

# **Application of fuzzy operators to groundwater potential mapping using remote sensing data and GIS**

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## **ABSTRACT**

The main aim of this research is to investigate potential application of a data driven fuzzy logic method for spatial prediction of groundwater productivity potential mapping in the Langat basin area, Selangor, Malaysia using geographic information system (GIS). The study area has experienced drought and water shortage due to El Nino effects. The spatial relationships between groundwater yield measurements and spatial factors relevant to productivity of yield were analyzed. These conditioning factors including aspect, slope, curvature, altitude, river density, lineament density, stream power index, topographic wetness index, geology, soil and land use which collected and extracted from topographical data, geological data, satellite imagery and published maps. Yield measurements were collected from well locations and high yield values were input to a spatial database and randomized in a ratio of 70:30 for training and validation of the model, respectively. Based on the groundwater occurrence and the spatial factors relevant yield measurements, fuzzy membership values for these evidences were estimated using frequency ratio approach. Then the fuzzy algebraic operators were applied to the fuzzy membership values for groundwater productivity potential mapping. Finally, the produced map was validated by comparing with existing well locations for prediction accuracy computation.

Keywords: Fuzzy logic, Groundwater productivity, GIS, Langat Basin