

Offset markets: New approach could help save tropical forests by restoring faith in carbon credits

October 30 2023



A team led by scientists at the University of Cambridge has invented a reliable and transparent way of estimating the benefit of carbon stored because of forest conservation. Credit: Marije Schaafsma

A new approach to valuing the carbon storage potential of natural habitats aims to help restore faith in offset schemes, by enabling investors to directly compare carbon credit pricing across a wide range of projects.

Current valuation methods for [forest conservation](#) projects have come under heavy scrutiny, leading to a crisis of confidence in [carbon](#) markets. This is hampering efforts to offset unavoidable carbon footprints, mitigate [climate change](#), and scale up urgently needed investment in tropical forest conservation.

Measuring the value of carbon storage is not easy. [Recent research](#) revealed that as little as 6% of carbon credits from voluntary REDD+ schemes result in preserved forests. And the length of time these forests are preserved is critical to the climate benefits achieved.

Now, a team led by scientists at the University of Cambridge has invented a more reliable and transparent way of estimating the benefit of carbon stored because of forest conservation.

The method is [published in *Nature Climate Change*](#). In it, the researchers argue that saving tropical forests is not only vital for biodiversity, but also a much less expensive way of balancing emissions than most of the current carbon capture and storage technologies.

The new approach works a bit like a lease agreement: carbon credits are issued to tropical forest projects that store carbon for a predicted amount of time. The valuation is front-loaded, because more trees protected now means less carbon released to the atmosphere straight away.

The technique involves deliberately pessimistic predictions of when stored carbon might be released, so that the number of credits issued is conservative. But because forests can now be monitored by remote

sensing, if projects do better than predicted—which they usually will—they can be rewarded through the issue of further credits.

The payments encourage local people to protect forests: the carbon finance they receive can help provide alternative livelihoods that don't involve cutting down trees.

And by allowing for future payments, the new method generates incentives for safeguarding forests long after credits have been issued. This contrasts with the current approach, which passes on a burden for conservation to [future generations](#) without compensation for lost livelihoods.

The approach also allows different types of conservation projects to be compared in a like-for-like manner.

"Until now there hasn't been a satisfactory way of directly comparing technological solutions with nature-based solutions for carbon capture. This has caused a lack of enthusiasm for investing in carbon credits linked to tropical forest protection," said Dr. Tom Swinfield, a researcher in the University of Cambridge's Department of Zoology and senior author of the study.

He added, "Tropical forests are being cleared so quickly that if we don't protect them now, we're not going to make the vital progress we need towards net-zero. Buying [carbon credits](#) linked to their protection is one of the best ways to do this."

Tropical forests play a key role in taking carbon dioxide out of the atmosphere, helping to reduce global warming and avert climate catastrophe. But the carbon they capture is not taken out of the atmosphere permanently: forests can be destroyed by pests, floods, fire, wind—and by human clearance.

This impermanence, and therefore the difficulty of reliably measuring the long-term climate benefit of tropical forest protection, has made it an unattractive proposition for investors wanting to offset their carbon emissions.

And this is despite it being a far cheaper investment than more permanent, technology-based methods of carbon capture and storage.

Protection of [tropical forests](#), a nature-based solution to climate change, comes with additional benefits: helping to conserve biodiversity, and supporting the livelihoods of people living near the forests.

"Nature-based carbon solutions are highly undervalued right now because the market doesn't know how to account for the fact that forests aren't a permanent carbon storage solution. Our method takes away a lot of the uncertainties," said Anil Madhavapeddy, a Professor in the University of Cambridge's Department of Computer Science and Technology, who was involved in the study.

The new method, developed by scientists at the Universities of Cambridge and Exeter and the London School of Economics, is called "Permanent Additional Carbon Tonne" (PACT) accounting, and can be used to value a wide range of nature-based solutions.

"Carbon finance is a way for us—the carbon emitters of the richer world—to direct funds towards rural communities in the tropics so they can get more out of the land they have, without cutting down more trees," said Andrew Balmford, Professor of Conservation Science at the University of Cambridge and first author of the paper.

Co-author Srinivasan Keshav, Robert Sansom Professor of Computer Science at Cambridge added, "Our new approach has the potential to address market concerns around nature-based solutions to carbon

offsetting, and lead to desperately needed investment."

Conversion of tropical [forest](#) to agricultural land results in vast carbon emissions. Around 30% of all progress towards the ambitious net-zero commitments made at COP26 is reliant on better management of carbon in nature.

Other carbon credit investment options include technologies that remove carbon dioxide from the atmosphere and lock it deep in the Earth for hundreds of years. These permanent storage options may currently be easier to value, say the researchers, but they typically cost substantially more than nature-based solutions and do nothing to protect natural habitats that are vital in regulating the global climate and mitigating the extinction crisis.

More information: Realising the social value of impermanent carbon credits, *Nature Climate Change* (2023). [DOI: 10.1038/s41558-023-01815-0](#) , www.nature.com/articles/s41558-023-01815-0

Provided by University of Cambridge

Citation: Offset markets: New approach could help save tropical forests by restoring faith in carbon credits (2023, October 30) retrieved 2 May 2024 from <https://phys.org/news/2023-10-offset-approach-tropical-forests-faith.html>

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