

Secondary Tropical Forests Sequester Large Amounts of Carbon

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Regrowing secondary tropical forests rapidly sequester carbon. An international team of forest researchers led by researchers from Wageningen University measured an eleven times higher carbon uptake compared with old-growth forests. In this week Nature they elaborate their findings.

At the climate top in Paris, all attention was focused on how humanity can reduce climate change by reducing carbon emissions, or by increasing carbon uptake. Forests are an important carbon sink. While most attention has focused on old-growth tropical forests, it turns out that secondary forests that re-grow after forest clearance or agricultural abandonment can sequester large amounts of carbon. And over half of the world's tropical forests are not old-growth, but naturally regenerating forests. Is this a forgotten sink?

Carbon uptake

A large international team of forest ecologists shows this week in Nature that regrowing tropical forests are highly resilient. They analysed recovery of aboveground biomass using 1500 forest plots and 45 sites across Latin America. Lead author Prof. Lourens Poorter is surprised by the fast carbon uptake in these young forests that regrow on abandoned pastures or abandoned agricultural fields. "After twenty years, these forests have recovered already 122 tons of biomass per ha. This corresponds to an uptake of more than three tons carbon per ha each year. This is eleven times the uptake rate of old-growth forests" he says.

Secondary forests are forests that regrow after nearly complete removal of forest cover for agricultural use often for shifting cultivation or cattle ranching. Currently over half of the world's tropical forests are not old-growth, but naturally regenerating forests of which a large part is secondary forest.

Resilient secondary forests

Second-growth forests differ dramatically in their resilience, the research team concluded. In twenty years between 20 and 225 ton biomass has recovered. Biomass recovery is high in areas with high rainfall and water availability throughout the year, whereas soil fertility or the amount of forest cover in the surrounding landscape were less important. Co-author Danaë Rozendaal of the University of Regina in Canada: "We also used these data to produce a potential biomass recovery map for Latin America. Regional and national policy makers can use this information to identify areas that should be conserved, for instance because they have a slow recovery and are more difficult to restore, or to identify areas with fast recovery, where forest regrowth or reforestation has a high chance of success and a high carbon sequestration potential."

Work with nature

Climate change and mitigation possibilities were heavily discussed in Paris. Wageningen Professor Frans Bongers: "We need active policies that reduce carbon emissions and increase carbon uptake. Therefore we urge to halt deforestation and protect old-growth tropical forests, and to promote natural forest regrowth in deforested areas. Forest regrowth clearly deserves more attention of national and international policy makers. Rather than working against nature we should work with nature; natural regrowth is a cheap and nature-based solution with a tremendous carbon mitigation potential."

2ndFOR

This research is a product of the 2ndFOR collaborative research network on secondary forests. It involves 65 researchers from 15 different countries. The network focuses on the ecology, dynamics, and biodiversity of secondary forests, and the ecosystem services they provide in human-modified tropical landscapes. The 2ndFOR network is coordinated by Prof. Lourens Poorter and Prof. Frans Bongers (Wageningen University, the Netherlands) and Dr. Danaë Rozendaal (University of Regina, Canada).

Publication

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