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Study shows more corn for biofuels would hurt water

In Brief: More of the fertilizers and pesticides used to grow corn would find their way into nearby water sources if ethanol demands lead to planting more acres in corn, according to a Purdue University study.

A study of Indiana water sources found that those near fields that practice continuous-corn rotations had higher levels of nitrogen, fungicides, and phosphorous than corn-soybean rotations. Results of the study by ASABE member **Indrajeet Chaubey**, associate professor of agricultural and biological engineering, and ASABE member **Bernard Engel**, professor and head of agricultural and biological engineering, at Purdue were published in the early online version of *The Journal of Environmental Engineering*.

"When you move from corn-soybean rotations to continuous corn, the sediment losses will be much greater," Chaubey said. "Increased sediment losses allow more fungicide and phosphorous to get into the water because they move with sediment."

Nitrogen and fungicides are more heavily used in corn crops than soybeans, increasing the amounts found in the soil of continuous-corn fields. Sediment losses become more prevalent because tilling is often required in continuous-corn

fields, whereas corn-soybean rotations can more easily be no-till fields. The common practice is that there is a lot of tillage to put corn back on top of corn," Engel said. "Any time we see changes in the landscape, there is a potential to see changes in water quality."

Chaubey said that there was no significant change in the amount of atrazine detected in water near fields that changed to continuous-corn rotations. The commonly used pesticide sticks to plant material and degrades in sunlight, keeping it from reaching water through runoff or sediment.

USDA data has shown that corn acreage has increased with the demand for ethanol, with 37.6 million ha (93 million acres) in 2007, an increase of 4.9 million ha (12.1 million acres) that year.

"As we look forward here, if corn stover is going to be a preferred bio-feedstock, we would see more corn acreage being planted," Engel said. "We need to know how that will affect water quality."

The USDA and Purdue funded the study. Chaubey and Engel are expanding their research to Iowa, Tennessee, and Arkansas. That three-year study will include impacts of various biofeedstock, such as switchgrass, and developing management practices to reduce sediment, nutrient, and pesticide losses.

For more information contact **Brian Walheimer**, bwalhei@purdue.edu, or ASABE member **Indrajeet Chaubey**, ichaubey@purdue.edu.