

# Cover crops make stover more sustainable, profitable

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Farmers using cover crops as a soil conservation method can remove much more corn stover per acre for biofuels or other uses and at the same time potentially increase their income, Purdue University research shows.

The research points to the age-old conservation method as a way to protect the soil and add value. Using [cover crops](#) - plants such as crimson clover or annual ryegrass that blanket the soil - farmers can sustainably remove 1.8 tons more stover per acre than they otherwise would remove, the researchers say.

"The most important finding is that the added revenue from stover removal likely would be enough to pay the costs of a cover crop, in most cases," said Wally Tyner, one of the researchers. "Thus, with a cover crop, more stover removal is environmentally sustainable."

Corn residue, or stover, left on fields after harvest has long been a promising source of biofuel. But harvesting too much stover strips the soil of nutrients and health.

The research is detailed in the Purdue Extension publication *Synergies Between Cover Crops and Corn Stover Removal*, by Tyner and Michelle Pratt of the agricultural economics department; David J. Muth Jr. of Praxik Inc. of Ames, Iowa; and Eileen J. Kladvik of agronomy. It also was published online by the journal *Agricultural Systems*.

The research tests whether revenue from stover sales can pay for cover crop costs. It also analyzes the benefits of different cover crops and cover crop mixtures for farmers who just reap the agronomic impact and for farmers who remove and sell corn stover.

"If you have a cover crop, it provides some of the same soil retention, organic matter buildup and other benefits as keeping the stover on the ground.

In fact, it provides more," Tyner said. "So, if there were a viable market for corn stover for biofuels, animal feed or anything else, then the added stover that could be sustainably removed could provide enough revenue to pay for the cover crop costs."

That means farms would have healthier soil and higher potential revenues, even accounting for costs of seed, planting and terminating. As the U.S. government encourages a transition to biofuels, stover removal is likely to increase. By 2022, the U.S. Energy Independence Act requires that 16 billion gallons of ethanol-like biofuels come from renewable fuel sources. These could be derived from corn stover.

The researchers considered and modeled various benefits for two kinds of farmers: those who harvest corn stover and those who don't. Cover crops increase net benefits for both - whether in cash or soil health, even compared with a no-till approach.

For farmers who remove and sell the stover, the benefits are financial. Instead of increasing agronomic value, such as soil retention and vitality, the cover crop replaces the corn stover as a protector and preserver of the soil. In turn, more stover can be removed and sold, then turned into biofuel. Considering cost alone, annual ryegrass provided the greatest potential profits in models, but when nitrogen in the soil was accounted for, crimson clover performed better.

But even farmers who don't remove [corn](#) stover may gain agronomic advantages from cover crops - healthier soil with more nutrients that is less likely to erode or compact. For instance, crimson clover adds \$21.28 worth of nutrients to the soil per acre and increases the soil organic matter by a value of \$44.72 an acre. It reduces soil compaction - essentially when the soil doesn't get enough air in it - and erosion as well, further increasing the value of the [soil](#) for the farmer.

The full article, which includes comparisons and benefit-cost analyses of six cover crops and two cover crop mixes for agronomic advantage or [corn stover](#) removal, is available free for download at Purdue Extension's Education store at <http://www.the-education-store.com>. Search for publication RE-7-W.

**More information:** Synergies between cover crops and corn stover removal, *Agricultural Systems*, [www.sciencedirect.com/science/.../S0308521X14000869](http://www.sciencedirect.com/science/.../S0308521X14000869)

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