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Cost of planting, protecting trees to fight climate change could jump

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Planting trees and preventing deforestation are considered key climate change mitigation strategies, but a new analysis finds the cost of preserving and planting trees to hit certain global emissions reductions targets could accelerate quickly.

In the analysis, researchers from RTI International (RTI), North Carolina State University and Ohio State University report costs will rise steeply under more ambitious emissions reductions plans. By 2055, they project it would cost as much as $393 billion per year to pay landowners to plant and protect enough trees to achieve more than 10 percent of total emissions reductions that international policy experts say are needed to restrict climate change to 1.5 degrees Celsius. The findings were published today in the journal Nature Communications.

"The global forestry sector can provide a really substantial chunk of the mitigation needed to hit global climate targets," said Justin Baker, co-author of the study and associate professor of forest resource economics at NC State. "The physical potential is there, but when we look at the economic costs, they are nonlinear. That means that the more we reduce emissions -- the more carbon we're sequestering -- we're paying higher and higher costs for it."

The researchers found that The Intergovernmental Panel on Climate Change expects forestry to play a critical role in reducing climate change. To analyze the cost of preserving forest, preventing harvest and deforestation, and planting trees, researchers used a price model called the Global Timber Model. That model estimates costs of preserving trees in private forests owned and managed by companies for harvesting for pulp and paper products, as well as on publicly owned land, such as U.S. national parks.

"Protecting, managing and restoring the world's forests will be necessary for avoiding dangerous impacts of climate change, and have important co-benefits such as biodiversity conservation, ecosystem service enhancement and protection of livelihoods," said Kemen Austin, lead author of the study and senior policy analyst at RTI. "Until now, there has been limited research investigating the costs of climate change mitigation from forests. Better understanding the costs of mitigation from global forests will help us to prioritize resources and inform the design of more efficient mitigation policies."

The researchers estimated it would cost $2 billion per year to prevent 0.6 gigatons of carbon dioxide from being released by 2055. Comparatively, $393 billion annually would sequester 6 gigatons, or the equivalent of emissions from nearly 1.3 billion passenger vehicles driven for one year, according to the U.S. Environmental Protection Agency's Greenhouse Gas Equivalencies Calculator.

"It's not clear from these results that you'll have consistent low-cost mitigation from the global forest sector as other studies have indicated," Baker said. The tropics are expected to play the biggest role in reducing emissions, with Brazil -- the country that contains the largest share of the Amazon rainforest -- the Democratic Republic of Congo, and Indonesia contributing the largest share. The tropics will contribute between 72 and 82 percent of total global mitigation from forestry in 2055.

The researchers also found that forest management in temperate regions, such as forestland in the southern United States, will play a significant role, especially under higher price scenarios. They expect that afforestation, which is introducing trees to areas that are not actively in forest, and managing existing forestland will be important strategies in the United States.

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