Summary of Romero et al. 2025 on carbon content of Amazonian trees

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Romero, F.M.B., L.A.G. Jacovine, A.C.O. Carneiro, M.V.G.S. Chaves, E.B. Bezerra, J.P.S. Lafuente, S.J.S.S. da Rocha, M.T.G. Lopes & P.M. Fearnside. 2025. Carbon content of Amazonian commercial tree boles: Implications for forest management. *Sustainability* 17: art. 296. https://doi.org/10.3390/su17072960 [open access].

The carbon content of Amazonian trees is a key factor in calculating the quantity of greenhouse gases emitted by deforestation and degradation of the Amazon forest and the enormous stock of carbon that could be released in the eventual collapse of the forest due to climate change. It is also important for quantifying the effects of logging on carbon emissions, uptake and stocks. The work of Flora Magdaline Romero and colleagues measured the carbon content in the trunks of 57 trees in 19 commercially exploited species in Brazil's state of Acre. The study showed that the value for this content in these trees is higher than the value that has been used in emissions estimates, including in the official reports submitted by Brazil to the United Nations Framework Convention on Climate Change (UNFCCC). We found an average content of 50.48% (±0.42), while the "default" value of the Intergovernmental Panel on Climate Change (IPCC) used in the reports is only 47%.

Although 19 species are not enough to characterize the Amazon rainforest, the only other study in the region found an average content of 48.5% (±0.3%) in 44 trees in the Manaus area, also higher than the "default" value of 0.47. Considering the emissions in 2016 calculated in the last Brazilian report to the Climate Convention, our result implies that emissions from deforestation were 7.40% higher than those reported, or 29.42 million tons of CO_2-equivalent. This is equivalent to 68% of the emissions of greater São Paulo in the same year from its entire energy sector, including electricity, fuel and natural gas.

The estimates submitted by countries to the Climate Convention form the basis for calculating how much the world needs to reduce its emissions to avoid the global climate catastrophe that would result if global warming were to pass a tipping point beyond it escapes from human control. Any underestimation of emissions

means that reductions that may be agreed upon in international negotiations would be insufficient to avoid such a catastrophe.