GROUNDWATER POTENTIAL AREA USING ANALYTIC HIERARCHY PROCESS (AHP) AND MULTI-INFLUENCING FACTOR (MIF). CASE STUDY: KEDAH

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DECLARATION

I declare that the work on this project/dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA (UiTM). This project/dissertation is original and it is the result of my work, unless otherwise indicated or acknowledged as referenced work.

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ABSTRACT

Groundwater is an essential source of water for humanity as it provides drinking water to as much as 50 percent of the world's population – 2.5 billion people rely primarily on it resources and accounts for 43 percent of all agricultural water, therefore another groundwater potential area needs to be discovered. The aim of this study is to identify the potential area of groundwater in Kedah using the method, analytical hierarchy process (AHP) and multi-influence factors (MIF). There are 15 conditioning parameters which consist of slope, elevation, aspect, topographic wetness index (TWI), plan curvature, geomorphology, drainage density, geology, lithology, aquifers, tube-well distribution, distance to fault, rainfall, soil types, and land use. The analysis is based on a combination of satellite imagery, geological and hydrogeological data. AHP models the groundwater potential area by creating a hierarchical structure of criteria and sub-criteria that influence groundwater availability, assigning weights to them using pairwise comparisons to determine the overall groundwater potential of each parameter. Meanwhile MIF models the groundwater potential area by calculating the weight from major and minor effects. Based on the AHP and MIF results, several potential groundwater extraction sites were identified with varying levels of suitability including very high, high, moderate, low, and very low. It was found ROC-AUC of AHP is 0.807 and MIF is 0.740, this proofed that AHP method is more accurate than MIF method. The results of this study can provide valuable information to decision-makers in Kedah to support sustainable groundwater management and development.

TABLE OF CONTENTS