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

M.H.V.H.Y. Gunarathne and D.M.S. Duminda

Department of Agricultural Engineering and Soil Science, Faculty of Agriculture, Rajarata University of Sri Lanka, Anuradhapura, Sri Lanka.

Rice (*Oryza sativa* L.) is one of the main agricultural crops in Sri Lanka. At present, chemical fertilizers (CF) are widely used in conventional rice farming in Sri Lanka. The literature revealed that CF application adversely impacts on environment and eco-systems. Hence, this experiment was conducted to investigate the soil characteristics of rice fields managed under conventional [Department of Agriculture recommendation (DOA), 2013], reduced (50% DOA + 50% organic), and organic Input Management Systems (IMSs). This experiment was established under Randomized Complete Block Design in the research field, Faculty of Agriculture, Rajarata University of Sri Lanka, during the 2020/2021 *Maha* season. Soil samples were collected from the surfaces (0 – 15 cm) and subsurface (15 – 30 cm) soil depths at prior to crop establishment, 50% flowering and harvesting stages from three different IMSs with three replicates. Data analysis was done by mixed procedure, and mean comparison was performed by Tukey's method using SAS 9.0 version. In this third transition year, soil pH, EC, available P, exchangeable K and organic matter content were significantly different ($p<0.05$) among three IMSs and three different rice growth stages. Soil cation exchange capacity was not significantly different ($p>0.05$) among the rice growth stages while significantly different ($p<0.05$) across IMSs. Soil total N, available N, exchangeable Ca, and microbial biomass C were not significantly different ($p>0.05$) across three IMSs, although they were significantly different ($p<0.05$) among different growth stages. Reduced IMS has given significantly highest grain yield, and there was no significant difference ($p>0.05$) of grain yield between the conventional and organic IMSs. Therefore, replacing 50% inorganic fertilizers with organic manure could be suggested, and the above results reveal the importance of an integrated nutrient management system to increace production and sustain soil fertility in the rice-growing Alfisols in Sri Lanka. However, further research is required for a concrete recommendation.

Keywords: Alfisols, Input Management Systems (IMSs), Rice, Soil characteristics