

High-tech fixes for the food system could have unintended consequences

December 11 2020



A farmer in Beora, a small community in Rupandehi District of Nepal. Credit: Neil Palmer / International Center for Tropical Agriculture

Protein derived from organic waste to feed livestock could decrease demand for soybean meal. This could lead to less deforestation caused

by soy farming. But decreased production of soybean, which is also used to produce oil for food products, could increase demand for palm oil. This could clear more forests for oil palm plantations.

This is just one example of how innovations to fix our [food](#) systems could backfire. In a [new analysis](#) in *The Lancet Planetary Health*, a team of scientists builds on [recent research](#) that discusses how new technology is needed to improve human health and the wellbeing of the planet.

The authors say that the urgency to meet the United Nations' Sustainable Development Goals (called SDGs; there are 17) must be tempered by the understanding that there are no quick fixes to ending poverty, eliminating hunger and conserving biological diversity.

"The [food system](#) is in the mess it is right now because we introduce technologies and approaches to managing it without fully understanding all the indirect impacts the intervention can have," said Andy Jarvis, a co-author and the associate director of the Alliance of Bioversity International and CIAT.

Symptoms of our ailing food system include unsustainable farming practices, habitat destruction, biodiversity loss and the waste or loss of about 30 percent of all food produced. Some 2 billion people are unhealthy because of their diets and some 8 million people died in 2019 due to dietary risk factors.

In addition to tapping organic waste to produce microbial protein (called "circular feed") the authors looked at trade-offs of three other food-system remedying technologies on the horizon:

- Using cereals to replenish nitrogen in soils (called "nitrogen fixation") could decrease the overuse of chemical fertilizers and its unsustainable impacts on the environment such as water

pollution. But this could reduce prices for already over-consumed foods, potentially leading to further increases in [non-communicable diseases](#) (NDCs) like diabetes.

- Personalized nutrition technologies could substantially reduce NDCs by tailoring diets to people's genetic profiles and metabolism. But this could lead to a rapidly unsustainable increase in demand for healthy foods (see: Mexico's avocado sector). The cost of personalized nutrition could also be out of the economic reach of many. And, were it to become widespread, personalized nutrition would generate high volumes of sensitive personal data.
- Automation and robotics could increase the reach of precision agriculture. This could reduce food prices, stabilize food supply and reduce overuse of fertilizers and water, which would benefit the environment. But this could reduce the need for unskilled labor, further threaten the precarious livelihoods of smallholder farmers, and drive more migration to haphazardly growing megacities.

"Exciting new technologies are needed for transitioning towards a sustainable food system," said Ana Maria Loboguerrero, a co-author and the Alliance's research director for [climate action](#). "But we must be aware that "win-win" technological solutions do not always exist, with losers and winners and trade-offs and synergies across different SDGs."

Helping the SDGs

The study was led by Mario Herrera, the chief research scientist at CSIRO, Australia's national research agency. The authors calculated the potential direct effects of different technologies on the food system (including digital agriculture, gene technology and resource efficiency) and their indirect effects on the SDGs.

The analysis showed most technologies will have neutral or varying degrees of positive impacts across most of the SDGs. But in the case of decent work and economic growth for all (SDG 8), reduced inequality (SDG 10) and peace, justice and strong institutions (SDG 16), the results will be mixed.

Some of the SDGs, which were created in 2015 to expand upon 2000's Millenium Development Goals, are [not trending in the right direction](#). Hunger was already increasing before the COVID-19 pandemic made undernourishment worse. Rapid action is necessary and the temptation to adopt quick-fix actions with unknown negative impacts may be greater now than ever.

The authors conclude, "[C]hange and innovation come with trade-offs, but we now have methods, the science, the targets, and the socioeconomic mechanisms in place to ensure that the trade-offs of our actions do not become insurmountable. Now is the time to put our arsenal of sociotechnical innovation and immense human ingenuity to use to secure the future of our planet and the next generations."

More information: Mario Herrero et al, Articulating the effect of food systems innovation on the Sustainable Development Goals, *The Lancet Planetary Health* (2020). [DOI: 10.1016/S2542-5196\(20\)30277-1](https://doi.org/10.1016/S2542-5196(20)30277-1)

Provided by International Center for Tropical Agriculture (CIAT)

Citation: High-tech fixes for the food system could have unintended consequences (2020, December 11) retrieved 3 May 2024 from <https://phys.org/news/2020-12-high-tech-food-unintended-consequences.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.