

Do Cover Crops Pay? Positive Yield Response Reduces Net Cover Crop Cost

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In short...

- Cover crop use increased average corn yield by 6.4 bu/acre (3.2%) and soybean yield by 1.4 bu/acre (1.9%).
- At current commodity and input prices, breakeven yield increases were 5.6% for corn and 3.9% for soybean.
- Additional yield partially offset cover crop cost, reducing the average cost from \$30.08 to \$16.89 per acre.

What's the Question?

- 1) Do cover crops increase the yield of crops that follow?
- 2) If so, does the increased yield offset the cost of cover crop establishment?

Why Does it Matter?

Commodity prices have been depressed for several years causing scrutiny of input purchases. Should investment in cover crops be considered even if it could jeopardize soil benefits? Survey data suggests that farmers are achieving yield increases of 1.3 to 9.6 % for corn and 2.8 to 11.6% for soybean following cover crops (SARE/CTIC, 2012 -2017). This could potentially increase income or, at least, help reduce the cost of investment for cover crops. Survey data potentially introduces wide-scale variability due to its lack of replication and large-scale estimates from a small population. Our objective was to measure yield effects from cover crops and determine economic implications from their establishment using controlled plot research.

What are the Results?

Replicated field trials were conducted at several locations in Southeast WI in 2017 and 2018. Cooperator farmers used their routine cover and cash crop management practices. Grain yield was measured at all fields comparing cover vs. no cover (n=40) and farmers provided input rates and prices as well as their contracted grain prices and USDA Market Facilitation Program payments. Partial budgeting was used for economic comparison and included the change in revenue, cover crop costs (seed, establishment, termination and interest) and costs associated with additional yield (drying, hauling and P & K removal).

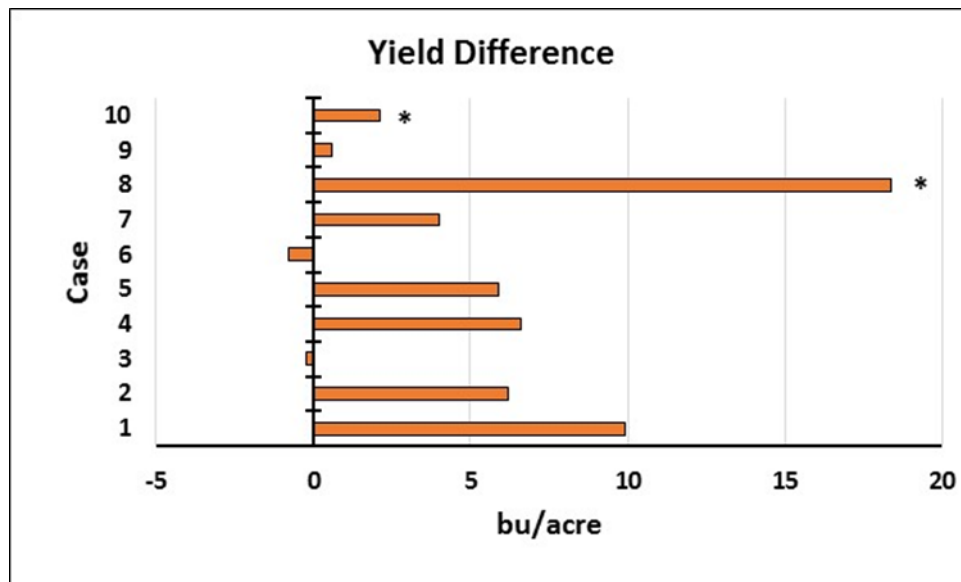


Figure 1. Crop yield response to cover crop 2017-18

Case	CC System*	Crop	Yield Increase (bu/acre)	Yield Increase (%)	Net Return (\$/acre)	Break-even Price (\$/bu)	Break-even Yield (bu/a)	Break-even Yield (%)
1	S. mix/W	Corn	6.2	2.8	-24.55	7.67	14.0	6.3
2	W. rye/SB	Corn	9.9	5.3	5.16	2.83	8.0	4.3
3	W. rye/SB	Corn	-0.8	-0.5	-25.50	N/A	7.7	4.4
4	W. rye/C	Corn	5.9	3.5	-5.84	4.39	7.9	4.6
5	W. rye/C	Corn	6.6	3.4	-4.12	4.02	8.0	4.1
6	mRC/W	Corn	-0.2	-0.1	-59.30	N/A	23.5	11.3
7	W. rye/SB	Corn	4.0	2.1	-10.68	6.23	7.8	4.2
9	W. rye/C	SB	0.6	0.9	-18.22	39.51	2.7	3.8
10	W. rye/C	SB	2.1	2.9	-9.00	14.86	3.0	4.1
Mean				2.3				5.2

*Cover crop / previous crop: S. mix, summer mix; W, winter wheat; SB, soybean; C, corn; mRC, medium red clover.

Table 1. Cover crop / previous crop: S. mix, summer mix; W, winter wheat; SB, soybean; C, corn; mRC, medium red clover.

Cover crops increased yield in 8 of 10 cases for an average increase of 6.4 bu/acre (3.2%) for corn and 1.4 bu/acre (1.9%) for soybean, however, yield increases were statistically significant in only 2 cases (Figure 1). The yield increase resulted in positive net return in only 1 of 9 cases (Table 1). In this case, positive net return can be attributed to a 5.3% yield increase coupled with a low-cost cover crop (winter rye). Larger monetary losses could be attributed to either expensive cover crops such as summer mixes and frost seeded red clover or small yield increases. Under current market conditions, an average yield increase of 5.2% is required to breakeven (Table 2) and breakeven commodity prices are unlikely. Research results show the importance of maximizing yield response and selecting a low-cost cover crop to generate a positive net return. Importantly, a positive yield response can reduce net cover crop costs (Table 2) and should be taken into consideration when weighing the decision to use cover crops.

Case	Actual	Net
1	44.09	24.55
2	22.05	-5.16
3	23.10	25.50
4	23.10	5.84
5	23.10	4.12
6	58.80	59.30
7	23.32	10.68
9	23.32	18.22
10	29.81	9.00
Mean	30.08	16.89

Table 2. Cover crop cost (\$/acre)

What’s the Status of the Research? Are There Updates?

This research, supported by a SARE Partnership Program grant (ONC17-034) and a USDA ARS Cooperative Agreement (58-5090-7-072), will be repeated in 2019 with an updated publication.