

To avoid carbon debt, CRP beats fields of corn, soybeans

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Farmers and policymakers should wait before converting Conservation Reserve Program land to corn and soybean production, according to a Michigan State University study.

The study, which appears in the current issue of the [Proceedings of the National Academy of Sciences](#), focuses on CRP land, a federal program encouraging farmers to grow natural vegetative cover rather than [crops](#), and its role in the production of biofuels. A team of MSU researchers shows directly for the first time that the carbon costs of converting these lands to corn and soybeans is high – even when care is taken to protect soil carbon from loss by using no-till cultivation practices.

Carbon debt results from carbon dioxide and other greenhouse gases released when land is converted from natural vegetation to agriculture. It's called debt because until a new biofuel crop creates enough renewable fuel to offset the lost CO₂, the new biofuel crop has no climate benefit. In fact, it's the same as burning fossil fuel as far as the atmosphere is concerned, said Ilya Gelfand, MSU postdoctoral researcher who worked with the Great Lakes Bioenergy Research Center.

"Conversion creates carbon debt, which must be paid off before the biofuel crop can provide climate mitigation benefits," he said. "No-till practices (planting without plowing) reduced by two-thirds the amount of debt created by the conversion, but still it would take 29 to 40 years for it to be repaid by growing corn and [soybean](#) for biofuel."

Alternatively, growing CRP grasses harvested for cellulosic ethanol would create no debt and provide immediate energy and climate mitigation benefits, he added.

"The conversion of CRP lands to corn and [soybean production](#) has a larger climate consequence than has been previously estimated," Gelfand said. "And much of the [debt](#) comes from the loss of soil [carbon](#) that would have been stored in CRP land in the future had it not been converted."

Nationally, more than 30 million acres are set aside as CRP land, and they provide significant climate, wildlife and other conservation benefits, said Phil Robertson, a co-author and MSU professor of crop and soil sciences.

"Growing CRP grasses rather than using the land for corn or corn-soybean production could maintain these benefits indefinitely while providing a valuable bioenergy feedstock," he said. "It could be a win-win for [farmers](#) and the environment once a market for cellulosic biofuel develops."

The GLBRC team also included MSU researchers Poonam Jasrotia and Stephen Hamilton as well as scientists from the University of Toledo. The study was performed at Michigan State's Kellogg Biological Station in partnership with MSU's Long-term Ecological Research program funded by the National Science Foundation.

Provided by Michigan State University

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