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SOPITA KHANOM : THE STUDY OF INFLUENCING ON GROUNDWATER TO SOIL - MOISTURE, APPLICATION OF GEOGRAPHIC INFORMATION SYSTEM AND GEOPHYSICAL INVESTIGATION ; CASE STUDY : KAO HIN SORN ROYAL DEVELOPEMENT STUDY CENTRE. THESIS ADVISORS : KASEM KULPRADIT, M.Sc., PONGPIT PIYAPONG, M.Sc., SATHAPORN JAIARREE, M.Sc. 160 p. ISBN 974-633-182-9

The objective of this study is to investigate the influence of groundwater and various factors that affect soil-moisture content. Additionally, a soil-moisture content map was created. The study area is located on Kaohinsorn Royal Development Study Centre and surrounding areas in Chacherngsao Province. The methodology used was to set up a database system in terms of the study area for data planning , geophysical investigation and analysis of soil samples in the study area. Analysis was performed to evaluate the relationships between soil-moisture content and thickness of unconsolidated rock layers and other relative factors by mean average and multiple regression analysis. The soil-moisture content map was created using the ILWIS program. Factors in this study were the elevation of land surface (msl) , geophysical characteristics and hydrogeological characteristics , groundwater well data , mabbon soil series and land use and soil depth. This study was conducted in December 1998. All data were stored and processed in terms of the geographic information system.

From data analysis and resistivity curve interpretation. The soil was categorized into geophysical and hydrogeological properties with three different types ; unit 1 dry sandy soil , unit 2 sandy clay loam with sporadic sand lens/layers and unit 3 granite bed rock. The thickness of the unconsolidated rock layers was the combined thickness of unit 1 and unit 2. The thickness of the unconsolidated rock layers in the Southwest was greater than that in the Northeast.

The relationship between various factors and soil-moisture content showed that the most effective factors had a 95% reliability level in terms of statistical significance. The following six factors were indicated ; 1) area cover with rice , 2) soil depth , 3) high percentage of clay particles , 4) high percentage of sand particles , 5) area was covered with eucalyptus and 6) the elevation of land surface. Their relationship is showen by the equation $Y = 11.493 - 0.068(\%\ sand) + 5.305(rice) + 0.029(depth) + 0.127(\%\ clay) - 1.266(eucalyptus) - 0.037(high\ of\ mean\ sea\ level)$. This equation gave the variance of soil-moisture content at 75.3% with an error of prediction at 2.03. The thickness of the unconsolidated rock layers had no significant relationship to soil-moisture content at 95% reliability. However, its relation can be explained by analysis of geophysical and hydrogeological cross-section together with the height of land surface. The thickness of the unconsolidated rock layers conformmably varied to soil-moisture content. Consequently , that relationship was brought into the soil-moisture content map.

The soil-moisture content map from this study can be used as a database for planning plant cultivation and development of groundwater resources in this study area.