

Devastating human impact on the Amazon rainforest revealed

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Logging. Credit: Luke Parry

The human impact on the Amazon rainforest has been grossly underestimated according to an international team of researchers from Brazil and the UK, led by Lancaster University.

They found that [selective logging](#) and surface wildfires can result in an annual loss of 54 billion tonnes of carbon from the Brazilian Amazon,

increasing [greenhouse gas emissions](#).

This is equivalent to 40% of the yearly carbon loss from deforestation - when entire forests are chopped down.

This is the largest ever study estimating above and belowground carbon loss from selective logging and ground level forest fires in the tropics, based on data from 70,000 sampled trees and thousands of soil, litter and dead wood samples from 225 sites in the eastern Brazilian Amazon.

The forest degradation often starts with logging of prized trees such as mahogany and ipe. The felling and removal of these large trees often damages dozens of neighbouring trees.

Once the forest has been logged, the many gaps in the canopy means it becomes much drier due to exposure to the wind and sun, increasing the risk of wildfires spreading inside the forest.

The combination of selective logging and wildfires damages turns primary forests into a thick scrub full of smaller trees and vines, which stores 40% less carbon than undisturbed forests.



Credit: Jos Barlow

So far, climate change policies on the tropics have effectively been focusing on reducing carbon emissions from deforestation only, not accounting for emissions coming from forest degradation.

Lead researcher Dr Erika Berenguer from Lancaster University said: "The impacts of fire and logging in tropical forests have always been largely overlooked by both the scientific community and policy makers who are primarily concerned with deforestation. Yet our results show how these disturbances can severely degrade the forest, with huge amounts of carbon being transferred from plant matter straight into the atmosphere".

The research to be published in *Global Change Biology* on June 3 was carried out by 10 [researchers](#) from 11 universities and research

institutions in Brazil and the UK.

The second author, Dr Joice Ferreira from Embrapa in Brazil, said: "Our findings also draw attention to the necessity for Brazil to implement more effective policies for reducing the use of fire in agriculture, as fires can both devastate private property, and escape into surrounding forests causing widespread degradation. Bringing fire and illegal logging under control is key to reaching our national commitment to reducing [carbon emissions](#)."

More information: Erika Berenguer, Joice Ferreira, Toby Alan Gardner, Luiz Eduardo Oliveira Cruz Aragão, Plínio Barbosa de Camargo, Carlos Eduardo Cerri, Mariana Durigan, Raimundo Cosme de Oliveira Junior, Ima Célia Guimarães Vieira, Jos Barlow, "A Large-Scale Field Assessment of Carbon Stocks in Human-Modified Tropical Forests", *Global Change Biology* June 3 2014, provisional. [DOI: 10.1111/gcb.12627](#)

Provided by Lancaster University

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