

**Title:** Effects of Two-wheel Tractor Operated Tillage Implements on Soil Properties in Kilinochchi Sri Lanka

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**Abstract:** Preparation of land is necessary to ensure that the field is ready for planting. A well-prepared field manages weeds, recycles nutrients from plants and provides a soft soil mass for transplantation and a sufficient soil surface for direct seeding. This study was set to investigate the effects of two-wheel tractor (RV80) operated tillage implements on soil properties. Three implements rotavator (T1), single mouldboard plough (T2) and rotavator & mouldboard plough (T3) were used. The experiment was carried out Randomized Complete Block Design (RCBD) with three replicates. The tractor parameters velocity, engine speed (rpm), wheel slip, fuel consumption and overall ploughing depth of various treatments were measured. Experiments were carried out in a soil filled with loamy soil (sand 40%, slit 40% and clay 20%) at an average moisture content of 11.6 % (dry basis). The plastic limit, liquid limit and plasticity index of the soil were  $42.5 \pm 0.03$  %,  $28.9 \pm 0.19$  % and  $10.3 \pm 0.02$  % respectively. The soil particle density was observed to be  $2.34 \pm 0.02$  g/cm<sup>3</sup>. The soil parameters bulk density, porosity, soil moisture content, soil infiltration, soil particle size distribution, soil infiltration, & soil compactness were measured before and after ploughing. Results revealed that (before and after sloughing) the soil particle size was clean gravel – less than 5% fines, well-graded gravel soil its range CU (Uniformity Coefficient) & CC (Coefficient of Curvature) between  $CU \geq 4$  &  $1 \leq CC \leq 3$ . The continuous rpm of two wheel tractor RV80 is 2200 rpm. The rpm was observed to be (2000-2200) in various treatments. The maximum ploughing depth observed to be in both (T3) treatment. It was  $26.8 \pm 0.5$ cm. Wheel slip was observed to be higher in single mouldboard ( $32.63 \pm 0.5$  %) than in rotavator ( $14.19 \pm 0.7$  %). The high fuel consumption observed to be in both (T3) treatment. It was 1.89L/hr. Analysis of variance (ANOVA) of resulted data revealed that significantly changes ( $p < 0.05$ ) in various treatments follows; velocity, wheel slippage, Fuel consumption, overall ploughing depth. Therefore, this comprehensive work is highly useful to understand the effect of different land preparation implements driven by the two-wheel tractor on soil properties in order to carry out land preparation activities effectively.