

# Innovative technologies and policies can make agriculture environmentally sustainable

May 22 2018

---

Agriculture faces increasing demands for food, feed, fiber, and fuel from a growing population under the looming threat of climate change. Advances in seed technologies, equipment, and crop management offer considerable promise for increasing agricultural productivity and meeting these demands. But a key challenge for agriculture is to meet growing demands while protecting our natural resources.

That challenge is the motivation behind a new article published in *Applied Economic Perspectives and Policy*. In the article, environmental and [agricultural economists](#) examine ways to integrate the agricultural, transportation, and electricity sectors and identify research priorities that will help move agriculture forward sustainably.

"Ultimately, land is the resource in fixed supply on the planet; therefore, we have to figure out how to best use the land to meet diverse needs," says Madhu Khanna, College of Agricultural, Consumer and Environmental Sciences (ACES) Distinguished Professor in the Department of Agricultural and Consumer Economics at the University of Illinois and lead author of the study.

"We need to explore opportunities for 'sustainable intensification' which allow us to increase productivity while reducing environmental harm. More research is needed, including looking at ways in which the recent emergence of big data-enabled precision agriculture can intensify

agricultural production sustainably."

Land for agricultural production has increased since World War II and is accompanied by more input use and intensification of land use by using fuel, fertilizer, pesticides, tillage, and irrigation, among other technology advances. This surge in productivity has ushered in many environmental problems for water quality, climate, and biodiversity.

In the article, the researchers identify the need to build capacity for systems-based approaches that consider both the environment and agriculture. One strategy is to closely connect the values of the environment to consumers along with the costs to producers to design objectives that further the quality of the environment.

Khanna adds, "We need to be looking not just at what the technologies are and what their environmental benefits are but also at their economic effects so that we can weigh the trade-offs involved."

The study also suggests future research should explore integrating data on soil quality, climate, land use, [economic effects](#), and farmer decisions to develop strategies for sustainable land use. Alongside those strategies, the researchers say, more effective and implementable policies for reducing non-point pollution and more insight into what drives farmer behavior need to be considered.

However, strategies to use natural resources more sustainably while meeting growing societal demands for food and fuel production won't be win-win opportunities for everybody, according to Khanna. The costs of adopting alternative technologies and their environmental benefits will vary across locations and this calls for site-specific approaches, rather than a one-size-fits-all solution.

"There could also be negative effects on some groups and benefits to

others – we have to design policies that achieve conservation goals at least cost for society," Khanna explains.

The study concludes by calling for more integrated approaches that link economics to the agricultural and biological sciences to provide innovative solutions to the grand challenge of feeding 9 billion people sustainably in the coming decades.

The study, "Sustaining our natural resources in the face of increasing societal demands on agriculture: directions for future research," is published in *Applied Economic Perspectives and Policy*.

**More information:** Sustaining our Natural Resources in the Face of Increasing Societal Demands on Agriculture: Directions for Future Research. *Applied Economic Perspectives and Policy*, Volume 40, Issue 1, 1 March 2018, Pages 38–59, [doi.org/10.1093/aep/px055](https://doi.org/10.1093/aep/px055)

Provided by University of Illinois at Urbana-Champaign

Citation: Innovative technologies and policies can make agriculture environmentally sustainable (2018, May 22) retrieved 6 May 2024 from <https://phys.org/news/2018-05-technologies-policies-agriculture-environmentally-sustainable.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.