

11% of destroyed moist tropical forests could be restored to boost climate, environment

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In a peer-reviewed report released today, researchers have identified more than 100 million hectares of lost lowland tropical rain forests—restoration hotspots—spread out across Central and South America, Africa and Southeast Asia that present the most compelling opportunities for restoration to overcome rising global temperatures, water pollution and shortages, and the extinction of plant and animal life. Brazil, Indonesia, Madagascar, India and Colombia have the largest accumulated area of restoration hotspots; six African countries—Rwanda, Uganda, Burundi, Togo, South Sudan, and Madagascar—are home to the areas presenting the best restoration opportunities on average.

"Restoring [tropical forests](#) is fundamental to the planet's health, now and for generations to come," said lead author Pedro Brancalion, from the University of São Paulo, Brazil. "For the first time, our study helps governments, investors and others seeking to restore global tropical moist forests to

determine precise locations where restoring forests is most viable, enduring and beneficial. Restoring forests is a must do—and it's doable."

The 12 authors of the study "Global restoration opportunities in tropical rainforest landscapes," published today in the journal *Science Advances*, used [high-resolution satellite imagery](#) and the latest peer-reviewed research on four forest benefits (biodiversity, [climate change mitigation](#), climate change adaptation, and water security) and three aspects of restoration effort (cost, investment risk and the likelihood of restored forests surviving into the future) to assess and "score" all tropical lands worldwide in 1 kilometer square blocks that retained less than 90 percent of their forest cover.

Restoration hotspots are those lands that scored in the top 10 percent, meaning that restoring them would be the most beneficial and the least costly and risky.

- The top 15 countries with the largest restoration hotspots were found across all the tropical forest biomes, or zones: three in the Neotropics, five in the Afrotropics, and seven in Indo-Malaysia and Australasia.
- The five countries with the largest restoration hotspot by area are Brazil, Indonesia, India, Madagascar and Colombia.
- The six countries with the highest mean score were found in Africa: Rwanda, Uganda, Burundi, Togo, South Sudan and Madagascar. "We were surprised to find such a concentration of highly ranked countries in a single continent," co-author Robin Chazdon said. "The study really highlights the high potential for successful rainforest restoration outcomes in these African countries."

- Nearly 87 percent of the restoration hotspots were found within biodiversity conservation hotspots, areas that hold high concentrations of species found nowhere else, but are at high risk for deforestation.
- Seventy-three percent of the restoration hotspots were found in countries that have made restoration commitments as part of the Bonn Challenge, a global effort to bring 150 million hectares of the world's deforested and degraded land into restoration by 2020, and 350 million hectares by 2030. "It's encouraging that so many hotspots are located in countries where restoring forests and landscapes is already a priority," said Brancalion.

In most cases, restoration hotspots overlap with fields and pastures currently in use by farmers. As a result, the study shows, restoring forests is most feasible on lands of low value for agricultural production. Alternatively, the researchers argue, restoration could be coupled with income-generating forms of production through, for example, enriching pastures with trees, harvesting forest-based products like rattan and growing coffee or cocoa beneath a forest canopy. Any decisions about changing land use must fully engage local communities, as restoration should complement rather than compete with food security and land rights. In other cases, these hotspots include abandoned, degraded farmlands or government lands.

"Restoration involves far more than simply planting trees," said Chazdon. "It starts with the need for mutually beneficial agreements with those currently using the land and doesn't end until forests host the rich diversity of plant and animal life that make them so awe-inspiring and valuable. But, fortunately, [studies show](#) it doesn't take long for the benefits of new forests to kick-in."

Consensus is emerging that forest restoration—together with the protection of natural, old-growth forests—is one of the most cost-effective and readily available solutions to current climate and environment woes. A [statement](#) signed by 40 scientists last year laid out the "five often overlooked reasons why limiting global warming

requires protecting and sustainably managing the forests we have, and restoring the forests we've lost." The scientists stress that the world must focus on rapidly decreasing fossil fuel use and stopping deforestation, while seeking ways to increase carbon sinks. Ramping up restoration, they caution, will help meet climate goals, but it cannot supplant the urgent need to reduce emissions.

While some countries, most notably China and India, have already launched large-scale tree planting efforts with some [success](#), these efforts are getting mixed reviews in terms of the quality of plantation cover and its value for protecting native species. In some cases, countries are establishing monoculture tree plantations—one species of tree planted over and over again—to meet restoration commitments. Experts caution, however, that a focus on protecting and restoring [natural forests](#), not planting monoculture plantations is essential to meeting climate and other co-benefits of restoration.

Brancalion added, "Pledges and agreements like the Bonn Challenge and the New York Declaration on Forests show that there is will to restore and protect forests. With the tools we have developed, countries, companies and other actors who have pledged to restore forests have the precise information they need to roll up their sleeves and dive into the difficult work of bringing our forests back. There are no shortcuts when it comes to [forest restoration](#), but there is low-hanging fruit that we need to seize now, before it's too late."

More information: "Global restoration opportunities in tropical rainforest landscapes" *Science Advances* (2019). advances.sciencemag.org/content/5/7/eaav3223

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