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Review of peat surface greenhouse gas emissions from oil palm plantations in Southeast Asia

Growth in palm oil production has been a key component of meeting growing global demand for vegetable oil, including for biodiesel, over recent decades. This growth has been accompanied by mounting concern over the impact of the oil palm business on tropical forests and peat swamp forests. Tropical peatland is one of Earth's most efficient carbon sinks. Development of tropical peatland for agriculture and plantations reduces or, in most cases, removes the carbon sink capacity of the peatland system, with large carbon losses arising particularly from enhanced aerobic peat decomposition and the loss of any future carbon sequestration by the native peat swamp forest vegetation.

The authors conclude that a value of 86 Mg CO₂-eq ha⁻¹ yr⁻¹ (annualized over 50 years) represents the most robust currently available empirical estimate of peat CO₂ emissions from OP and pulpwood plantations. For a shorter annualization, the emissions would be higher. Revising underestimated emissions from peat degradation in the modeling of indirect land use change could have important consequences for assessing the emissions balance of biofuels. For instance, adopting the 20-year annualization given above alongside correcting for a more realistic percentage of palm expansion on peat would have increased the carbon intensity of palm oil biodiesel as modelled by Al Riffai et al. (2010) for the European Commission by over 30 gCO₂-eq/MJ.

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