

Eliminating GMOs would take toll on environment, economies

March 1 2016, by Brian Wallheimer

Higher food prices, a significant boost in greenhouse gas emissions due to land use change and major loss of forest and pasture land would be some results if genetically modified organisms in the United States were banned, according to a Purdue University study.

Wally Tyner, James and Lois Ackerman Professor of Agricultural Economics; Farzad Taheripour, a research associate professor of agricultural economics; and Harry Mahaffey, an [agricultural economics](#) graduate student, wanted to know the significance of crop yield loss if [genetically modified crops](#) were banned from U.S. farm fields, as well as how that decision would trickle down to other parts of the economy. They presented their findings at the International Consortium on Applied Bioeconomy Research in Ravello, Italy, last year. The findings of the study, funded by the California Grain & Feed Association, will be published in the journal *AgBioForum* this spring.

"This is not an argument to keep or lose GMOs," Tyner said. "It's just a simple question: What happens if they go away?"

The economists gathered data and found that 18 million farmers in 28 countries planted about 181 million hectares of GMO crops in 2014, with about 40 percent of that in the United States.

They fed that data into the Purdue-developed GTAPBIO model, which has been used to examine economic consequences of changes to agricultural, energy, trade and environmental policies.

Eliminating all GMOs in the United States, the model shows corn yield declines of 11.2 percent on average. Soybeans lose 5.2 percent of their yields and cotton 18.6 percent. To make up for that loss, about 102,000 hectares of U.S. forest and pasture would have to be converted to cropland and 1.1 million hectares globally for the average case.

Greenhouse [gas emissions](#) increase significantly because with lower crop yields, more land is needed for agricultural production, and it must be converted from pasture and forest.

"In general, the landuse change, the pasture and forest you need to convert to cropland to produce the amount of food that you need is greater than all of the landuse change that we have previously estimated for the U.S. ethanol program," Tyner said.

In other words, the increase in [greenhouse gas](#) emissions that would come from banning GMOs in the United States would be greater than the amount needed to create enough land to meet federal mandates of about 15 billion gallons of biofuels.

"Some of the same groups that oppose GMOs want to reduce greenhouse gas emissions to reduce the potential for global warming," Tyner said.

"The result we get is that you can't have it both ways. If you want to reduce [greenhouse gas emissions](#) in agriculture, an important tool to do that is with GMO traits."

With lower crop yields without GMO traits, commodity prices rise. Corn prices would increase as much as 28 percent and soybeans as much as 22 percent, according to the study. Consumers could expect food prices to rise 1-2 percent, or \$14 billion to \$24 billion per year.

In the United States, GMOs make up almost all the corn (89 percent), soybeans (94 percent) and cotton (91 percent) planted each year. Some

countries have already banned GMOs, have not adopted them as widely or are considering bans. Tyner and Taheripour said they will continue their research to understand how expansion of and reductions of GMO crops worldwide could affect economies and the environment.

"If in the future we ban GMOs at the global scale, we lose lots of potential yield," Taheripour said. "If more countries adopt GMOs, their yields will be much higher."

More information: Farzad Taheripour, Harry Mahaffey, and Wallace E. Tyner. Evaluation of Economic, Land Use, and Land Use Emission Impacts of Substituting Non-GMO Crops for GMO in the US.

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