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Stock and particulate organic carbon at suboptimal soil under super wet tropical region in Indonesia

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Organic carbon (OC) stock in agricultural soils functions as a sink to mitigate emission of CO₂ as well as an indicator of soil quality, especially for suboptimal soil. A research conducted in super wet (>5000 mm/year rainfall) tropical soil was aimed to determine the SOC stock and the particulate organic carbon (POC) at the top 40 cm depth under different types of land use (LU). Soils were sampled from 5 types of LU (Zalacca, Uncaria, bush, seasonal crops, and forest). The results showed that, forest had the highest SOC stock (79.18 t/ha) at the top 20 cm soil, while Zalacca had the highest (46.53 T/ha) at the lower depth. The highest SOC stock (117.33 t/ha) for 40 cm soil depth was found under Zalacca plantation. Then, SOC stock decreased by 16%, 19%, and 26% as the LU was changed from forest

into Uncaria, seasonal crops, and bush, respectively. Furthermore, soil OC stock was dominated ($\geq 79\%$) by POC. Land use change (LUC) from forest decreased POC content by 3% ($P>0.05$) to *Zalacca*, by 37% ($P<0.001$) to bush, by 39% ($P<0.001$) to *Uncaria*, and by 42% ($P<0.001$) to seasonal crop land use for the first 0-20 cm soil depth after approximately 15 years. At the lower (20-40 cm) depth, the tendency of the POC content followed the top soil depth. It could be concluded that under super wet tropical region, the SOC was dominated by POM and Zalacca plantation could stock OC comparable to that of forest after 15 years of LUC.

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