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Tropical peatland conservation in Indonesia as a nature-based solution

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The importance of the land sector in addressing the climate and nature crises has gained worldwide attention. Nature-based solutions were a key topic at the recent United Nations Conference of the Parties (COP26) in Glasgow to limit global warming to well below 2 degrees. The conservation, restoration, and improved management of peatlands play a significant role in Indonesia's nature-based solutions.

The eddy covariance measurements of net ecosystem carbon dioxide and methane exchanges from a coastal peatland in Sumatra, Indonesia indicate that the GHG balance increased from $20.0 \pm 4.5 \text{ tCO}_2\text{e ha}^{-1} \text{ yr}^{-1}$ at the intact site (undrained and undisturbed forest cover) to $43.8 \pm 1.5 \text{ tCO}_2\text{e ha}^{-1} \text{ yr}^{-1}$ at the degraded site (drained with canal system and selectively logged). The significant carbon dioxide emissions from the intact site, during an extreme drought caused by a positive Indian Ocean Dipole phase combined with El Niño event, highlight the potential importance of climate regime in determining the GHG budget of tropical peatlands.

Although the measurements indicate that both intact and degraded peatlands in this study are warming the atmosphere, it remains clear that protection of the remaining intact tropical peatlands offers a viable way to avoid substantial GHG emissions from this globally important ecosystem, which for our study in Sumatra was $24 \pm 5 \text{ tCO}_2\text{e ha}^{-1} \text{ yr}^{-1}$. These results highlight that protecting all remaining intact peat swamp forests in Indonesia (6.2 Mha) from degradation will avoid GHG emissions of around $0.15 \text{ GtCO}_2\text{e yr}^{-1}$, this equates to ~10% of Indonesia's GHG emissions in 2016.

Additionally, tropical peatland conservation contributes directly to the UN Sustainable Development Goals by fostering unique biodiversity and ecosystem services.