

Study identifies additional hurdle to widespread planting of bioenergy crops

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Credit: Indiana University

A study examining how certain decisions impact what farmers plant and

harvest identified one crucial factor that researchers believe needs to be added to the list of decision variables when considering bioenergy crops: the option value.

Most studies have not examined the role of the option value, which has to do with farmers waiting to see how [bioenergy](#) crop prices will change in the future, said Jerome Dumortier, an associate professor in the Indiana University School of Public and Environmental Affairs at IUPUI and a co-author of the study.

The study, "Production and [spatial distribution](#) of switchgrass and miscanthus in the United States under uncertainty and sunk cost," was published in the journal *Energy Economics* and is one of the first to consider adding the option value to the list of barriers to widespread planting of bioenergy crops. It also shows the spatial distribution of potential bioenergy crops in the U.S. when considering the option value.

"Farmers take into account the uncertainty associated with price fluctuations with bioenergy crops," Dumortier said. "They don't know how the price is going to evolve. Hence, they have to wait. Hence, fewer bioenergy crops are produced."

Previous studies have focused on comparing the costs of traditional crops—corn, soybeans, wheat—to planting bioenergy crops—switchgrass, miscanthus—and the cost of harvesting agricultural residue.

Dumortier said bioenergy crops have a higher energy density than other crops but are more expensive. There is also the issue of displacing acreage used to produce food, he said.

The study also found:

Bioenergy crops are less likely to be produced in the Midwest. Productivity for traditional crops is so high that the opportunity costs of converting to dedicated bioenergy crops would not be cost-effective. Agricultural residues, or the organic material left in the fields after crops are harvested, are abundant enough in the Corn Belt to supply the quantity of cellulosic ethanol mandated by the U.S. Renewable Fuel Standard.

There are two main sources for the cellulosic ethanol called for in the fuel standard. One is bioenergy crops. The second is agricultural residue.

"The fuel standard mandate is covered by agricultural residue, and planting of switchgrass or miscanthus is not necessary," Dumortier said.

Harvesting agricultural residue also has its problems, including either slowing harvesting as farmers gather the crops and the residue in a single pass through a field or increasing labor as farmers harvest their fields twice, once for [crops](#) and once for residue.

All of these issues play a role in determining the cost of the option value.

"This study shows that the option value cost now must be added to the higher [costs](#) of [bioenergy crops](#) and the cost of harvesting agricultural [residue](#)," Dumortier said.

More information: Jerome Dumortier et al. Production and spatial distribution of switchgrass and miscanthus in the United States under uncertainty and sunk cost, *Energy Economics* (2017). [DOI: 10.1016/j.eneco.2017.08.023](https://doi.org/10.1016/j.eneco.2017.08.023)

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