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CALCULATION OF CARBON BALANCE IN ACACIA CRASSICARPA PLANTATION ON TROPICAL PEATLAND IN INDONESIA

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Methodologies for calculating carbon balance in peatland are various, reflecting differences in consideration of the factors contributing to the net emission or net sequestration. Among the published methodologies, measured carbon fluxes are considered as a source of carbon release with no exception of the flux originating from respiration. On the other hand, the forest cut as well as the following harvest of planted species are totally calculated as carbon loss, neglecting the drop back of root, litter, dead plant, and the potential harvest which remains on the land. At the landscape scale, the count may be in error if it is assumed that the forest cut and the harvest take place over a homogeneous time span for all the managed area. This study applied an approach in calculating the carbon balance in *Acacia crassicarpa* planted peatland by taking into consideration all the shortcomings mentioned above. The approach includes CO₂ flux from bare land as the source of carbon release and calculation of sequestration by summing the carbon components which enter into the soil from 1) falling trees subtracted of those that decomposed up to the time of harvest, 2) litter falls subtracted of those that decomposed up to the time of plantation harvest, 3) plant roots over a plantation period, 4) plant parts that were left behind in the field after harvest, 5) left-over or residual wood which has not been taken to the mill for technical or economic considerations, and 6) wild understory plants that naturally grew underneath the *Acacia crassicarpa* stand. The results showed that CO₂ flux from the bare peatland was around 11 tons C-CO₂ ha⁻¹ year⁻¹;; that is lower than the sequestration for one plantation rotation. It can be concluded that the *Acacia crassicarpa* plantation on peatland produces a positive value in the carbon balance calculation.

Keywords: *CO₂ emission, falling trees, litter fall, CO₂ sequestration*