

Wattanaï Onsumrarn 2009: Impact of Different Crop Practices on Soil Moisture Characteristics in Rain Shadow Area, Kanchanaburi Province. Master of Science (Soil Science), Major Field: Soil Science, Department of Soil Science. Thesis Advisor: Mr. Somchai Anusontpornperm, Ph.D.
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A study on impact of different crop practices on soil moisture characteristics in rain shadow area, Kanchanaburi province using Time Domain Reflectometry (TDR) to measure moisture content at various depths was carried out on seven locations, aiming at monitoring soil moisture change as affected by different plants in relation to soil characteristics. One and three months old cassava plots, six months old sugarcane plot and eight years old neem plantation were located on moderately fine-textured soil while degraded forest plot, eight years old eucalyptus plantation and one year old cassava plot were in medium-textured soil.

Results showed that bulk density values of both soils were similar and increased with depth (1.6-2.1 Mg m⁻¹). Moderately fine-textured soil had slightly lower saturated hydraulic conductivity than did medium-textured soil. Available water content of the former soil ranged between 6.7-11.0 % by volume while the latter having 7.1-10.0% by volume. Soil moisture data measured at various depths between Sep. 2008 and Mar. 2009 revealed that moisture deficit within depths between 0-30 cm was found in all cassava plots. Moisture content in sugarcane plot was greater than the content at permanent wilting point through the depth of 100 cm till Feb. 2009 and total moisture content in the upper part of soil profile was tentatively higher than that of other plots. The moisture content at depths between 0-60 cm under neem plantation reduced drastically one month after the last rain, indicating that this plant consumed large amount of water and most of water loss by evapotranspiration. Change of soil moisture under eucalyptus plantation and degraded forest was quite similar at depths below 60 cm in which moisture content slowly decreased at the beginning of drought season mainly due to upward movement in the form of capillary rise and water uptake by plants.

Sugarcane is the plant that conserves moisture best because at mature stage it has dense canopy with quite considerable amount of leaf residues covering ground surface. Soils under cassava crop practice tend to lose moisture rapidly in the upper part due to wide space cultivation and frequent weed controls. The moisture contents at depths of 60-100 cm in both soils under tree plantations were lowered more swiftly and in greater amount than those under field crops because of their deeper root zone. Growing both trees may have caused the reduction of groundwater level and subsequent droughtiness in the surrounding area.

Student's signature

Thesis Advisor's signature