

Effects of soil moisture content on groundwater electrical resistivity values in irrigation paddy scheme, Tanjung Karang, Malaysia

ABSTRACT

Electrical Resistivity Tomography (ERT) analyses have been conducted in Irrigation Paddy Scheme, Tanjung Karang, Malaysia as part of investigation on groundwater potential aquifer to provide an alternative water resource for paddy irrigation. Based on recent studies on groundwater resistivity in paddy field, irrigation system mentioned as soil moisture content was observed to affect the value of electrical resistivity and subsurface geological profile resulted from ERT analysis. The objective of this study was to proof any correlation between soil moisture content and electrical resistivity values and to determine at what level of soil moisture content which will be the best condition to conduct ERT survey. ERT analysis was conducted by using ABEM Terrameter SAS 4000 of Wenner-Schlumberger array with 5.0 meter and 10.0 meter for minimum and maximum electrode spacing. Visually, based on subsurface geological profile resulted from ERT analysis soil moisture content affected (changed) electrical resistivity values. With all different treatments of soil moisture ranged from 16.96% to 27.50%, electrical resistivity values decreased in certain points and in certain depth along with the increase of soil moisture content. This was proofed by ANOVA and Duncan's multiple range tests showing that $P > F$ value was less than 0.0001. Further on Chi-square test showed that at soil moisture level of 22.54%, it was the best condition which gave more correct counts of electrical resistivity values compared to well lithology. This was assumed to be the best condition to conduct ERT survey.

Keyword: Groundwater; Electrical resistivity tomography; Irrigation; Soil moisture