

Tariffs lead to creative supply chains

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Soybeans grown in central Illinois may arrive in China despite challenges of trade tariffs, but China may not have a clear idea where they were grown. Credit: Sue Nichols, Michigan State University Center for Systems Integration and Sustainability

Where there's a will to peddle soybeans in the global marketplace, there's a way, even if a trade war creates roadblocks.

In the recent issue of the international open-access journal *Sustainability*, Michigan State University (MSU) scholars apply a new, more holistic way to examine global agricultural [trade](#) to better understand what's going on when a country as enormous as China develops a big appetite for soybeans.

In 2017, China imported 95.5 million metric tons of soybeans, worth nearly \$40 billion—67% of the world's [soybean](#) supply. That trade comes with cascading economic and [environmental consequences](#) as countries change the way they use their land and natural resources to meet the demand.

Anna Herzberger, a Ph.D. candidate and fourth-generation farmer from central Illinois, and her colleagues applied the integrated framework of metacoupling to understand the true extent of global soybean trade. The framework, which examines socioeconomic and environmental

interactions within as well as between distant and adjacent places, allow researchers to consider input from a variety of disciplines, and then model interactions and reactions that can be compared to reality.

In addition to being part of a farming family, Herzberger has studied soybean farming practices in China's primary agricultural region in the northeastern Heilongjiang Province. She comments on those two worlds in [FromTheFarm.org](#), which includes a recent post putting today's farmer concerns over soybean trade in both a historical and pro boxing context.

"In a time when [international trade](#) is being targeted by increased tariffs, it's even more important to understand the true impact of these tariffs across the world," said Jianguo "Jack" Liu, Rachel Carson Chair in *Sustainability* and director of MSU's Center for Systems Integration and Sustainability. "We can't understand the full impact—both socioeconomically and environmentally—of trade and trade restrictions until we look at the cascading consequences of production that is driven by internal, adjacent, and distant demands."

The results, reported in "Telecoupled Food Trade Affects Pericoupled Trade and Intracoupled Production," show that the perception that Chinese swelling demand for foreign soybeans plays out only in Brazil is a limited view. Brazil has displaced the United States as China's top soybean importer. With that distinction comes more conversion of forestland to cropland or shifts from planting other crops in favor of soybeans.

But the MSU team shows the changes don't end there. A closer look at the policies and planting decisions of neighbors show that some soybeans exported from Brazil were not grown in Brazil. Neighboring South American countries like Paraguay and Argentina restrict trading with China, yet their soybeans flow into Brazil as Brazil is shipping record amounts of soybeans to China.

"We're masking the true extent of China's demands when we only consider Brazil," Herzberger said. "We need to consider that what Brazil export in fact in part comes from other countries, which in turn points us to greater impacts that extend to Brazil's neighbors, even though some of those neighbors put in policies to avoid their markets being driven by China's market."

More information: Anna Herzberger et al, Telecoupled Food Trade Affects Pericoupled Trade and Intracoupled Production, *Sustainability* (2019).
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