Efforts to reduce pollution from agriculture paying off slowly

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Efforts by farmers to reduce the amount of fertilizer that reaches drinking water sources can take years to have a positive impact, according to a new study from the University of Waterloo.

The study found that that depending on the type of terrain, efforts to reduce algae-causing nutrients such as nitrogen and phosphorus from reaching water sources such as the Great Lakes and can take decades to bear fruit.

"In recent years, people involved in agricultural have gone to great lengths and expense to try to reduce the impact of fertilizer on drinking water," said Nandita Basu, an associate professor of engineering and science at Waterloo. "What this study tells us, is that it can take a very long time to see the effects of pollution-reduction efforts, and that we have to be careful not to rush to judgement.

"The fact is, it can take up to 30-to-40 years for our efforts to have the desired impact."

As part of the study, Basu, together with Kimberly Van Meter, a postdoctoral fellow at Waterloo, reviewed more than 50 years-worth of environmental data from Canada's Grand River Watershed, including not only water quality data but also records of fertilizer application and livestock production.

After crunching the numbers, the researchers found that watershed nutrient inputs have actually been decreasing steadily since the late 1980s. Despite these decreases, however, water quality has been slow to respond.

While some watersheds, particularly those with a large amount of tile drainage, began to see stream nutrient reductions within five-to-10 years of the reduction in inputs, others have yet to see a significant effect. The study showed that time lags between implementation of conservation measures and real improvements in water quality are often on the order of decades.

"Understanding these time lags is crucial to setting water quality goals," said Van Meter. "When we set a policy goal to reduce nutrient loads by 40 per cent, it is important to understand that it may take decades to achieve this target, even if watershed managers are doing everything right. "

Van Meter and Basu's study was recently published in *Environmental Research Letters*.

Provided by University of Waterloo