ABSTRACT

Soil Water Content (SWC) mapping is very important in various fields such as agriculture. The gravimetric method is usually a method that is often used to measure SWC, but it requires a lot of sampling, takes a long time and is expensive. One method that can be used as an alternative is the Ground Penetrating Radar (GPR) method. GPR is an underground measurement method using electromagnetic waves. In previous studies, the use of GPR only focused on detecting SWC at one point. To know the overall soil water content in the area, of course it requires more than one measurement point in a large area.

This study uses a GPR tool modeled by Vector Network Analyzer (VNA), trying to map SWC of more than one point of place in a wide area. For the extraction method using the three-dimensional C-scan depiction supported by the MATLAB application and python programming. The final goal is in the form of three-dimensional mapping data of water content in the soil from a large area.

Based on the research that has been done, it can be concluded that measurements with mobile GPR can detect SWC not only at single point, but also a thorough mapping of an area. Accuracy obtained with mobile GPR reaches 86.6%. The time required for detection is also much faster 200 times in GPR measurements than gravimetric. With the SWC mapping system in a large area, it can be the first step in developing the previous system which can only detect water content at one point.

Key words: Ground Penetrating Radar, Soil Water Content, C-Scan, Post-Processing.