Researchers: Modeling can revolutionize the fight against climate change in agriculture

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According to a group of esteemed researchers, better collaboration between research, policy, and society is needed to achieve the set political climate goals. Credit: Camilla Brodam Galacho

It's no secret that climate change poses a threat to our planet. Agriculture

plays a pivotal role in the battle against climate change, but it's a complex task. According to a group of esteemed researchers, better collaboration between research, policy, and society is needed to achieve the set political climate goals. In a comment published in the journal *Nature Food*, researchers from, among others, Aarhus University discuss how modeling tools can play a crucial role in this effort.

Climate change and how to combat it have been widely debated topics among world governments. They have discussed ways to reduce harmful greenhouse gases contributing to climate change, particularly from agriculture.

Despite some progress made during the 2021 United Nations Climate Conference (COP26) in Glasgow, where countries agreed to set targets for reducing harmful greenhouse gas emissions and increasing support for developing nations, researchers from, among others, Aarhus University believe that there is still a long way to go in mitigating climate change.

"It's been a highly discussed issue, but it has actually led to very few concrete actions. We face a dilemma—we need to produce enough food for everyone while protecting the environment and climate. It's not an easy task, and it can be challenging for politicians to know how best to support the necessary changes," says Professor Davide Cammarano from the Department of Agroecology at Aarhus University.

He is one of the authors of a comment published earlier this year in the journal *Nature Food*. In the comment, a team of renowned researchers emphasizes the importance of increasing collaboration between scientists, policymakers, and society, potentially through scientific modeling.

Barriers to implementing climate initiatives

"There are several reasons why ideas like shifting to plant-based diets, reducing food waste, producing bioenergy, and planting trees to reduce the agricultural impact on the climate can be challenging to implement. It can be due to a lack of economic incentives, people's entrenched eating habits, inadequate knowledge dissemination, and technological limitations," says Professor and Head of Department Jørgen E. Olesen from the Department of Agroecology.

"It's an area where politicians need to make decisions; otherwise, the issues won't be resolved. It's crucial that climate initiatives take into account the entire society and offer solutions that benefit all."

According to the researchers, one of the major challenges is translating scientific knowledge into actions that benefit everyone. Communicating the need for action so that it is taken seriously by all levels of society is also a problem.

"We need to improve our ability to convey our knowledge and research findings so that the decisions made are based on a strong scientific foundation. At the same time, there is a significant need for more research that addresses societal and political issues," says Olesen.

The interaction between research, policy, and society

According to the researchers, an effective collaboration based on three principles is essential:

- Connecting research and data across food systems is crucial to help develop policies that consider food security, health, environmental protection, and the promotion of social well-being and equality.

- Providing a reliable, easy-to-understand, and impartial summary and assessment of knowledge, including research evidence, uncertainty estimates, and perspectives from affected parties, is essential for making well-informed decisions.

- Establishing and executing a research and innovation plan at the policy level that is relevant and practical.

Knowledge is required

To succeed in transforming the food system, it is necessary to have a strong understanding of how agriculture works, what society prefers, and what the future economic and climatic conditions will be. This requires good communication among all involved parties.

To make it easier to communicate complex scientific data, researchers suggest using scientific models. These models help us understand how agricultural and food systems affect the climate and how these systems can be changed to be more environmentally friendly. According to the researchers, these scientific models can assist us in making better decisions and predicting the consequences of those decisions.

To combat climate change in agriculture, close collaboration between science, policy, and society is essential. Here, modeling tools can play a crucial role in developing concrete and implementable action plans to reduce greenhouse gas emissions and mitigate climate change as much as possible.

More information: Davide Cammarano et al, Models can enhance science–policy–society alignments for climate change mitigation, *Nature Food* (2023). DOI: 10.1038/s43016-023-00807-9

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