

CLIMATE

# Why deforestation means less rain in tropical forests

April 2, 2023 · 11:37 AM ET

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View of a deforested and burned area of the Amazon rainforest in northern Brazil on Sept. 2, 2022.

*Douglas Magno/AFP/Getty Images*

A new study has uncovered that forest loss is changing weather patterns in the world's three largest remaining tropical rainforests.

The study, published in the journal *Nature* last month, found that clearing wide swaths of trees — what's known as deforestation — reduces rainfall in tropical rainforests which actually generate their own rain. When it rains, trees soak up and use that water. They then release that moisture, both through evaporation and through

their leaves. That humid air rises and helps create clouds, which in turn create more rain.

This process, called precipitation recycling, accounts for up to 41% of the rainfall in the Amazon and up to 50% in the Congo, according to the study's authors. When trees are cut down, it breaks this cycle, hampering the formation of rain and leading to drought. Reduced precipitation recycling due to forest loss, the researchers say, has grave repercussions for agriculture, hydropower generation and climate resilience – as well as for the rainforest itself.

"Global efforts to restore large areas of degraded and deforested land could enhance precipitation, reversing some of the reductions in precipitation due to forest loss observed here," the authors wrote. They called for renewed efforts to protect rainforests and urged world leaders to act on their pledges to stop deforestation.

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#### Sponsor Message

The study looked at satellite data on rainfall and forest loss in the world's largest rainforest, the Amazon, which covers nine countries; the Congo Basin, the second largest rainforest spanning six countries; and Southeast Asia, home to Indonesia's thriving Leuser Ecosystem.





Each of these rainforests is losing trees primarily to agricultural land use. The Amazon has lost a significant amount of its forest cover – more than an estimated 60 million acres from 2000 to 2010 alone. Much of the deforestation in the Amazon is due to soy cultivation and cattle farming.

In Indonesia, peatland forests are burned to the ground for lucrative palm oil plantations – a cheap oil commonly found in packaged foods, cleaning and cosmetic products and increasingly in biofuels. The palm oil industry, illegal logging and deforestation by small-scale farmers in West-Central Africa are also decimating the rainforests in the Congo Basin.

"When we're removing trees, we're making the environment drier and that lack of moisture that's the big cloud above those trees just disappears," said Callum Smith, a PhD researcher at the University of Leeds in England and co-author of the study.

In the Congo, deforestation could reduce local rainfall by 8-10% by the end of the century, the study points out. Scientists are also seeing the impact in the Amazon.

"The important thing to remember is that this is just due to forest loss," Smith said of the Congo prediction. "We're screening out the effect(s) of climate change."

## **Stopping deforestation**

Robin Averbeck, forest program director at the Rainforest Action Network, said global forests are critical for producing rainfall and regulating global temperatures. They also capture carbon dioxide which is a major contributor to human-caused climate change. That gas releases, though, when trees are cut down or burned.

"Once we deforest, we lose one of our greatest natural defenses in protecting ourselves from climate change. This is not only true for forests, but also other ecosystems," Averbeck said. Draining and burning peatlands for palm oil plantations, particularly in Indonesia, also releases carbon into the atmosphere, they said.



Rangers cut down illegal palm oil trees within the protected Leuser Ecosystem rainforest in Aceh Province, Indonesia on Jan. 9, 2019.

*Chaideer Mahyuddin/AFP/Getty Images*

Averbeck said banks, corporations and governments need to adopt and meaningfully enforce regulations and policies to prevent future deforestation while not funding or using crops or products cultivated on deforested land. They also said ensuring and protecting indigenous land rights is a critical step in preventing deforestation and rights abuses before they occur.

Indigenous lands contain 80% of the planet's remaining biodiversity, Averbeck pointed out. For this reason, Averbeck said it is critical for Indigenous people to be able to resist development and for governments and companies to respect their decision.

In Brazil, deforestation dramatically decreased through law enforcement under Luiz Inácio Lula da Silva, who was president from 2003 to 2010. The country saw deforestation surge and reach a fifteen-year high in 2021 under former president Jair Bolsonaro. Lula, who assumed the presidency again this year, campaigned on preserving the Amazon and protecting Indigenous communities.



A firefighter works to put out a large forest fire in Porto Jofre, Brazil on Sept. 4, 2021.

*Carl De Souza/AFP/Getty Images*

Unlike Indonesia and the Brazilian Amazon, much of the forest loss in the Congo Basin is due to poor, small-scale farmers trying to survive, explained Frances Seymour, senior fellow at the World Resources Institute, a global nonprofit that works

with leaders to solve environmental problems. Addressing deforestation in the Congo Basin is more complex, she said.

"It really requires an across-the-board approach to rural development that provides these communities with access to improved agricultural methods and to clean energy sources and other alternatives to make a decent living and live a decent life that doesn't require the exploitation of forest resources," Seymour said.

She said it is important to distinguish between corporations and governments that are engaging in illegal actions – such as opening unlicensed palm oil plantations, illegal road construction and logging or corruption – and poorer communities who depend on the rainforest because they lack other resources.

"There's a real moral problem about exercising law enforcement against people who have no alternative, some of the most vulnerable people in the world," she said.

Bernardo Flores, an economist at the Federal University of Santa Catarina in Brazil said the Amazon region is already being stressed by hotter temperatures. According to a 2018 study, temperatures there have increased by more than one degree Fahrenheit over the last 40 years. Flores is worried that the rainforest is heading toward a tipping point.

"You would trigger this domino effect related to the loss of rainfall. Then you would lose a large part of the Amazon," he said. "We wouldn't be able to control that anymore."

