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Effect of organic and conventional fertilizers on soil properties and yield of coconut in the intermediate zone of Sri Lanka

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The prolonged conventional farming practices with the overuse of fertilizers and other chemicals are leading to a wide range of social and environmental concerns. Coconut is the most widely grown plantation crop in Sri Lanka and the growing trend of organic coconut cultivation poses a need on identifying the plant and soil fertility status of organically managed coconut lands in comparison with conventionally cultivated lands of similar field conditions. This study attempts to investigate the effect of organic manure-based nutrient management practice on soil physical properties and the yield of coconut in comparison with conventional fertilizer management. Soil samples from randomly selected twenty-four locations at each site and yield data were collected from a longstanding on-going field experiment with the treatment of poultry manure as an organic nutrient source together with sulphate of potash (SOP) as recommended, and treatment of inorganic fertilizer as conventional practice in two different coconut lands on Red Yellow Podzolic soils in IL3a, low country intermediate zone. The soil physical parameters were evaluated by analyzing soil bulk density, porosity, hydraulic conductivity and water holding capacity. Two sample t-test and analysis of variance were used to analyze the data using SAS statistical software. According to the results, water holding capacity was significantly higher in organic coconut land (79.7%) than conventional land (70.9%) indicating the soil's ability to withstand drought conditions. The hydraulic conductivity of organically managed soil was lower (0.73 ml/min/cm²) compared to conventional treatment (1.06 ml/min/cm²) corresponding to higher water holding capacity in organic treatment. There was no significant difference in the bulk density of organically cultivated (1.55 g/cm³) and conventional cultivated coconut land (1.53 g/cm³). There was a large variation in coconut yield over the years in the both organic and conventional systems. Five years yield records show no significant difference in yield of the two cultivation systems, which indicates the potential of organic manure when applied with mineral potassium source has the ability to maintain the same yield as the conventional fertilizer applications.

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