

Roadmap offers solutions for future of food, global ag innovation

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To deflect future world food crises created by climate change and growing consumer demand, a Cornell University-led international team of economists, scientists and business experts has created a road map for

global agricultural and food systems innovation, reform and sustainability.

The group's report—"Socio-Technical Innovation Bundles for Agri-Food Systems," funded by the Cornell Atkinson Center for Sustainability—was published Dec. 10 on the *Nature Sustainability* website, in collaboration with its sibling journal, *Nature Food*.

"By any measure, our world's food systems are phenomenally productive, responsive and adaptable, as we can now feed almost 5 billion in a healthy way," said Chris Barrett, professor of applied economics and management, and international professor of agriculture in Cornell's Dyson School of Applied Economics and Management, who leads the project.

"But that means nearly 3 billion cannot afford a healthy diet. And with inevitable population growth, income growth and the [climate change](#) that's already baked into the food system, our current agricultural gains and methods are not sustainable," said Barrett, also a faculty member in the Department of Global Development and in the Department of Economics. "Globally, we can't continue on this path without destroying the planet and imperiling billions of people."

In December 2019, more than 20 business, government, nonprofit and scientific experts from around the world convened to kick off the expert panel at Cornell Tech in New York City to assess research linking agri-food systems, technological and institutional innovations, and society's future needs.

The group has outlined seven major recommendations in a 170-plus-page report in order to make the world's agri-food systems healthy, equitable, resilient and sustainable. Its main recommendation involves combining social and technological innovations.

"There's really no technology that's a silver bullet," said Barrett, a Cornell Atkinson fellow. "During the Green Revolution, for example, breeders improved the seeds, but to scale those advances, governments had to improve roads to get to farmers, and offer extension services to educate farmers on how to use the new seeds. That's bundling. All of these pieces were essential, complementary elements."

The second major suggestion calls for reducing the land and water footprint for producing food. Society cannot effectively tackle the climate and biodiversity loss crises—and, for example, reduce the risk of virus-driven pandemics—without easing agricultural demands on the land and oceans.

"We've hit this tipping point where we're starting to see the downside of [ramping up food production with [fossil fuels](#)], particularly with climate change and also with the depletion of soil and [water resources](#) and other key food production resources," said co-chair Rebecca Nelson, professor in the School of Integrative Plant Sciences and Global Development.

"We're also seeing that we're polluting the environment to a really dangerous level and we're seeing which systems are unfair, and we're all not feeling that global warming crisis equally.

"It's hitting some people much harder than others," said Nelson, also a Cornell Atkinson fellow.

Further, Nelson is intrigued with a circular economy, which reimagines mining everyday waste and turning it into useful resources.

"It is the worst of times," Nelson said. "But it's also the best of times, in the sense that we have powerful tricks up our collective sleeves that we could use to make things better—if we can muster the will to implement them."

Nations, firms and civil society organizations also must hold each other accountable, the report noted.

"We must ensure that there is no forced labor in the value chain that brings food to your dinner table," Barrett said. "We need stronger enforcement of international treaties that forbid human trafficking and slavery. We need to certify that companies contracting with farms and local traders can monitor working conditions.

"We must make sure that the commodities are not being produced on the backs of people who are not paid fairly for their labor," he said.

Further, the report suggested implementing systemic risk management policies; developing novel financing mechanisms to transform agri-food systems; and reconfiguring public support for changes in agri-[food](#) systems.

"Financing is crucial," said Barrett. "Innovation is expensive. It requires upfront research and development, and reengineering systems requires investments. The world is awash in capital right now, interest rates are at historic lows and companies with cash struggle to find good investment opportunities that promise to deliver more than just a modest financial payout.

"But we must get the structure of these new financial instruments right," he said. "And there are some promising, novel financing mechanisms emerging."

More information: Bundling agri-food innovations, *Nature Sustainability* (2020). [DOI: 10.1038/s41893-020-00672-5](https://doi.org/10.1038/s41893-020-00672-5)

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