mapping groundwater in ungauged lake basin in Tanzania: A comparison between two topography based methods

Gustavio Okwir, Hans C. Komakech, Sharma Prasmood Kumar, Hongkai Gao, Karoli N. Njau

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## Abstract

Groundwater is one of the most critical water resources for Sub Saharan Africa. However, the understanding of the groundwater system in the region is still lacking due to sparse groundwater observations. The influence of topography on the groundwater table is still mostly not evaluated in Sub Saharan Africa. This study applied the analytical hierarchical process to explore and compare the suitability of two secondary topography indices, the Height Above Nearest Drainage (HAND) and Topographic Wetness Index (TWI), to predict groundwater potential. We used shallow and deep wells to validate the groundwater potential zones. The results showed that both HAND and TWI are useful parameters to identify groundwater spatial variability. The water levels and wells depths varied and deepened with reduction in the groundwater potential. The study also showed that both methods are similar in groundwater potential classifications, with an overall accuracy (or similarity) of 70.56% and an overall kappa coefficient of 0.61. The HAND based method, however, showed superiority over the TWI based method. Nevertheless, both methods seemed suitable for preliminary groundwater prospecting with a high potential to minimize prospecting efforts and associated costs and provide insight into locations for future exploitation and optimization of wells drilling success in the study area.