

Analyzing long-term impacts of biofuel on the land

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The growing development and implementation of renewable biofuel energy has considerable advantages over using declining supplies of fossil fuels. However, meeting the demands of a fuel-driven society may require utilizing all biofuel sources including agricultural crop residues.

While a useful biofuel source, crop residues also play a crucial role in maintaining soil organic carbon stock. This stock of organic carbon preserves soil functions and our global environment as well ensures the sustainable long-term production of biofuel feedstock.

In a study funded by the USDA Agriculture Research Service, scientists analyzed five classical long term experiments. Using a process-based [carbon balance](#) model, researchers simulated experiments lasting from 79 to 134 years to predict the potential of no tillage management to maintain soil organic carbon.

Analysis of the experiments indicates that predicted potential long-term effects of changes in management from [conventional tillage](#) to no tillage practices provided insights on proposed management options that were not feasible either due to cost or other factors.

"Harvesting substantial amounts of [crop residue](#) under current cropping systems without exogenous carbon (e.g., manure) addition would deplete soil organic carbon, exacerbate risks of [soil erosion](#), increase non-point source pollution, degrade soil, reduce crop yields per unit input of fertilizer and water, and decrease agricultural sustainability," says Hero

Gollany, the author of the study.

Management practices in these experiments ranged from single cropping to two or three year crop rotations; manure, no fertilizer or fertilizer additions; crop residue returned, and crop residue removed. The predictions also factored diverse climates, [soil conditions](#), fertility management, cropping systems, and crop residue removal practices.

More information: The study is available in the January/February 2011 issue of *Agronomy Journal*. View the abstract at [www.agronomy.org/publications/ ... /abstracts/103/1/234](http://www.agronomy.org/publications/.../abstracts/103/1/234)

Provided by American Society of Agronomy

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