

# Role of terrestrial biosphere in counteracting climate change may have been underestimated

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A composite image of the Western hemisphere of the Earth. Credit: NASA

New research suggests that the capacity of the terrestrial biosphere to absorb carbon dioxide (CO<sub>2</sub>) may have been underestimated in past calculations due to certain land-use changes not being fully taken into account.

It is widely known that the terrestrial biosphere (the collective term for all the world's land vegetation, soil, etc.) is an important factor in mitigating climate change, as it absorbs around 20% of all fossil fuel CO<sub>2</sub> [emissions](#).

However, its role as a net carbon sink is affected by land-use changes such as deforestation and expanded agricultural practice.

A new study, conducted by an international collaboration of scientists and published in the journal *Nature Geoscience*, has analysed the extent to which these changing land-use practices affect [carbon emissions](#) - allowing the levels of CO<sub>2</sub> uptake by the terrestrial biosphere to be more accurately predicted.

The results not only show that CO<sub>2</sub> emissions from changing land-use practices are likely to be significantly higher than previously thought, but also imply that these emissions are compensated for by a higher rate of [carbon uptake](#) among [terrestrial ecosystems](#).

Co-author of the study, Dr Tom Pugh from the University of Birmingham, says:

"Our work shows that the terrestrial biosphere might have greater potential than previously thought to mitigate climate change by sequestering carbon emissions from fossil fuels. However, to fully realise this potential we will have to ensure that the significant emissions resulting from land-use changes are reduced as much as possible."

Co-author Professor Stephen Sitch from the University of Exeter adds:

"The results imply that reforestation projects and efforts to avoid further deforestation are of the utmost importance in our pursuit to limit global warming to below 2 C, as stated in the Paris climate agreement."

**More information:** Historical carbon dioxide emissions caused by land-use changes are possibly larger than assumed, *Nature Geoscience*, [nature.com/articles/doi:10.1038/ngeo2882](https://doi.org/10.1038/ngeo2882)

Provided by University of Birmingham

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