

COMPARISON OF SOIL CHARACTERISTICS UNDER DIFFERENT INPUT RICE PRODUCTION SYSTEMS: THE FIRST YEAR IN TRANSITION

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Rice (*Oryza sativa*) is one of the main agricultural crops in Sri Lanka. At present, rice farming in Sri Lanka is highly based on external inputs such as fertilizer and pesticides. However, many studies have revealed that long term use of chemical inputs creates adverse impacts on soil health. Hence, this study was conducted to compare soil characteristics of rice fields under organic, conventional and reduced input use production systems. The experiment was carried out in the research field, Faculty of Agriculture, Rajarata University of Sri Lanka during *Maha* cropping 2018/2019. Soil samples were collected from three production systems just after land preparation and maximum tillering stage and were analyzed for soil properties and characteristics. Data analysis was done by mixed procedure model using the Statistical Analysis System. Total nitrogen and available phosphorous of all three systems were significantly higher ($p < 0.05$) at maximum tillering stage compared to initial levels. Significantly higher ($p < 0.05$) total and ammonium nitrogen levels were reported in conventional system at maximum tillering stage compared to other systems. However, highest soil microbial activity at the maximum tillering stage was reported in organic system. Organic and reduced systems showed significantly higher ($p < 0.05$) available P content at the maximum tillering when compared to initial levels. This may probably be due to microbial mineralization of soil P. Exchangeable Potassium, Cd, As and Pb were not significantly different ($p > 0.05$) among three input systems. Results revealed that organic and reduced input systems showed better microbial activity than conventional system. However, long term investigations are needed to confirm other findings.

Keywords: High external input, Organic farming, Reduced input use system, Rice cultivation, Soil characteristics