Agriculture replaces fossil fuels as largest human source of sulfur to the environment
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Although sulfur is applied to agricultural lands to improve the production and health of crops, it can have detrimental effects to agricultural soils and downstream waters, similar to what occurred in remote forest landscapes under acid rain," indicates Charles Driscoll, a professor at Syracuse University and co-author of the study.

The researchers examined trends in sulfur applications across multiple important crops in the US, including corn in the Midwest, sugarcane in Florida, and wine grapes in California. Their models of surface water sulfate export demonstrate that while areas like New England show declining trends in response to recovery from historic atmospheric deposition, sulfate export from agricultural areas is increasing.

Driscoll says an example of the impacts of agricultural applications of sulfur is the enhanced formation of methylmercury in waters draining agricultural lands, such as the Everglades Agricultural Area in Florida. Methylmercury is a potent neurotoxin which accumulates in food chains leading to high concentrations in fish and increasing exposure of mercury to humans and wildlife that consume these fish.

The researchers predict that increasing trends will
continue in many croplands around the world, including places like China and India that are still working to regulate fossil fuel emissions.

To date, much research has focused on understanding and regulating nitrogen and phosphorus fertilizers, which can cause eutrophication, fish kills, and harmful algal blooms downstream of agricultural areas.

Hinckley and Driscoll believe it is time for the research community to apply lessons learned while investigating the effects of nitrogen and phosphorus fertilizers to studying the implications of high sulfur use in agriculture. This research must seek not only to document its environmental and human health effects, but also to collaborate with farmers to investigate how to optimize sulfur use.

"Sulfur in agriculture is not going away," said Hinckley, "yet there is an opportunity to bring science and practice together to create viable solutions that protect long-term environmental, economic, and human health goals."

Researchers from the University of Colorado, Boulder, University of Southern Illinois at Carbondale, and Syracuse University participated in this study.


Provided by Syracuse University


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