

Simulations suggests cutting rainforests in mid and high latitudes can impact rainfall in northern hemisphere

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Credit: Teodoro S Gruhl/public domain

(Phys.org)—A trio of researchers with the Indian Institute of Science has found, via computer simulation, that deforestation in one part of the world can impact rainfall patterns in another. In their paper published in

Proceedings of the National Academy of Sciences, Abhishek Devaraju, Govindasamy Bala and Angshuman Modak describe the experiments they conducted with their models and what their findings may mean for real world deforestation.

Most everyone in the science community agrees that cutting down the rainforests is a bad idea, not only do they pump enormous amounts of oxygen into the atmosphere, they take out carbon dioxide. They also absorb some of the heat from the sun, which gets bounced back into space when the trees are gone. Prior research has shown that clear-cutting rainforests can cause changes to local temperature norms, and now, it appears it can also cause changes to weather patterns in far reaching places.

To come to these conclusions the researchers used a climate model that allows for taking into consideration circulation in the atmosphere, warming of the ocean surface, transpiration, photosynthesis and ice melt. To see how changing the amount of rainforest might impact other parts of the world, the researchers ran several scenarios with differing degrees of [deforestation](#) in different parts of the world. Doing so, the team reports, showed changes in air circulation patterns which resulted in shifts in where rain fell. They found, for example, that cutting the rainforest in mid and high latitudes, caused less rain to fall in northern hemisphere monsoon regions such as of South Asia, North Africa, North America and East Asia. At the same time, they saw a small increase in the amount of rain that fell in southern hemisphere monsoon regions such as parts of Australia, South America and South Africa. They found the biggest impact in the South Asian monsoon region, with India seeing 18 percent less rain when rainforests to the south were cut completely.

It is not clear how close the models reflect reality, but the results by the team suggest that scientists need to start conducting studies that compare real world [rainforest](#) cutting with real world [rainfall patterns](#) in other

parts of the world.

More information: Effects of large-scale deforestation on precipitation in the monsoon regions: Remote versus local effects, N. Devaraju, *PNAS*, [DOI: 10.1073/pnas.1423439112](https://doi.org/10.1073/pnas.1423439112)

Abstract

In this paper, using idealized climate model simulations, we investigate the biogeophysical effects of large-scale deforestation on monsoon regions. We find that the remote forcing from large-scale deforestation in the northern middle and high latitudes shifts the Intertropical Convergence Zone southward. This results in a significant decrease in precipitation in the Northern Hemisphere monsoon regions (East Asia, North America, North Africa, and South Asia) and moderate precipitation increases in the Southern Hemisphere monsoon regions (South Africa, South America, and Australia). The magnitude of the monsoonal precipitation changes depends on the location of deforestation, with remote effects showing a larger influence than local effects. The South Asian Monsoon region is affected the most, with 18% decline in precipitation over India. Our results indicate that any comprehensive assessment of afforestation/reforestation as climate change mitigation strategies should carefully evaluate the remote effects on monsoonal precipitation alongside the large local impacts on temperatures.

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