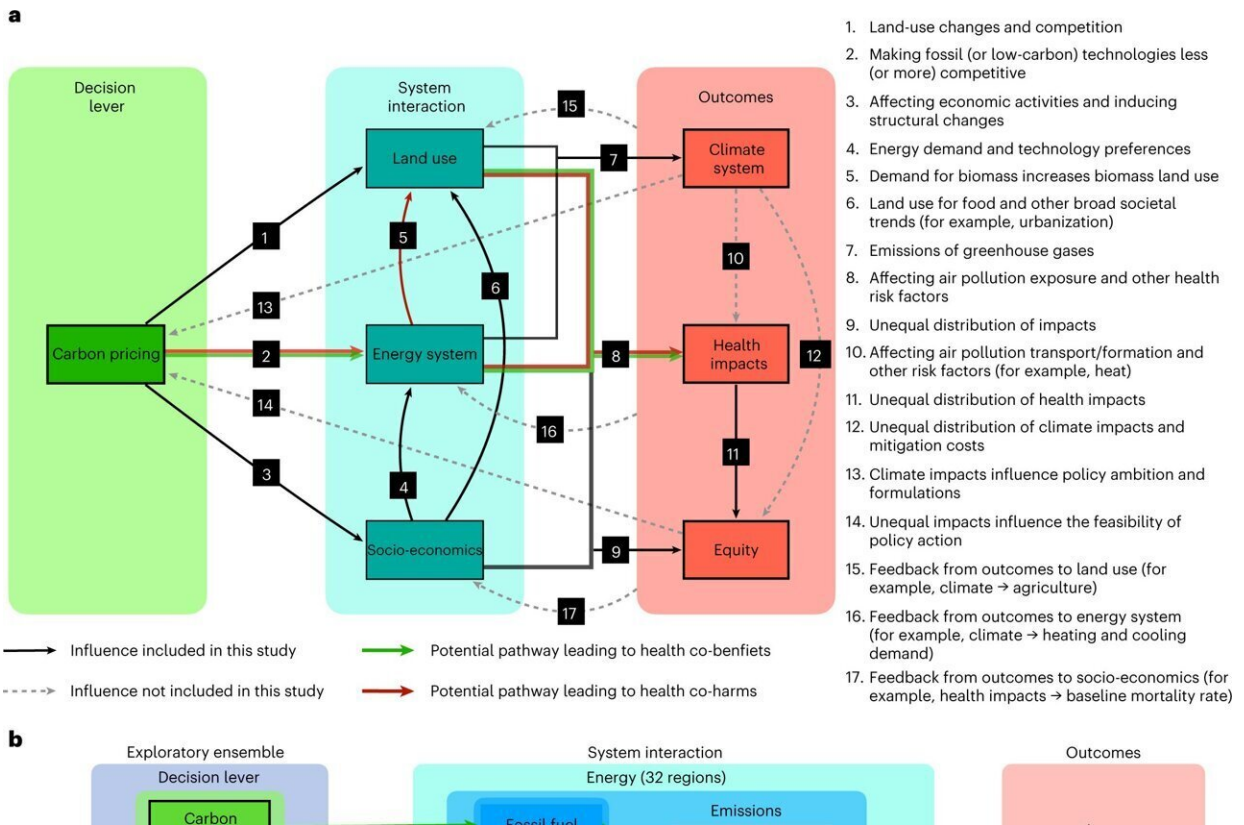


# New study reveals possible future health impacts related to climate mitigation

May 19 2023, by Sarah Small



Pathways for a global carbon price to influence climate, health and equity outcomes. Credit: *Nature Sustainability* (2023). DOI: 10.1038/s41893-023-01133-5

Reduce fossil fuel use and air quality will improve, right? It might not be as straightforward as it appears, according to a Penn State-led research

team. They explored almost 30,000 simulated future scenarios and found that some climate mitigation efforts could lead to harmful health impacts in certain geographic areas.

Their results were published May 18 in *Nature Sustainability*.

"In general, reducing [fossil fuel use](#) is good for climate mitigation and good for cleaning up the air, and the modeling studies have always found [health benefits](#) from climate mitigation," said corresponding author Wei Peng, assistant professor of international affairs and of civil and environmental engineering at Penn State, who has conducted research in this area for a decade. "But in this study, for the first time, we were able to see potential co-harm occur in a certain part of the scenarios."

The researchers found some scenarios where fossil fuel reduction requires a significant land use change to grow bioenergy resources, such as algae and plants like corn stalks and barley straw that can be used to create biofuels including types of ethanol and biodiesel.

In these scenarios, deforestation could occur on a grander scale for certain areas, such as Russia and Canada, leading to worsening air quality. As a result, people in these areas with worsened air quality could suffer from more respiratory and cardiovascular diseases, which could lead to more [premature deaths](#), said the researchers.

The researchers obtained these results by using an exploratory ensemble approach, which samples several variables at different levels—for example, [carbon emissions](#) at different levels of emission—to obtain an understanding of the breadth of potential future scenarios.

"Instead of using narrative-based scenarios, which tend to ask questions such as, 'What if we have a high inequality world?' or 'What if we have a low carbon development world?' we developed a large ensemble of

scenarios," said first author Xinyuan Huang, a doctoral student in the Penn State Department of Civil and Environmental Engineering. "This approach couples models of climate, energy and health to explore a wide range of plausible futures."

In this assessment, the researchers modeled the energy and land system changes for 32 geopolitical regions based on the Global Change Analysis Model, an [open-source](#) integrated assessment model. They then conducted the air quality and health impact assessment for nearly 200 countries.

Peng said that since the future is deeply uncertain, the likelihood of potential future scenarios that involve health co-harms are unknown, but their findings demonstrate the possibilities of unintended consequences of climate mitigation.

"What I find especially useful is that now we can start to think about the levers we have, and how we can use them to mitigate harmful impacts and to embrace the benefits," she said. "If we go for the bioenergy-heavy future, then we really need to pay attention to how we manage land."

Levers for mitigating harmful impacts could include different approaches to any necessary deforestation, according to Peng. She said that clear cutting instead of burning, for example, still allows unavoidable deforestation but lessens the impact on [air quality](#).

For next steps, the researchers plan to assess the impacts at an even finer geographic resolution.

"If we want to learn more about energy system changes and the resulting distribution of health impacts, we need more analysis at the finer resolution," Huang said. "For example, we are now working on a new scenario ensemble at the state and county level for the United States, so

that it could be more informative for policymakers."

**More information:** Xinyuan Huang et al, Effects of global climate mitigation on regional air quality and health, *Nature Sustainability* (2023). [DOI: 10.1038/s41893-023-01133-5](https://doi.org/10.1038/s41893-023-01133-5)

Provided by Pennsylvania State University

Citation: New study reveals possible future health impacts related to climate mitigation (2023, May 19) retrieved 7 August 2024 from <https://phys.org/news/2023-05-reveals-future-health-impacts-climate.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.