

Techniques for ground-based soil moisture measurement: A detailed overview

ABSTRACT

A vital natural ecosystem balance including seed sprouting, plant nutrition and growth, water infiltration, plant transpiration, redistribution, evaporation, and percolation relies on paramount property of soil moisture. Understanding soil moisture measurement and its pattern is crucial for various important fields such as meteorology, hydrology, agriculture, weather, and climate studies. In recent decades, a significant number of experimental methods have been developed to measure the soil moisture. This review paper aims to outline the available common techniques divided in gravimetric, volumetric, and potentiometric either in direct or indirect method for measuring soil moisture; discuss the basic principle for each technique; and compare and evaluate the available technique on the basis of common parameters such as advantages, limitations, and response time. This paper represents a viable resource particularly for the researchers and personnel responsible to manage natural resource and agriculturist to understand and select the suitable method for soil moisture estimation.