

Compare the Impact of Oil Palm and Rubber Cultivations on Soil Physical Properties

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Oil palm and rubber are major plantation crops in Sri Lanka. Oil palm has been cultivated in the Low-Country Wet-Zone region of Sri Lanka. However, in 2021 government banned the cultivation of oil palm due to the complains made by the public indicating that oil palm cultivation depletes soil properties, biological diversity, and water table without any scientific evidence. Thus, this experiment was conducted to investigate the impact of 10-12 years old oil palm and rubber-cultivated lands in Nakiyadeniya and Sapumalkanda estates on soil properties. Soil physical properties of two soil depths (0-15 and 15-30 cm) from 3m (inter-row spacing) and 1m distance from the tree bases of representative oil palm and rubber trees were assessed. Soil samples taken from 1m away from the tree-base showed that the dry-aggregate stability was higher in oil palm compared to rubber lands ($P < 0.05$). However, the wet aggregate stability, hydraulic conductivity, gravimetric water content at saturated level, gravimetric water content in field capacity, volumetric water content in saturated and volumetric water content in field capacity, organic carbon content, and bulk density were not significantly different ($P > 0.05$) between tree types. Soil properties of inter-rows indicated that, dry aggregate stability, gravimetric water content at saturated level, and volumetric water content at saturated level were greater in Oil palm ($P < 0.05$), but the wet aggregate stability, hydraulic conductivity, gravimetric water content at field capacity, volumetric water content in field capacity, organic carbon content, and bulk density were not significantly different ($P > 0.05$) between tree types. Overall, it could be concluded that, except the lower dry aggregate stability in rubber, all other soil physical properties were similar in oil palm and rubber-cultivated lands of the age category of 10-12 years old, where optimum canopy coverage could be observed.

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