ETH zürich

How trees could help to save the climate*

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78 Comments

Around 0.9 billion hectares of land worldwide would be suitable for reforestation, which could ultimately capture two thirds of human-made carbon emissions. The Crowther Lab of ETH Zurich has published a study in the journal *Science* that shows this can be a powerful tool for drawing carbon from the atmosphere.*

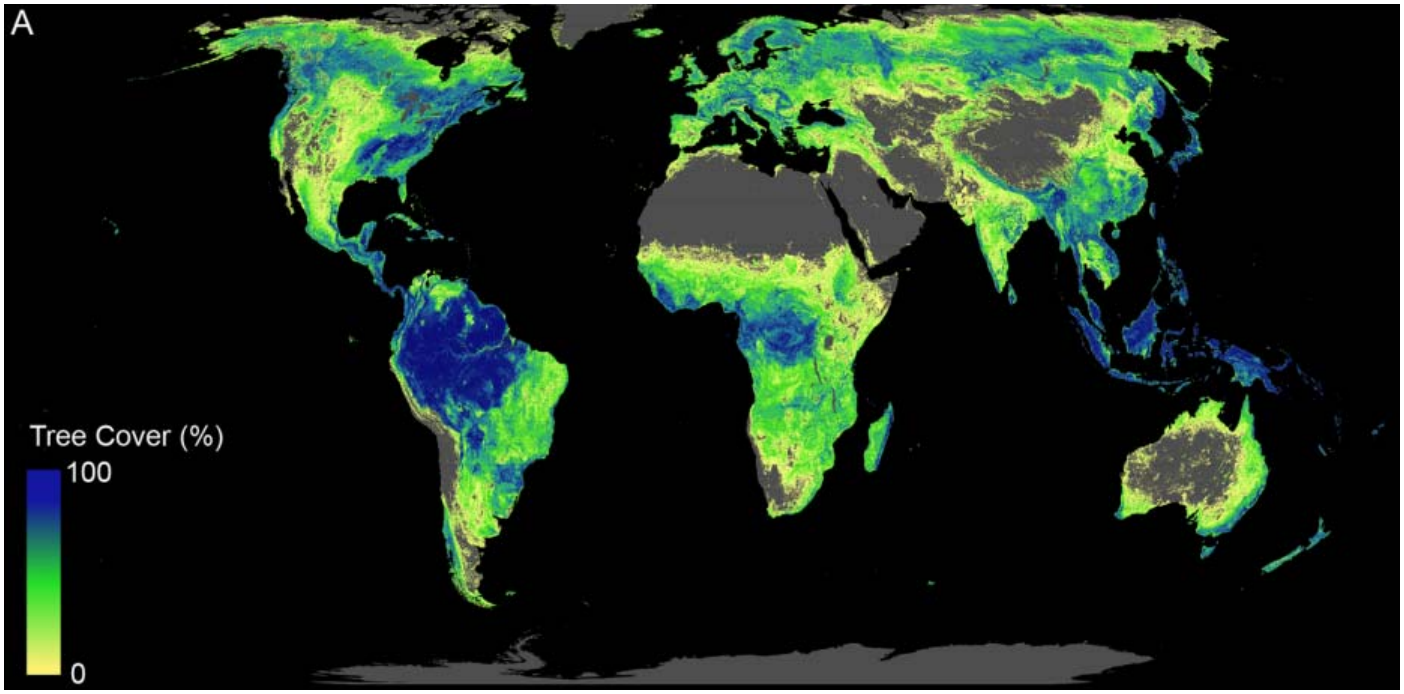
Reforestation would be the most effective method to combat climate change. (Image: Vershinin-M / iStock)

The Crowther Lab at ETH Zurich investigates nature-based solutions to climate change. In their latest study the researchers showed for the first time where in the world new trees could grow and how much carbon they would store. Study lead author and postdoc at the Crowther Lab Jean-François Bastin explains: "One aspect was of particular importance to us as we did the calculations: we excluded cities or agricultural areas from the total restoration potential as these areas are needed for human life."

Reforest an area the size of the USA

The researchers calculated that under the current climate conditions, Earth's land could support 4.4 billion hectares of continuous tree cover. That is 1.6 billion more than the currently existing 2.8 billion hectares. Of these 1.6 billion hectares, 0.9 billion hectares fulfill the criterion of not being used by humans. This means that there is currently an area of the size of the US available for tree restoration. Once mature, these new forests could store 205 billion tonnes of carbon: about two thirds of the 300 billion tonnes of carbon that has been released into the atmosphere as a result of human activity since the Industrial Revolution.

According to Prof. Thomas Crowther, co-author of the study and founder of the Crowther Lab at ETH Zurich: "We all knew that restoring forests could play a part in tackling climate change, but we didn't really know how big the impact would be. Our study shows that tree restoration can be a powerful tool for drawing carbon from the atmosphere.* But we must act quickly, as new forests will take decades to mature and achieve their full potential as a source of natural carbon storage."

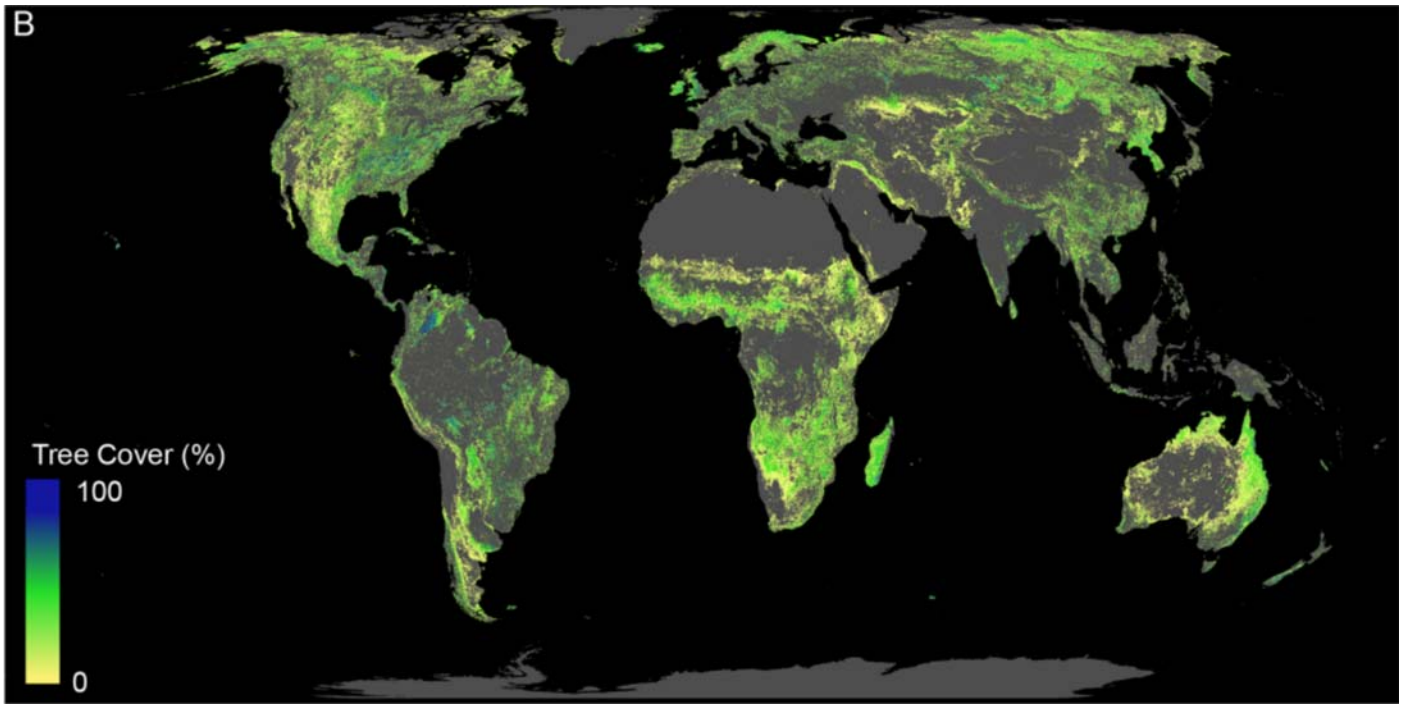


Total land available that can support trees across the globe (total of current forested areas and forest cover potential available for restoration). (Image: Crowther Lab / ETH Zurich)

Russia best suited for reforestation

The study also shows which parts of the world are most suited to forest restoration. The greatest potential can be found in just six countries: Russia (151 million hectares); the US (103 million hectares); Canada (78.4 million hectares); Australia (58 million hectares); Brazil (49.7 million hectares); and China (40.2 million hectares).

Many current climate models are wrong in expecting climate change to increase global tree cover, the study warns. It finds that there is likely to be an increase in the area of northern boreal forests in regions such as Siberia, but tree cover there averages only 30 to 40 percent. These gains would be outweighed by the losses suffered in dense tropical forests, which typically have 90 to 100 percent tree cover.



Land available for forest restoration (excluding deserts, agricultural and urban areas; current forestland not shown). (Image: Crowther Lab / ETH Zurich)

*In the initial version of the media release, afforestation was described as "the best climate change solution available today" and the title as "could trees could save the climate". This statement and the titel was clarified on 17.10.2019.