

**SHEAR STRENGTH OF RICE GROWING PUDDLED LOWLAND SOILS
FOR DESIGNING FARM MACHINERY (A CASE STUDY IN
ANURADHAPURA)**

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Shear strength is the magnitude of the shear stress that a soil can sustain. There is no reliable shear strength data on the puddle soil of dry zone in Sri Lanka. Aim of this study was to estimate the shear strength of puddled lowland rice soils in Anuradhapura. This experiment was carried out in *Maha* 2013/14 at Puliyankulama in the dry zone of Sri Lanka. Direct shear strength was measured by vane shear tester with four treatments; T₁ – control (no paddy), T₂ – no weed controlling, T₃ – chemical weed controlling, T₄ – weed managed with manual wooden clog. Three replicates were used in Randomized Complete Block Design. BG 358 rice variety was grown. Soil parameters tested were; soil moisture content, bulk density, true density, soil texture and soil organic matter content. Plant growth parameters, plant height, number of tillers/plant, harvest index, shoot and root biomass were measured. Yield was determined by yield components and net plot yield. Weed growth was quantified in terms of root and shoot dry weight of weeds. Data were collected in weakly intervals from establishment to harvesting. Treatment and time effect have significantly affected the shear strength of puddled soil ($p < 0.05$). Bulk density and moisture content have also significantly affected the shear strength ($p < 0.05$). The estimated average shear strength was 22,242.47 N/m². Average shear strength variation of different treatments were T₂ (1,646.19 N/m²) < T₃ (1,908.63 N/m²) < T₁ (1,957.48 N/m²) < T₄ (2,044.76 N/m²), respectively. Results revealed that, shoot and root biomass, plant height have significant difference from treatment and time. Average plant height values varied as T₄ < T₃ < T₂. Yield components were not significantly affected by treatment or time. The results of this study will be useful in designing farm machineries for puddled soil conditions.

Keywords: Bulk density, Shear strength, True density, Vane shear tester, Yield component