

# Replacing trees with bamboos halves the carbon storage capacity of forests

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Subtropical forests are among the most important ecosystems in terms of carbon sinks, fixing carbon from the atmosphere. Recent evidence indicates that after selective logging, bamboos replace trees in

subtropical forests, which leads to decreased carbon storage. This decrease is far from trivial. The amount of carbon that a forest loses due to tree replacement by bamboos equals the amount of carbon liberated through clear cutting of the forest. Until now, the process responsible for this decline was unknown. Now, a new study reported in the journal *Forest Ecology and Management* sheds light on the mechanisms behind the loss in carbon fixation of subtropical forests.

The study found that bamboo domination affects the forest's function and carbon cycling by changing some characteristics of the litterfall. While the amount of total litterfall remained mostly unchanged from intact forest to degraded, bamboo-dominated forest, the quality of litter decreased as bamboo litter proportion increased. Bamboo litter has the lowest quality for decomposers and tends to accumulate above the [soil](#); as a result, the thickness of the litter layer doubled in bamboo-dominated forest patches. Forest degradation also caused a deceleration in litter decomposition, which resulted in a 50 percent decline in the amount of carbon that enters the soil community.

The analysis was conducted in the Atlantic Forest of South America, one of the world's most threatened biodiversity hotspots. The Atlantic Forest has been heavily impacted, and only 7 percent of its original area remains. It originally fringed the eastern coast of South America, from northeastern Brazil to eastern Paraguay and northeastern Argentina. The study, conducted in one of the largest intact fragments of the Atlantic Forest located in Argentina, compared sites with closed tree canopy with adjacent areas heavily dominated by bamboos.

At a time when the world seeks to curb carbon emissions, the results of the paper are relevant for the carbon budget. Dr. María Genoveva Gatti, biologist at the Institute of Subtropical Biology and one of the authors of the paper reflects on the significance of the study: "The soil contains more [carbon](#) than the atmosphere and the vegetation; this is why we

wanted to look at the effect of tree replacement on soil [carbon storage](#)."

She adds, "The replacement of [trees](#) by bamboos produces a cascade effect from the vegetation to the soil, implying that a disturbed forest is not delivering the same ecological service as a non-degraded forest."

**More information:** Zaninovich S.C, L.F. Montti, M.F. Alvarez, M.G. Gatti. 2017. Replacing trees by bamboos: Changes from canopy to soil organic carbon storage. *Forest Ecology and Management* 400: 208-217. [DOI: 10.1016/j.foreco.2017.05.047](https://doi.org/10.1016/j.foreco.2017.05.047)

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