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New study shows where we should grow more forest to fight climate change

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Reforestation is a major tool in the arsenal against global warming, but just how much it can help is still a bit of a mystery. But a new study published this week in Nature sheds more light on just how much carbon regrown forests can absorb and where efforts should be targeted to be the most effective, and finds that reforestation has the capacity to sop up more carbon than previously estimated – but that overall it stands to absorb less.

The study was conducted by scientists representing more than a dozen organizations, including U.S.-based The Nature Conservancy and World Resources Institute, who combined data from more than 250 previous studies to map the aboveground carbon accumulation of forests around the world – basically how much and how quickly trees grew. They then looked at the different environmental factors that may have played a role in this growth, such as a region's climate, soil composition and hilliness, to assess the forest growth/carbon sequestration potential of degraded areas that could be reforested.

"We already know the many benefits of restoring global forest cover – from capturing carbon and cleaning our air and water, to providing habitats for wildlife and providing sustainable development opportunities for local communities," said lead author Susan Cook-Patton from The Nature Conservancy What's been missing to date is robust, actionable data that helps environmental decision-makers understand where natural regrowth makes the most sense as a tool to tackle climate change. Our study will help change that."

Reforestation project in Sabah, Malaysia. Image by Rhett Butler/Mongabay.

Overall, their results show that, globally, rates of forest carbon sequestration presumed by the Intergovernmental Panel on Climate Change (IPCC) were underestimated by 32%. When considering just tropical regions, that number went up to 53%. This means that reforestation could be a more powerful means to combat climate change than previously assumed.

However, zooming in reveals a more complicated situation. The IPPC default rates are less nuanced, taking fewer factors into consideration; when the new study took a closer look at conditions on the ground in more places, it found that the IPPC rates actually overestimate carbon accumulation potential for some areas. Adding this up, the study ultimately concludes that the maximum climate mitigation potential from reforestation – 2.43 billion metric tons of absorbed carbon – is 11% lower than previously reported. And the study's authors admit that achieving even that number will require big changes such as global dietary shifts away from meat, which they say would allow land previously used for pasture and growing livestock feed to be restored back to forest.

In addition to absorbing carbon, reforestation can help provide habitat for wildlife – like this rainbow whiptail (Cnemidophorus lemniscatus). Image by Rhett Butler/Mongabay.

Still, Cook-Patton and her colleagues write that these challenges should not dissuade from the potential of forest regrowth as a low-cost, high-impact way to address climate change, and say their findings provide a path forward for reforestation efforts in concert with other strategies.

"Based on the most robust dataset of its kind, assembled to date, our map highlights locations worldwide where natural forest regrowth has potential to be an efficient and cost-effective natural climate solution," said co-author Bronson Griscom from Conservation International. "In doing so, our research also provides a timely reminder of the powerful potential of natural forest regrowth as part of a wider portfolio of natural climate solutions, which encompasses protection, restoration, and improved management of forests, wetlands, grasslands, and agricultural lands."

The study's results are visualized on the Natural Climate Solutions World Atlas. It shows that, on the national level, China, Brazil, and Indonesia have the greatest potential for aboveground carbon sequestration in potential restoration areas. Russia, the U.S., India, and the Democratic Republic of Congo fall closely behind.

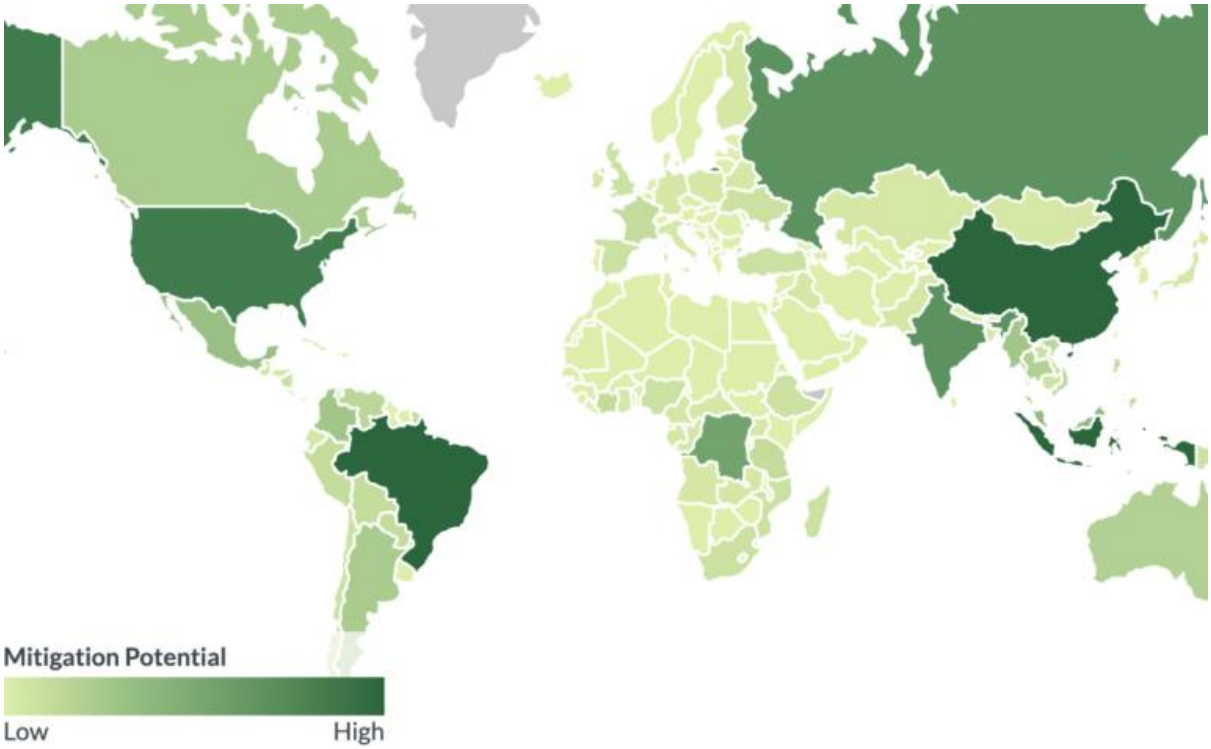

Image from Nature4climate.org

“We know there is no single, one-size-fits-all solution for addressing climate change. Our goal with this study was to show where forests can capture carbon fastest on their own, a mitigation strategy that complements keeping forests standing,” said co-author Nancy Harris from World Resources Institute.

“If we let them, forests can do some of our climate mitigation work for us.”

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