

Forests increase cloud cover, have net cooling effect: Study reveals critical need for afforestation

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The world has begun to face the menace of climate change as the rising warming of the planet leads to higher temperatures, wildfires in one part, and intense rains and flooding events in the other. Scientists are now advocating afforestation at a large scale to reduce the dangerous consequences. A new study points out that forests are not only key to moderating climate by sequestering atmospheric carbon, but also create a cooling effect by increasing low-level clouds. Satellite observations have resulted in the first of its kind global assessment that shows that for two-thirds of the world, afforestation increases low-level cloud cover. The strongest effect of this has been seen in evergreen needle-leaf forests.

The research published in the journal Nature Communications marks that changing the forest cover can further affect the cloud regime, which can potentially have repercussions on the hydrological cycle. Researchers found that in 67 per cent of sampled areas across the world, afforestation would increase low-level cloud cover, which should have a cooling effect on the planet.

A cooling effect

Forests are widely regarded as carbon absorbers for their ability to sequester carbon dioxide from the atmosphere and convert it into biomass that helps in reducing climate change. However, it has been unclear as to how forests affect the climate in other ways such as their role in the water cycle and surface energy balance.



Forests play a key role in current challenge to mitigate climate change.

Led by Gregory Duveiller of Max Planck Institute for Biogeochemistry in Germany, researchers used global data records of cloud and land-fractional cover to examine the effect of the transition of vegetation cover into the deciduous and evergreen forest. They used data from the European Space Agency's Climate Change Initiative to describe that cloud generally increased over the whole year in afforested areas in temperate, tropical and arid regions, sometimes by as much as 15 per cent.

The cloud cover goes down in forests of North America, Russia and Eastern Europe, when these areas experience prolonged snow cover. The reduction in cloud cover during winters is moreover forests compared to open land. "Earth observations are increasingly showing that trees and forests are impacting climate by affecting biophysical surface properties," Alessandro Cescatti, a co-author of the study, told ESA.

Researchers maintain that clouds remain a very sensitive and uncertain component of the climate system that plays an important role in radiation by modulating the amount of energy reflected, emitted and absorbed both at the surface and in the atmosphere. Clouds exert a net cooling effect on climate, with a large contribution by the low-level clouds.

They stressed that to reduce the dire consequences of climate change, not only do we need to stop emitting greenhouse gases but also remove the excess carbon that has already been emitted, and the "most effective way to capture carbon is to have it sequestered by trees."

Several countries are pushing for increasing forest cover including China, which is working on its Green Wall and Europe with its European Green Deal. However, researchers said in the paper that planting trees is not a simple solution and can have various climate impacts and mitigation efficacy depending on how and where they are planted.

<https://www.indiatoday.in/science/story/forest-climate-change-global-warming-cooling-effect-cloud-cover-1837212-2021-08-05>