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**The Distribution of Soil Organic Carbon and Its Relevance for
Soil Water Content in Oil Palm Plantation**

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Expansion of oil palm plantation is assumed to be responsible for degradation of hydrological function. The objectives of research were to identify distribution of soil organic carbon and water content and to evaluate their relation on several soil depths under different oil palm age-gradient. The research activities included field survey and laboratory analysis. The field survey was carried out for identification of oil palm age-gradient and soil samplings. The research were conducted under smallholder oil palm plantation at Bungku Village, Batanghari District, Jambi Province in February-June 2014. Soil sampling were collected from several age-gradients of oil palm plantation (0, 1, 5, 7, 10, and 16 years) from 0-30, 31-60, and 61-90 cm of soil depth with 3 (three) replications respectively. Laboratory analysis was conducted to determine soil texture, bulk density, organic carbon and water content. Data of soil properties was analyzed descriptively and furthermore relation between soil organic carbon and soil water content under different soil depths along an oil palm-age gradient was analyzed by regression analysis. The smallholder oil palm farmers at Bungku Village managed their plantation without proper technology and oil palm were grown mostly unweeded. The result indicated that soil under different oil palm-age gradient is compact. Soil bulk density 1.12-1.59 g cm⁻³ and soil organic carbon (SOC) is very low-low (0.29-1.60%). Relation of soil depth and SOC under different age-gradient of oil palm plantation was linear. The deeper the soil depth, the lower the SOC is. Low SOC was responsible for low soil water availability under oil palm plantation. Meanwhile, relation of SOC and soil water content (field capacity, permanent wilting point, and available water) under different age-gradient of oil palm plantation was not always linear. The difference of water consumptive of several age-gradient of oil palm plantation and other factors were presumed to have influence on soil water content under oil palm plantation simultaneously. We need more comprehensive research on hydrology function of soil under different age-gradient of oil palm plantation, determinant factors, and autocorrelation of determinant factors.

Keywords: oil palm plantation, soil organic carbon, soil water content