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Estimation of SOM-stock after 35 years of critical land rehabilitation using Pinus merkusii in Aripan, West Sumatra, Indonesia

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Soil OM content can be used as an indicator of soil quality. Disappearance of OM from the top soil causes land degradation. Soil OM is mostly determined by the vegetation growing on it, if the other environmental factors are homogeneous. A research on OM stock estimation was conducted on degradation land after being rehabilitated using pine (Pinus merkusii) for approximately 35 years in Aripan, Solok Regency, West Sumatra, Indonesia. Soil samples were taken from three different ranks of slope (15-25%, 25-45%, and >45%) and from secondary forest for comparison from the top 40 cm soil depth with 20 cm interval. The result showed that, generally SOM stock at the top 20 cm was higher than that at 20-40 cm soil depth. Total OM content at the top 40 cm soil depth linearly decreased (r=-0.97) by increasing slope grade from slightly steep (15-25%) to highly steep (>45%). The highest OM stock at rehabilitated land was 88.93 t/ha at 0-20 cm soil depth (for slope 15-25%). It was about 131% compared to the OM stock at slope grade >45%. However, the value was still lower than the OM stock (115.63T/ha) under forest land use, it was still approximately 77% of that at forest land use. Soil OM stock at 0-40 cm depth was about 67%, 79%, and 97% of that at forest land use for slope >45%, 25-45%, and 15-25% respectively. Soil OM content in this rehabilitation land linearly affected soil bulk density (r=-0.74) but not soil aggregate stability.

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