Soil Moisture Content

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Soil Moisture Content:

People defined soil moisture content in two different terms as soil water content and soil water potential. Soil water content is the amount of water that can be evaporated from a soil by heating to between 100 and 110^{o}C, but usually at 105^{o}C, until there is no further weight loss. Soil water potential describes the energy status of the soil water and is used for water transport analysis, water storage estimates and soil-plant-water relationships. A difference in water potential between two soil locations indicates a tendency for water flow, from high to low potential. In practice, it is usually a change of soil water content with the time that is of interest (e.g., seasonal changes in field soils or change in response to irrigation). Alternatively, the quantity of water retained between specific thresholds may be required (e.g., between the liquid and plastic limits or between ‘‘field capacity’’ and ‘‘wilting point. If moisture goes below the wilting point (wilting point (WP) is defined as the minimal point of soil moisture the plant requires not to wilt) or any lower point plant wilts and can no longer recover its turgidity when placed in a saturated atmosphere for 12 hours. The range of soil moisture content is from 0-100.

The Need for Soil Moisture Content Measurement

Volumetric water content is an important part of the soil, influencing the many biological, physical, and chemical processes. For the growing of crop three factors are most important first the soil nutrients and soil properties; second, the properties of the seeds and most important is the soil moisture level. Objectives of soil moisture measurements in agriculture are: Automatic irrigation, Water saving Increase product or yield, Soil salinity control and Soil erosion control.

Factors Affecting Soil Moisture Content

The factors that affect soil moisture content are texture, structure, organic matter, the density of soil, temperature, salt content, depth of soil etc.

Methods of Soil Moisture Content Measurement

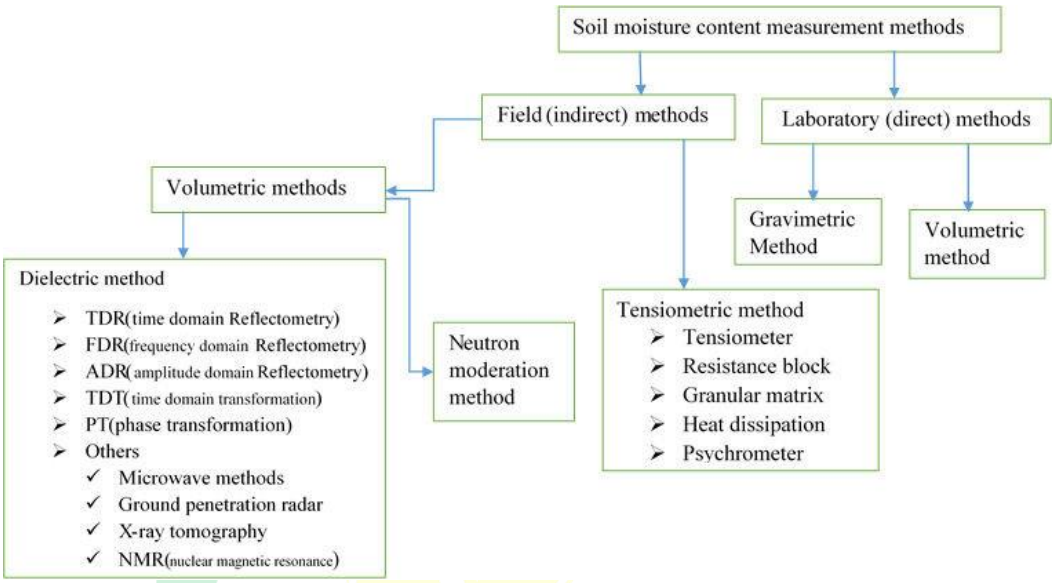

Fig. 1: TDR (Time Domain Reflectrometry)

Fig. 2: FDR (Frequency Domain Reflectrometry)

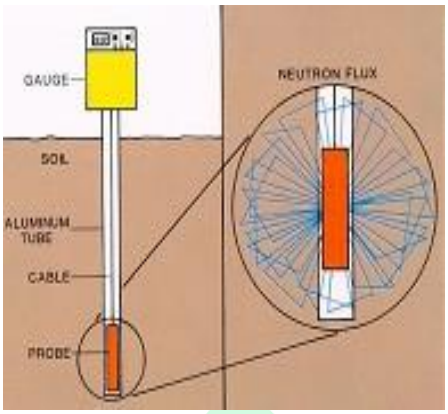

Fig. 3: Neutron moisture meter

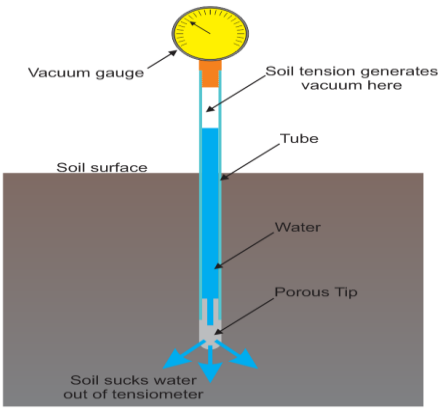

Fig. 4: Tensiometer

Conclusions and Recommendations

Soil is known as the life of every living creature on earth. Soil will support living things and non-living things comfortably if it becomes optimum. Optimum soil contains its components in suitable composition both in quality and quantity for living things and non-living things that contain within it. The most important soil component that affects living things especially crops on earth is soil moisture content. Soil moisture content greatly influences the agricultural productivity of one country. Plants require optimum moisture or water for their proper development and production. Some of the advantages of soil moisture estimation are water saving, weather forecasting, reduce soil erosion, and increase productivity. Therefore, estimating and measuring soil moisture somewhat accurately is required. In this regard, some works were done using some methods in the past. Some of the methods are volumetric methods, gravimetric methods, and tensiometric methods. Intern the volumetric method includes time domain Reflectometry method, the frequency domain Reflectometry method, amplitude domain Reflectometry method, time domain transformation, phase transformation and non-contact methods like microwave methods, ground penetration radar, and nuclear magnetic resonance methods. But still, these methods have their own limitations like high cost, low accuracy, temperature dependent, low resolution, soil dependent calibration, slow response time, poor installation, small area coverage per one sensor, the complexity of operation etc. therefore improvement is required. For example, using advanced materials the performance of soil moisture content measurement devices can be improved.