

**EVALUATION OF SOIL PHYSICO-CHEMICAL
PARAMETERS IN DIFFERENT COCONUT BASED
MULTIPLE CROPPING SYSTEMS**

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ABSTRACT

Coconut (*Cocos nucifera* L.) is a traditional and the largest plantation crop in Sri Lanka. Sri Lanka is the fourth owner of world's Coconut cultivation and in extent land is about 394,836 hectares (Department of Census & Statistics, 2013). This is about 20% of the total cultivated land extent the country. Long-term cropping system affects on soil properties. Intensive row-crop production is lead to soil degradation and insufficient biomass return, or excessive erosion lead to deplete soil organic carbon. Coconut multiple cropping system control soil erosion, maintain soil organic matter and soil physical, chemical and biological properties. Soil physical and chemical parameters are widely used to evaluate different land use system.

A study was conducted to determine the effect of different land use systems on soil physical and chemical parameters in Intermediate Zone (Makandura estate) and Wet Zone (Walpita estate). Differences in soil properties in different land use types at 15cm depth were observed on many soil parameters important to crop growth. Ten land use systems were considered for the study; coconut mono culture (CM), bare land (BL) and coconut multiple cropping. Under coconut multiple cropping, eight different intercrops were selected separately for IMZ and WZ. The treatments were arranged in a randomized complete block design (RCBD) with three replicates ($n = 3$). The experiment was conducted under mature coconut (>40 years) plantation.

Findings of intermediate zone study suggested that coconut multiple cropping systems may increase soil moisture content, porosity, electrical conductivity, total nitrogen, available phosphorous, exchangeable cations (K) and porosity in 15cm depth and it was decreased bulk density in soil other than the two land use systems. (coconut monoculture and bare land) and also some parameters were recorded low values from the coconut with intercrops land use systems. These were moisture content, total nitrogen and potassium content in coconut + dragon fruit land use system and available phosphorous in coconut + banana land use system. Most probable reason might be, these lands are agricultural field, some changes can be occurred due to agricultural management practices and fertilizer effect etc.

Finding of wet zone study also suggested that coconut multiple cropping systems may increase soil moisture content, porosity, electrical conductivity, organic carbon, total

nitrogen, available phosphorous, potassium content and cation exchange capacity in 15cm depth and it was decreased bulk density in soil other than the two land use systems as intermediate zone. Some parameters were observed low values from the coconut with intercrops land use systems. These were electrical conductivity, cation exchange capacity and potassium content in cinnamon + coconut intercropped land use systems and available phosphorous content in mango + coconut land use system.

These results suggest that land use has persistent of soil resources and also the need of land use and landscape research to determine sustainable land use and management strategies.

Key Words: Coconut multiple cropping system, soil physico-chemical, land use system