

Soil carbon stock of coconut plantations in southern coast of Sri Lanka

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Coconut plantations have been identified as common cultivation providing a significant contribution to the economy of coastal communities. However, considering the coconut plantations as a coastal ecosystem, information on the carbon storage in the soil is scanty. Therefore, the current study aimed to fill that knowledge gap by assessing the Soil Organic Carbon (SOC) stock of coastal coconut plantations in Southern coast of Sri Lanka. Soil samples (189) were collected from selected coconut plantations in Galle, Kalametiya, and Hambanthota areas (5-soil-cores; 45-soil-samples, each site) while another set of soil samples was collected from mangrove vegetation's in Galle (6-soil-cores; 54-soil-samples) for comparison, as mangroves identified as the most carbon-rich ecosystem in the world. Soil samples were taken using a soil corer (diameter=4.8cm, depth=1.8m), following random sampling approach. The SOC contents of the soil samples (5g) were analyzed in triplicates using the Loss On Ignition (LOI) method. Wilcoxon signed-rank test was performed to analyze data using R-statistical software. Results showed that the average SOC contents of coconut plantations in Galle, Kalametiya, and Hambanthota were 150.51(±44.09), 130.12(±87.00), and 143.91(±13.36) Mg C/ha respectively. The average SOC content of mangroves was 861.95(±131.3) Mg C/ha. According to the analysis, SOC content in coconut plantations was significantly lower ($p < 0.05$) compared to mangroves. Less variation was observed for SOC contents in coconut plantations between sites. The SOC content of adjacent coconut plantations was estimated 16% of that of SOC content in mangroves. Therefore, as a win-win step, coconut plantations are recommended for non-productive coastal areas (e.g., coastal bare-lands, underutilize-areas) considering their economic importance and carbon science.

Keywords: Carbon stock assessment, coconut plantations, mangroves, Southern Sri Lanka

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