Iowa State University
Extension and Outreach

Annual Net Returns to Cover Crops in Iowa

Photo courtesy of Andrea Basche

Data in this report are based on 233 farmer responses across all nine crop reporting districts in Iowa

Average respondent statistics:

Typical cover crop: cereal rye	
Most common planting method:	drilling
Most common termination method:	herbicide
Most common grain following cover crop:	corn
Average cover crop area:	268 acres
Average experience with cover crops:	7.9 years
Median farm size:	500-999 acres

Net returns to cover crops dependent on several factors

Cover crops, which are planted on approximately 700,000 of Iowa's 30 million acres of farmland, have been found to have varying net returns based on several factors—cover crop species, planting technique, termination method, tillage practices, following cash crop, and the farmer's years of experience with cover crops.

Farmers that don't use cover crops for grazing livestock or forage tended to consistently derive negative returns. Farmers that used cover crops for grazing livestock or forage and received cost-share payments tended to see positive net returns.

The full findings are detailed in the working paper "Annual Net Returns to Cover Crops in Iowa," which is available on the Iowa State University Library website, https://lib.dr.iastate.edu/econ_workingpapers/39/. The study was funded by NCR-SARE and the Center for Agricultural and Rural Development at Iowa State University.

The data in the working paper are based on a subset of survey respondents that reported planting cover crops on some, but not all, of their acres in 2015 and planting the same cash crop in 2016 in acres where they did and did not use cover crops. Farmer's production system expenses and revenues were then identified, monetized, and compared when they did and did not use cover crops.

Cover crops can induce revenue and expense changes in a farmer's production system in several ways. Revenue can be affected by savings in livestock feed costs due to cover crop grazing, changes in cash crop yields following cover crop plantings, and cost-share payments that can partially offset the cost of cover crops. Expense changes due to cover crops can be broken down into planting, termination, and other costs. Planting costs include seed purchases, differential planting method costs, and labor. Termination costs typically include herbicide purchases, spraying, and labor. Some of the other costs that might change when using cover crops include costs to repair soil erosion, fertilizer and insecticide costs, cash crop seed costs, and changes in cash rent due to cover crop use.

Net returns to cover crops terminated with herbicides

When examining cover crops terminated with herbicides, net returns were found to be positive, $8.59 and $14.25 per acre for corn and soybeans, respectively. However, net returns became negative when farmers didn't utilize cover crops as livestock feed or received cost-share payments. When excluding those two factors, farmers that terminated cover crops with herbicide faced negative net returns of $48.82 per acre and $38.42 per acre when cover crops were followed by corn and soybeans, respectively.

Net returns based on years of experience

Farmers were placed into three categories, based on their experience with cover crops: 3 years or less, 4–9 years, and 10 or more years. More experienced farmers reported a smaller yield drag in corn production than less experienced farmers, and the most experienced farmers reported a corn yield bump following cover crops. When cover crops were followed with corn and not used for livestock feed and cost-share payments were not received, negative net returns were realized—$57.95, $43.19, and $31.97 per acre, respectively. Yield drag in soybean production due to cover crops was less of an issue than in corn production, but the most experienced group showed the largest yield drag. When cover crops were followed with soybeans and not used for livestock feed and cost-share payments were not received, all three experience groups saw negative net returns—$39.36, $34.33, and $36.79 per acre, respectively.

Net returns to cereal rye followed by corn by tillage practice

When examining cereal rye followed by corn, every tillage practice—no-till, reduced-till, and conventional- or vertical-till—produced negative net returns, despite the similar planting costs, when livestock feed savings and cost-share payments were not utilized. Farmers in these conditions saw negative net returns of $30.34, $53.41, and $69.23 per acre for reduced-till, no-till, and conventional-till operations, respectively.

Net returns to cover crops by planting method in no-till systems

Excluding feed cost savings and cost share payments in no-till systems, farmers that followed drill-planted cover crops with corn saw a negative net return of $54.09 per acre; and farmers that followed aerial seeding of cover crops with corn saw a negative net return of $53.73 per acre. When following cover crops with soybeans, farmers that used aerial seeding saw a negative net return of $34.12 per acre, whereas farmers using drill-planting saw a negative net return of $34.65 per acre.

Net returns to cover crops by termination method

Farmers that used tillage to terminate cover crops saw a negative net return of $29.94 per acre; and farmers that used herbicide as the termination method saw a negative net return of $53.55 per acre. These findings are valid for conventional-till operations that used drill planting of cover crops and followed with corn, excluding feed cost savings and cost-share payments.

How to make cover crops pay?

These results suggest that economic returns are a major stumbling block for widespread adoption of cover crops in Iowa. The lack of market valuations for actual soil health indicators prevents the incorporation of long term benefits into the calculation. Potential measures to improve the economic viability of cover crops without increasing government transfers to cover croppers include (1) developing of a more competitive market for cover crop seeds; (2) promoting the use of cover crops for grazing livestock or forage; and (3) developing and promoting location-specific best management practices particularly focused on minimizing yield drag and containing planting and termination costs.

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