

Simple Parallel Probe as Soil Moisture Sensor for Sandy Land in Tropical-Coastal Areas

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Abstract	<p>One potential land in marginal areas able to be utilized for keeping the sustainability of agriculture in Indonesia is coastal areas. However it requires optimum treatment, especially in using the water for plants efficiently due to the factors of land characteristics and climate. This paper describes the use of simple and low-cost soil moisture probe for sandy land in the coastal area. The probe is a parallel plate which separated at a certain distance. The principle is based on soil electrical conductivity, which delivers the electrical current from one plate to another. Two designs (single and double) and two distances (3 mm and 5 mm) of probes were tested to measure the sandy soil at the moisture content of 0%, 5%, 10%, 15%, 20%, 25%, 30%, 35% and 40%. It was found that the resistance of probes was inversely proportional to water content, but not linear. The best fit of probe resistance (X) to the moisture of sandy soil (Y) was of the 5 mm double parallel probe, with the equation $Y = -10.33 \ln(X) + 128.13$ (R-2 is 0.9199) and non-linearity of 62.88%. The probes and a built soil moisture logger/controller were applied for sandy soil of Shallot cultivation land at coastal area in Empurancak Beach, Jepara (located about 150 m from the foreshore).</p>
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