

Paper ID: CMT-220

## Estimating the soil organic carbon content and other selected properties in *Katupotha* dry zone forest systems, Mihintale, Sri Lanka

M. Kiruciga<sup>1</sup>, W.D.U. Premarathna<sup>2</sup>, G.A.D. Perera<sup>3</sup>, R.R. Ratnayake<sup>2\*</sup>

<sup>1</sup>Department of Agricultural Engineering and Environmental Technology, Faculty of Agriculture, University of Ruhuna, Mapalan, Sri Lanka <sup>2</sup>National Institute of Fundamental Studies, Kandy, Sri Lanka <sup>3</sup>Department of Botany, Faculty of Science, University of Peradeniya, Peradeniya, Sri Lanka

\*renuka.ra@nifs.ac.lk

Tropical Dry Zone Forests are renowned for their ecological resilience and biodiversity, playing a crucial role in supporting local communities and ecosystem services. Katupotha forest profoundly stands as a significant archaeological treasure in Sri Lanka's historical legacy. Characterized by diverse vegetation and unique ecological dynamics, these forests exemplify the delicate balance between anthropogenic and natural habitats in the dry zone of Sri Lanka. Total Organic Carbon in forest soil is a vital indicator of soil quality, reflecting soil fertility and carbon sequestration potential, a key to Climate change mitigation. Also, limited baseline information is available on the soil carbon of dry zone forests. This study has aimed to assess the current Total Organic Carbon (TOC) of the Katupotha tropical dry zone forest systems, Mihintale, Sri Lanka. Soil samples were collected from 30 predetermined locations of the forest from two depths, surface (0-15 cm) and subsurface (15-30 cm) soil layers, using the Stratified Random Sampling technique. Soil pH, Electrical conductivity (EC), Bulk density, Soil moisture content, and TOC were analyzed using standard protocols. The findings showed that the TOC and soil moisture varied significantly throughout the sites. TOC varied from 3.905% to 0.585% mean 1.762%) and Soil moisture ranged from 30.915% to 5.310% (mean 14.36%). pH ranged from 5.03 to 9.52 (mean 6.77) and EC from 0.184 µS/cm to 165.100 µS/cm (mean 30.065 µS/cm). Bulk density varied from 0.437 g/cm<sup>3</sup> to 1.307 g/cm<sup>3</sup> (mean 0.802 g/cm<sup>3</sup>). The results were analyzed using Pearson Correlation analysis. Accordingly, TOC was positively correlated with soil moisture in both surface (r=0.219) and subsurface (r=0.199) levels. Descriptive analysis revealed a significant variation in the distribution of TOC and Soil moisture (coefficient of variation, 169.20 and 100.84 respectively). The findings of this study provide useful information for future forest conservation and management practices and climate change mitigation projects in Sri Lanka.

**Keywords:** Carbon sequestration, climate change, ecosystem services, soil moisture content, total organic carbon