

# World can't rely on tree planting to limit climate change, says report

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Credit: Pixabay/CC0 Public Domain

Little consideration has been given by the IPCC to the feasibility of schemes that remove carbon dioxide from the atmosphere—despite many countries banking on it as part of their net zero plans.

Nature-based climate solutions, such as planting trees, won't be anywhere near as big a part of the world's solution to [climate change](#) as governments currently plan for, and relying on them is 'risky' according to a report led by King's College London.

Many countries are currently banking on being able to remove [carbon dioxide](#) from the atmosphere in the future as a way to delay or avoid significant emission cuts.

Reforestation is one such form of land-based carbon dioxide removal—sometimes called 'offsetting' or CDR—where either technological or ecological-based practices are used to capture carbon dioxide from the atmosphere and lock it away, thereby removing its contribution to [global warming](#).

However, as the report shows, while much has been made of the technical and economic potential of CDR, little consideration has been given by the IPCC to the feasibility of such schemes.

The lead author says various social, cultural, environmental and institutional factors have been glaringly overlooked by those championing CDR.

"Part of the problem is the optimistic projections that inform IPCC assessments that then feed into [government policies](#). For example, if you total up all the pledges made worldwide to use land-based carbon dioxide removal techniques, it will require around 1 billion hectares of land. This is in the same ballpark as the total area of the planet's cropland, 1.5 billion hectares," says Oliver Perkins, Ph.D. student, King's College London.

"Land use change on this scale overlooks the fact that we now inhabit a 'used' planet: there is little land that can be used for CDR without some

[difficult decisions.](#)"

These difficult decisions include converting huge swathes of land to forestry away from its current uses, perhaps livestock rearing or [crop production](#), with large implications for security and sustainable development.

In addition, the world's farmland is divided into 600 million farms, most of them smaller than 1 hectare, and many with either insecure or disputed ownership—making coordinating widescale-CDR implementation extremely challenging.

Furthermore, the implementation and success of CDR will depend on being able to accurately measure its impact on [carbon dioxide emissions](#)—something that would require a monumental monitoring effort that would challenge even the richest, technologically developed nations.

Another danger the team outlines is that storing so much captured carbon in trees creates a high risk of re-release. This danger is even greater as climate change progresses, as the threat to forests from disease, droughts and wildfire increases.

"When you think of fire and climate change, you might think of images from last summer's fires across Greece or Northern Canada. Rightly so—these represent an important and growing climate adaptation challenge. However, fire also has another important interaction with climate change: by restricting our ability to mitigate it through reforestation," says Oliver.

"A [worst-case scenario](#) for fire and carbon removal would see large-areas dedicated to planting new forests, only for them to go up in smoke."

Other types of land-based CDR include increasing the carbon stored in soils, and BECCS—bioenergy with [carbon capture](#) and storage.

BECCS makes use of the fact growing plants naturally absorb carbon dioxide from the atmosphere. Its proponents suggest widescale farming of bioenergy crops, such as willow, and burning them to produce energy—with the carbon dioxide that is also produced by this safely captured and stored.

As COP28 has demonstrated, many countries' net-zero goals are based around a plan of less emission cuts now in the belief they will be able to remove carbon from the atmosphere in the future. In these visions of the future, global temperatures rise but are then brought back under the 1.5°C target—so called 'overshoot' scenarios.

This, the authors say, is something of a gamble, considering uncertainty around the success or otherwise of CDR.

Oliver said, "In the lead-up to COP28 there was much comment about the role of land-based carbon dioxide removal in countries' decarbonization plans. Land-based carbon dioxide removal is controversial for many reasons: not least because countries and companies can use it to justify delayed emissions' reductions, while still claiming compatibility with the goals of the Paris Agreement.

"Delaying action on climate change on the basis of future carbon removals is obviously risky. If we can't deliver the planned removals, we will be stuck with higher global temperatures and no safe way to reduce them."

Published in the journal *One Earth*, the report instead suggests a pathway for how we can arrive at a better informed and more realistic role for offsetting in net-zero policies.

"Our research paper outlines reasons to be concerned that countries' plans for land-based carbon dioxide removal are not practical. More positively, we set out ways to define more realistic global targets for offsets as a part of an overall strategy to reduce emissions and limit global temperature rises. This could inform a more policy-effective response to climate change," said Oliver.

**More information:** Oliver Perkins et al, Toward quantification of the feasible potential of land-based carbon dioxide removal, *One Earth* (2023). [DOI: 10.1016/j.oneear.2023.11.011](https://doi.org/10.1016/j.oneear.2023.11.011)

Provided by King's College London

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