

Control of Soil Carbon Dynamic of Southeast Asian Ecosystems

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The tropical ecosystems have been estimated to be a large carbon source (1.3 Pg C yr^{-1}) due to deforestation and forest degradation, even the global terrestrial carbon sink has been large (1.1 Pg C yr^{-1}) in recent decades. Reducing Emissions from Deforestation and Forest Degradation (REDD) is an effort to create a financial value for the carbon stored in forests, offering incentives for tropical region to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. The ultimate goal of this study is to update REDD mechanism through improved forest management by evaluation of effects of logging and land-use change on soil carbon emission of tropical forests. This study was conducted in a lowland primary forest at Pasoh Forest Reserve ($2^{\circ}58'N$, $102^{\circ}18'E$; $75\sim 150\text{m a.s.l.}$) and a mountainous tropical forests at Temenggor concession area ($5^{\circ}33'N$, $101^{\circ}36'E$; $800\sim 900\text{m a.s.l.}$) in Peninsular Malaysia. About 50~65% biomass was harvested and soil temperature increased about 3°C with SMS, resulting value of the carbon stock lost about $2,577 \text{ US\$ ha}^{-1}$ following the first year of logging. On the other hand, under low-impact harvest condition, only about $1,773 \text{ US\$ ha}^{-1}$ was lost following the first year of logging. Result suggests that this low-impact harvest system would achieve about $804 \text{ US\$ ha}^{-1}$ of REDD credit partially contributed from mitigating soil degradation of about $169 \text{ US\$ ha}^{-1}$.

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