THE ECONOMICS OF COVER CROPS ON MINNESOTA FARMS

Three-year trend analysis report

2022-2024

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EXECUTIVE SUMMARY

Farmers rely on healthy soil and water resources to sustain their operations and livelihoods. Cover cropping, an agronomic practice that enhances soil health and water quality, has grown in popularity in recent years. Cover cropping's benefits are particularly valuable as farmers face increasingly frequent and severe extreme weather events, which caused more than $20 billion in crop and rangeland damages in 2024.[i] This underscores the importance of supporting farmer decisions that make conservation practices like cover crops both practical and profitable.

In the Midwest, cover crops are typically planted after primary commodity crops have been harvested to maintain soil cover and soil structure over winter, helping reduce erosion and improve water retention. Despite the potential agronomic benefits, farmers continue to have questions about the economic impacts of cover crops on their farming practices.

To address these questions, Environmental Defense Fund, the University of Minnesota's Center for Farm Financial Management, the Minnesota State Farm Business Management program and the University of Minnesota Extension's Southwest Minnesota Farm Business Management Association are leading a collaborative effort to help farmers understand the economics of cover crops. From 2022 to 2024, this effort collected detailed financial data from a large group of farms across Minnesota, Wisconsin and South Dakota. The three **Annual reports** provide year-by-year insights into the financial impacts of cover crop adoption.

This analysis and summary builds on that work by cumulatively evaluating data from 2022 to 2024 to examine trends in the financial impacts of cover crop implementation over time. It focuses on a consistent group of 41 Minnesota farms – referred to as the "three-year cohort" – that submitted financial and production data for all three years. These farms, broadly representative of average Minnesota operations in size and experience, planted cover crops across 106 fields using various cover crop species and mixes. The three-year cohort includes a wide range of cover crop experience, from new adopters to seasoned practitioners.

i Farm Bureau. (February, 2025). Hurricanes, Heat and Hardship: Counting 2024's Crop Losses. https://www.fb.org/market-intel/hurricanes-heat-and-hardship-counting-2024s-crop-losses

KEY FINDINGS

1 | Cover crop costs and financial profitability varied significantly

- Data from 2022 to 2024 show that cover crop costs varied significantly, **ranging from $14 to $277 per acre, with a median of $42 per acre.** These costs include expenses for seed, fuel used to plant the cover crop and machinery repairs. The median costs for these expenses were $20 per acre for seed, $12 per acre for repairs, and $6 per acre for fuel and oil.
- **The intended purpose of the cover crop (feed, forage or soil health) was the primary driver of the cost variation.** Rye silage, grown for livestock feed, had the highest total median expenses due to higher machinery costs related to harvesting activities, while cover crop mixes planted primarily for soil health purposes generally incurred lower direct expenses.
- **Rye silage was the only cover crop to have a positive median gross return (revenue)** of $113 per acre, while the median cover crop rye mix and cover crop mix fields did not generate any gross return during the 2022-2024 period.

Cover crop costs ranged from

$14 TO $277 PER ACRE, WITH A MEDIAN OF $42 PER ACRE

2 | Cost-share payments significantly offset cover crop costs for producers that accessed these programs

- **Cost-share payments covered 54% of total direct cover crop costs for fields that received those payments.** However, only 27% of cover crop fields in the cohort received cost-share payments. When averaged across all fields in the cohort, cost-share contributions received from both government and private sector sources offset only about 15% of total cover crop expenses.

Cost-share payments covered

54% OF TOTAL DIRECT COVER CROP COSTS

for fields that received those payments.

3 | The most profitable cover crop fields generated strong revenue and had effective cost management

- The most profitable cover crop fields (top 20%) differentiated themselves from the rest of the three-year cover crop cohort in three critical ways:

  1. **Generating production income.** The most profitable fields generated more income from harvested cover crops, which were commonly used as livestock feed or retained as seed for cover crop seed sales. The harvested cover crop was primarily rye silage.

The most profitable fields generated

MORE INCOME FROM HARVESTED COVER CROPS.

2. **Leveraging incentive programs.** The most profitable fields consistently used incentive payments through cost-share programs to offset cover crop costs.
3. **Managing costs effectively.** The most profitable fields had low per acre cover crop costs, mainly through lower seed and repair costs.

- These three profitability factors should be closely considered in technical assistance provided to producers to ensure they can successfully grow cover crops without significant negative impacts on profitability.

4 | Corn was profitable after cover crops while soybeans were not

- **The average corn field planted after a cover crop was more profitable than the region's average field without cover crops in all three years of the analysis.** Corn grown after a cover crop had lower costs than corn planted without a cover crop.
- **Lower fertilizer expenses contributed to the lower corn production costs after a cover crop.** It is possible that producers using cover crops reduced fertilizer application due to increased soil fertility contributions from cover crop mixes that include nitrogen-fixing legume species.
- **The average soybean field planted after a cover crop was less profitable than the region's average field without cover crops.**

THE AVERAGE CORN FIELD PLANTED AFTER A COVER CROP WAS MORE PROFITABLE

than the region's average field without cover crops in all three years of the analysis.

This three-year trend analysis offers valuable insights for farmers considering or already adopting cover crops by assessing their economic impacts and evaluating the relative costs and profitability of different cover crop species and applications within the crop rotation. It adds critical detail to the discussion of cover crop financial profitability based on the financial experience of a representative set of real farms. The findings in this report should be used by agronomists, farm extension educators, and farm advisors to help farmers implement cover crop systems that can be financially sustainable in the long term. Professionals leading conservation funding programs in the federal and state governments, at food and beverage companies, and at non-profit organizations should also apply the insights from this report to deliver programs that help producers adopt successful cover cropping systems.

ABOUT THE DATA

About the FINBIN database

FINBIN is one of the world's largest farm financial databases and the most extensive publicly available resource of its kind in the United States. Each year, approximately 3,500 farms from 12 states contribute data to FINBIN. The database supports the generation of summary financial reports by management system, crop or livestock enterprise[ii] and geographic region. It also enables users to benchmark a farm's financial performance against similar operations. Annually, over 40,000 FINBIN reports are generated by farmers, lenders and other stakeholders.

FINBIN's information is derived from comprehensive year-end financial analyses conducted by participating producers with the guidance of farm business management educators. These professionals are part of farm business management programs who assist producers with recordkeeping, financial analysis and education, and benchmarking support. Data is collected consistently using the FINPACK farm financial management software. The Center for Farm Financial Management provides annual training, software updates and analysis recommendations to ensure uniformity of data entry.

All farm financial data undergoes multiple rounds of screening for accuracy and completeness. Farms that do not meet strict quality standards are excluded. Each dataset is anonymized and secured before aggregation to prevent individual privacy and ensure data integrity.

FINBIN is accessible at **https://finbin.umn.edu/**, where users can find a guide for querying cover crop financial reports.

Approximately 3,500 farms contribute data to FINBIN annually from approximately 12 U.S. states.

Farm benchmarking data

The data included in the FINBIN database is provided by approximately 3,500 farms annually who participate in farm business management programs. The FINBIN database represents a broad cross-section of production agriculture. In Minnesota, FINBIN represents 10% of the state's farms with sales of over $250,000.[iii] While there is no "typical" Minnesota farm, these farms include a large enough sample to provide a good barometer of farming in Minnesota. Note, farms pay a fee to participate in these programs; because of this there are likely characteristics of participating farms that set them apart from the broader farming population in the state.

Gathering cover crop financial data

The methodology for collecting detailed financial data on cover crops treats the cover crop as a distinct enterprise, capturing all revenue and expenses directly associated with their use. This cover crop enterprise is then analyzed both independently and in conjunction with the primary commodity crop that follows, recognizing that cover crops can influence soil health and subsequent crop production.

To support this effort, grants from Environmental Defense Fund (EDF), USDA Extension Risk Management Education, the Minnesota Office for Soil Health, Minnesota Natural Resources Conservation Service and the Morgan Family Foundation funded scholarships that cover tuition and fees for producers in the Farm Business Management program. With the support of these scholarships, participating producers who plant cover crops contributed financial data to the program during 2022–2024.

ii In farm financial accounting, an 'enterprise' includes all costs and returns associated with a single crop grown in a field. Throughout this report, the terms 'enterprise' and 'field' are used interchangeably.

iii United States Department of Agriculture (USDA). (2025). Farms and Land in Farms, 2024 Summary. USDA National Agricultural Statistics Service (NASS). ISSN: 1995-2004.

CHARACTERISTICS OF THE FARMS IN THIS REPORT

41 Minnesota farms in the program planted cover crops in each of the last three years

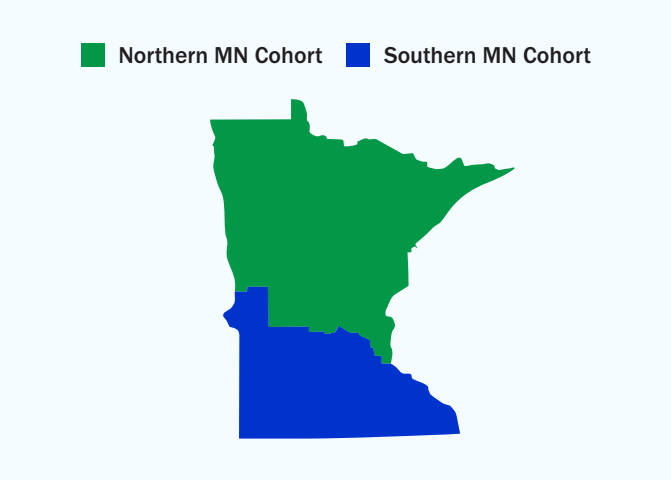
The FINBIN database includes cover crop financial data from farms across Minnesota, South Dakota and Wisconsin. There were 83 farms that contributed cover crop data in 2022, 100 farms that contributed data in 2023 and 94 farms that contributed data in 2024. Of these farms, there were 41 farms that provided data consistently for all three years.

There are several reasons why farms may choose not to or be unable to plant cover crops annually. Weather is an important factor since excessive dry or wet seasons can delay planting or limit crop growth. Additionally, many farms follow crop rotation schedules on their farms, cycling which crops are planted on certain fields each year. This influences when and where cover crops are planted. Some farmers prefer to use cover crops only with specific cash crops or in certain parts of their crop rotation, which may not align with every growing season.

Managing cover crops also involves a range of logistical complexities. Even farms that prioritize conservation practices may encounter operational hurdles, such as labor constraints, equipment availability or timing conflicts that make it difficult to establish cover crops consistently each year. These challenges can limit a farm's ability to integrate cover crops annually, despite their commitment to sustainable practices.

Throughout the report, the group of 41 farms that contributed data consistently is referred to as the "three-year cohort." These farms are all located in Minnesota. Where applicable, data related to specific enterprises, such as corn or cover crops, are further segmented into two regional categories: Northern Minnesota and Southern Minnesota. Figure 1 shows the general geographic distribution of the participating farms.

FIGURE 1 | Geographic distribution of the 41 farms in Minnesota that participated in the three-year cohort



Farm size, producer age and experience of the three-year cohort are similar to the average Minnesota farm

Table 1 presents a comparison of demographic and business characteristics between the three-year cohort and all Minnesota farms included in the FINBIN database. The data shows that, on average, farms in the cohort generally align with the broader population of Minnesota farms across many key metrics, suggesting that the findings are relevant to a typical Minnesota farm.

Although the three-year cohort had slightly fewer total crop acres than the statewide average, many other characteristics were similar. The average age of farm

operators was 47 years for the cohort, compared to 48 years statewide. On average, cover crop farmers had 24 years of farming experience, compared to 23 years among all Minnesota farmers.

One notable difference was the lower proportion of beginning farmers in the three-year cohort. This may reflect the need for financial stability, working capital or access to credit to apply a practice like cover cropping, and the additional complexity involved in managing cover crops, including planting, termination and integration into existing cropping systems. Another distinction is the higher percentage of farms with livestock production in the cohort, which points to their use of cover crops as a feed source.

The three-year cohort showed a higher average and median net farm income in 2024 as compared to the average farm in Minnesota. The median net farm income for the cohort was $45,838 and the median net farm income in Minnesota was $21,964. The three-year cohort has a larger proportion of livestock farms, therefore these stronger returns are consistent with the higher profitability experienced by livestock producers in general in 2024.

In terms of other financial measures, while the cohort reported a higher net worth and a higher debt-to-asset ratio, both groups maintained similar operating expenses as a percentage of revenue.

TABLE 1 | Comparison of farm demographic and business characteristics, 2024
(This table displays averages unless otherwise noted)

	THREE-YEAR COHORT	ALL MINNESOTA FARMS IN FINBIN
Number of farms (total)	41	2,349
Total crop acres per farm	705	823
Operator age	47	48
Years farming	24	23
Percentage of farms that are beginning farmers*	22%	29%
Percentage of farms with livestock production	32%	23%
Average net farm income	90,174	$67,890
Median net farm income	45,838	$21,964
Farm net worth	4,213,032	$2,870,207
Farm debt-to-asset ratio	39%	34%
Farm operating expense ratio	79%	82%

**Beginning farmers are defined as someone who has operated a farm for 10 years or less.*

Years of experience with cover crops

Adopting a new farm management practice often involves a learning curve, during which producers can improve the cost-efficiency of the practice as they gain experience. Within this cohort, there was a wide range of cover crop experience (see Table 2). At the start of data collection in 2022, the 41 participating farms had between one and 13 years of experience with cover crop production.

The diversity in experience levels provides valuable insight into the financial performance of cover crops across both new adopters and more seasoned practitioners. It is also important to note that because the same group of farms was tracked over a three-year period, the cohort became more experienced throughout the life of this study.

TABLE 2 | Number of farms by years of cover crop production experience, 2022-2024

	2022		2023		2024	
Years of cover crop production experience	**# of farms**	**% of total**	**# of farms**	**% of total**	**# of farms**	**% of total**
1 – 3 years	18	44%	9	22%	4	10%
4 – 5 years	10	24%	17	41%	14	34%
6+ years	13	32%	15	37%	23	56%

COVER CROP COSTS AND RETURNS

Over the 2022, 2023 and 2024 growing seasons, the 41 farms in the three-year cohort reported planting cover crops on 106 distinct fields. The primary cover crop enterprises included:

- Rye silage
- Cover crop rye mix – a mix of two to four species, with a base species of cereal rye
- Cover crop mix – four or more species without a specific cereal rye base

Two additional enterprises, rye and cover crop forage, were also reported by some farms. However, these were excluded from the analysis in this report due to limited data.

Weather, crop and market conditions in 2022-2024

Weather and market conditions played a major role in shaping financial outcomes over the analysis period. These external factors should be factored into any evaluation of cover crop performance and the profitability of primary commodity crops.

2022

The 2022 data reflect cover crops planted in fall 2021, which were either harvested or terminated in winter or spring 2022. These were followed by the main commodity crop of corn, soybean or wheat, which was planted in spring and harvested in fall 2022.

The spring of 2022 brought cold and wet conditions to Minnesota, delaying planting by several weeks. This was followed by a drier summer, leading to lingering drought conditions across much of the state. Despite these challenges, crop yields for corn, soybeans and wheat exceeded their 10-year averages.

Financially, 2022 was a strong year for Minnesota farms. Farms reported their highest net farm income across the preceding 10 years, driven by:

- Elevated prices for most crops sold in 2022
- Higher crop ending inventory values
- Strong livestock prices overall in 2022

These gains were impacted by strong yields, global market volatility and inflationary pressures. According to FINBIN data, 2022 was the second most profitable year on record for Minnesota farms, surpassed only by 2012.

2023

The 2023 data reflect cover crops planted in fall 2022, harvested or terminated in winter or spring 2023 and analyzed alongside the primary commodity crops planted in the spring and harvested in fall 2023.

The fall of 2022 brought extremely dry conditions across Minnesota, making it difficult for many farms to plant cover crops. For those that did, the lack of moisture hindered a successful establishment. Unfortunately, the dry trend continued throughout the entire 2023 growing season, with persistent drought conditions affecting much of the state. Despite these challenges, corn and soybean yields were near their 10-year averages, while wheat yields exceeded historical averages.

Financially, however, 2023 marked a sharp downturn. Minnesota farms experienced their lowest net farm income since 2019. Several factors contributed to this decline including:

- Elevated input costs
- Lower commodity prices for most crops sold in 2023
- Reduced year-end crop inventory values
- Generally lower livestock prices
- Rising interest rates and ongoing inflationary pressures

Collectively, these challenges led to a significant decline in profitability compared to the strong financial performance seen in 2022.

2024

The 2024 data reflect cover crops planted in fall 2023, which were either harvested or terminated in winter or spring 2024. These were analyzed alongside the primary commodity crop planted in spring 2024 and terminated in fall 2024.

Fall 2023 was marked by extremely dry conditions across Minnesota, making it difficult for farms to plant cover crops. Poor soil moisture conditions led to weak cover crop emergence. This was followed by an extraordinarily wet spring in 2024, especially in the southwest region of the state. Excess moisture delayed planting for many farms, and in some cases, prevented planting altogether. The wet conditions also complicated cover crop management.

After the wet spring, drought conditions returned and persisted through much of the summer in Minnesota. Despite these challenges, corn and soybean yields remained close to their 10-year averages, while wheat yields were above average.

Financially, 2024 was another difficult year for Minnesota farms, marking the lowest net farm income recorded this century. The main factors contributing to this difficulty included:

- Low commodity market prices
- Limited marketing opportunities for crop farms

Crop farms were hit hardest, facing both price and production pressures. In contrast, livestock operations saw improved profitability, benefiting from higher livestock prices and lower input costs, particularly for feed.

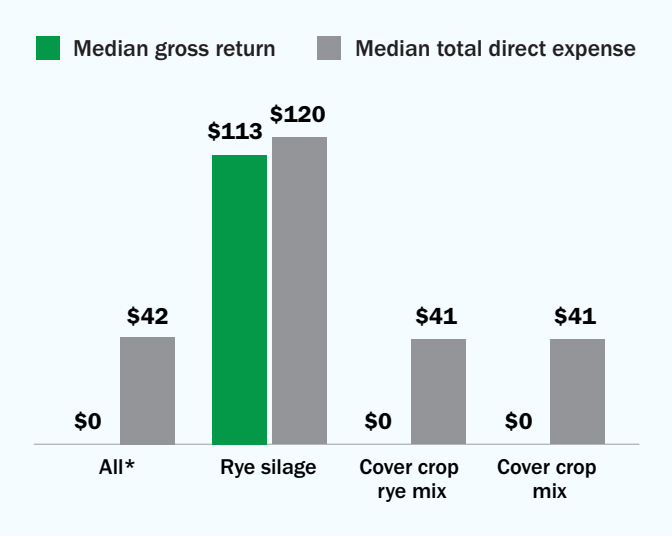
2024 was another difficult year for Minnesota farms, marking the lowest net farm income recorded this century.

Variation in cover crop costs and the role of cost-share programs

Figure 2 illustrates the median gross return and total direct expense for cover crop enterprises reported in FINBIN from 2022 to 2024, based on data from the 41 farms in the Minnesota three-year cohort.

Gross returns from these enterprises were generated through a combination of crop production, grazing of the cover crop and payments from cost-share or other incentive programs. Among the reported enterprises, only rye silage had a positive median gross return at $113 per acre while the median gross returns from cover crop rye mix and cover crop mix enterprises were zero.

FIGURE 2 | **Costs and returns of cover crops by species**
Data: Minnesota, owned and rented, 2022-2024



'All' includes all of the cover crop enterprises of rye, rye silage, cover crop rye mix, cover crop mix and cover crop forage from FINBIN in 2022-2024. There were not enough cover crop forage enterprises to analyze separately.

Data from 2022 to 2024 show that direct expenses with cover crops can vary significantly. One of the primary drivers of this variation is the intended use of the cover crop. For example, cover crops grown for feed (i.e., rye silage) tend to have higher machinery-related costs due to harvesting activities. In contrast, cover crop mixes planted primarily for soil health and agronomic purposes generally incur lower direct expenses.

Even among farms planting the same cover crop type, total direct expenses varied widely. This reflects differences in management practices, equipment use and input costs across the operations. Understanding this variability will remain a focus in future phases of our program.

Cost-share programs significantly offset cover crop costs for producers who accessed those opportunities. Over the three-year period, approximately 27% of cover crop enterprises in the cohort received cost-share payments. For those enterprises, the payments covered an average of 54% of total direct cover crop costs. However, when averaged across all fields in the cohort, cost-share contributions received from both government and private sector sources offset only about 15% of all the cover crop expenses.

Detailed cover crop returns and direct expenses

Table 3 presents a detailed breakdown of gross returns and direct expenses associated with cover crop enterprises, categorized by cover crop species, from 2022 to 2024. For each expense category, the table includes the minimum, maximum, average and median cost per acre. To maintain the confidentiality of individual producers, all values are rounded to the nearest whole number.

The median value represents the midpoint of the dataset, meaning half of the enterprises reported costs below this value and half reported costs above it. When working with smaller sample sizes, it is helpful to consider both the average and median, as averages can be skewed by outliers.

Across all cover crop enterprises during this period, total direct expenses ranged from $14 to $277 per acre, with an average of $61 and a median of $42. These total direct expenses include costs for seed, chemical, fertilizer, fuel and oil, repairs and custom hire.

TABLE 3 | Return and cost comparison across Minnesota cover crop enterprises by cover crop species in 2022-2024

	ALL	RYE SILAGE	COVER CROP RYE MIX	COVER CROP MIX
Number of enterprises	342*	29	109	180
% of all enterprises	100%	8%	32%	53%
Gross return	**n = 144**			
Min	$0	$15	$0	$0
Max	$338	$338	$157	$237
Median	$0	$113	$0	$0
Average	$29	$168	$0	$18
Seed	**n = 342**			
Min	$3	$7	$3	$5
Max	$199	$39	$76	$199
Median	$20	$14	$15	$23
Average	$25	$19	$23	$27
Fertilizer	**n = 6**			
Min	$0	$0	$0	$0
Max	$100	$100	$40	$13
Median	$0	$0	$0	$0
Average	$1	$7	$0	$0
Chemical	**n = 7**			
Min	$0	$0	$0	$0
Max	$42	$0	$37	$42
Median	$0	$0	$0	$0
Average	$1	$0	$1	$0
Fuel & oil	**n = 334**			
Min	$0	$6	$0	$0
Max	$33	$33	$24	$27
Median	$6	$19	$7	$4
Average	$7	$18	$8	$5
Repairs	**n = 335**			
Min	$0	$8	$2	$0
Max	$81	$81	$40	$71
Median	$12	$24	$17	$10
Average	$14	$24	$17	$11
Custom hire	**n = 81**			
Min	$0	$0	$0	$0
Max	$208	$208	$26	$154
Median	$0	$0	$0	$0
Average	$8	$62	$1	$5
Total direct expense	**n = 342**			
Min	$14	$36	$16	$14
Max	$277	$265	$124	$277
Median	$42	$120	$41	$41
Average	$61	$138	$51	$52

*There was also cover crop data submitted for rye and cover crop forage enterprises; however, there was not enough data for those enterprises to show independently in this report.

Among the cover crop enterprises that reported data from 2022 to 2024, rye silage had the highest median total direct expenses at $120 per acre. In comparison, the cover crop rye mix and cover crop mix had significantly lower median costs, at $41 per acre, each. The higher costs for rye silage are largely due to the increased machinery use required for harvesting the crop for feed.

Across all cover crop enterprises, the three largest contributors to direct expenses were:

- **Seed:** Median cost was $20 per acre, with a range from $3 to $199.
- **Repairs:** Median cost was $12 per acre, ranging from $0 to $81.
- **Fuel and oil:** Median cost was $6 per acre, with a range from $0 to $33.

Additionally, custom hire was a significant expense for the rye silage enterprise, averaging $62 per acre.

These figures highlight the variability in cover crop costs, influenced by crop type, management practices and farm operations.

Table 4 provides a year-over-year comparison of gross returns and direct expenses associated with cover crop enterprises from 2022 to 2024. While there were some variations across the three years, the median gross returns and direct expenses did not differ significantly. The share of cover crop enterprises receiving cost-share payments decreased over time, but for those that received cost-share payments, the payments continued to cover a large portion of total direct expenses.

TABLE 4 | Return and cost comparison across Minnesota cover crop enterprises in 2022, 2023 and 2024

	ALL	2022	2023	2024
Number of enterprises	342	118	116	108
% of all enterprises	100%	35%	34%	32%
Gross return	**n = 144**			
Min	$0	$0	$0	$0
Max	$338	$322	$181	$338
Median	$0	$5	$0	$0
Average	$29	$40	$16	$32
Seed	**n = 342**			
Min	$3	$5	$3	$5
Max	$199	$199	$62	$100
Median	$20	$20	$23	$20
Average	$25	$30	$24	$22
Fertilizer	**n = 6**			
Min	$0	$0	$0	$0
Max	$100	$100	$83	$18
Median	$0	$0	$0	$0
Average	$1	$1	$1	$0
Chemical	**n = 7**			
Min	$0	$0	$0	$0
Max	$42	$42	$0	$0
Median	$0	$0	$0	$0
Average	$1	$2	$0	$0
Fuel & oil	**n = 334**			
Min	$0	$0	$0	$1
Max	$33	$30	$33	$27
Median	$6	$7	$6	$5
Average	$7	$8	$7	$6

	ALL	2022	2023	2024
Repairs	**n = 335**			
Min	$0	$0	$0	$0
Max	$81	$50	$69	$81
Median	$12	$13	$12	$13
Average	$14	$13	$15	$14
Custom hire	**n = 81**			
Min	$0	$0	$0	$0
Max	$208	$191	$80	$208
Median	$0	$0	$0	$0
Average	$8	$6	$3	$15
Total direct expense	**n = 342**			
Min	$14	$14	$15	$16
Max	$277	$265	$178	$277
Median	$42	$41	$46	$43
Average	$61	$64	$55	$63
Species breakdown				
Rye	3%	6%	1%	1%
Cover crop rye mix	32%	31%	36%	28%
Rye silage	9%	7%	9%	9%
Cover crop mix	53%	53%	49%	57%
Cover crop forage	4%	3%	4%	5%
Cost share received				
% of enterprises that received cost share payments	27%	42%	28%	11%
% of direct expenses covered for those enterprises that received cost share payments	54%	57%	43%	72%

Comparison of high- and low-profit cover crop fields

Our analysis of the most and least profitable cover crop fields revealed three key factors that consistently set apart profitable cover crop fields:

- **Generating production income:** Most high-profit fields generated additional revenue by harvesting cover crops, which were commonly used as livestock feed or retained as seed for cover crop seed sales.
- **Leveraging incentive payments:** Fields with higher profitability were more likely to receive supplemental income associated with their cover crop practice, including conservation payments or other incentives.
- **Managing costs effectively:** Farms in the high-profit group generally maintained lower per-acre cover crop expenses, demonstrating stronger cost management. Lower seed and repair costs were key cost differentiators between the high-profit and low-profit groups.

Table 5 compares profit levels across all cover crop species within the cohort. The “high-profit” group represents the 20% of fields with the highest profit per acre, while the “low-profit” group represents the 20% of fields with the lowest profits per acre.

TABLE 5 | **High profit vs. low profit comparison across all cover crop species in 2022-2024**

(This table displays median values for each item, unless otherwise noted. The values do not sum to a total, as they are not from a single farm operation)

	ALL FIELDS	HIGH PROFIT	LOW PROFIT
Number of enterprises	342	68	68
Average years of experience	7	8	6
Returns			
Production income	$0	$0	$0
Other income	$0	$20	$0
Gross return	$0	$24	$0
Expenses			
Seed	$20	$24	$36
Fertilizer	$0	$0	$0
Chemical	$0	$0	$0
Fuel & oil	$6	$6	$9
Repairs	$12	$4	$22
Custom hire	$0	$0	$0
Total direct expense	$42	$41	$88
Species breakdown			
Rye	3%	3%	3%
Cover crop rye mix	32%	12%	29%
Rye silage	9%	13%	12%
Cover crop mix	53%	69%	49%
Cover crop forage	4%	3%	7%
Cost share received			
% of enterprises that received cost share payments	27%	79%	21%
Average % of direct expenses covered for those enterprises that received cost share payments	54%	68%	0%

These values are a three-year average, so price fluctuations between 2022, 2023 and 2024 may be reflected in the results.

COVER CROP IMPACTS ON COMMODITY CROPS

This section analyzes the financial effects of cover crops on the primary commodity crop, corn and soybeans, grown by farms in the cohort over the three-year study period.

Cover crops can influence the performance of subsequent cash crops by affecting factors such as soil fertility, pest and weed pressure, water availability and planting effectiveness due to field accessibility by equipment or cover crop termination timing. Therefore, it is important to evaluate not only the direct costs and returns of cover crops, but also their impact on the financial outcomes of the following cash crop.

For this analysis, the cover crop enterprises were planted in the fall prior to the production year and either harvested or terminated in the spring, just before planting of the primary commodity crop. The focus of this analysis is on corn and soybean enterprises in Southern Minnesota, with comparisons made annually between fields with and without cover crops. Owned and rented acres are combined in this analysis.

Cost figures in this report reflect the average accrual adjusted expenses reported by producers, which are influenced by timing, management practices and vendor selection. Similarly, crop values reflect producers' marketing strategies, which are shaped by timing, methods and location.

It is important to note that while this analysis highlights potential profitability differences between cover cropped and non-cover cropped acres, it does not account for all variables that can influence financial outcomes. Factors such as weather events, soil quality and individual management styles are not directly captured in the data set and should be considered when interpreting the results.

How to interpret the data tables

COLUMN 1

Crop grown after cover crop

This column shows the primary commodity crop planted during the analysis period. The acreage for this crop matches exactly with the preceding cover crop to allow for long-term analysis.

COLUMN 2

Cover crop

This column details the revenue and expenses directly related to the cover crop planted during the analysis period. Revenue includes product returns such as those generated from selling or using the cover crop as feed or forage, and any cost-share or government payments.

COLUMN 3

Combined: cover crop + following crop

This column combines the financial data from Columns 1 and 2, representing the total income and expenses for the acres that were planted as a cover crop, followed by a primary crop. Yield and price details are not shown here, as the two crop types are combined.

COLUMN 4

Regional average – no cover crop

This column presents the average financial performance of all fields in the region that did not use cover crops during the analysis period. This regional average is based only on Southern Minnesota farms.

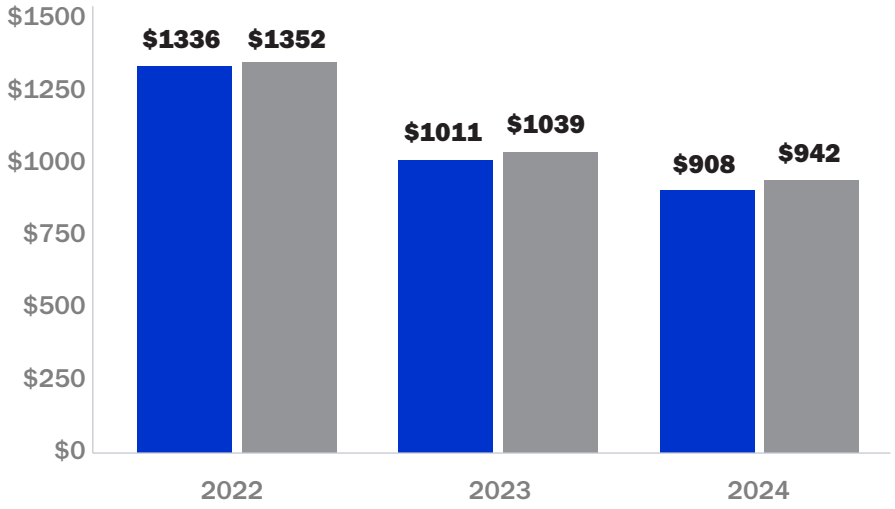
CORN
in Southern Minnesota on owned and rented land combined

FIGURE 3 | **Profitability comparisons**

KEY RESULTS

Gross returns

The corn and cover crop combined enterprise had a slightly lower gross return than the average corn acre in Southern Minnesota not using cover crops across all three years of this analysis.

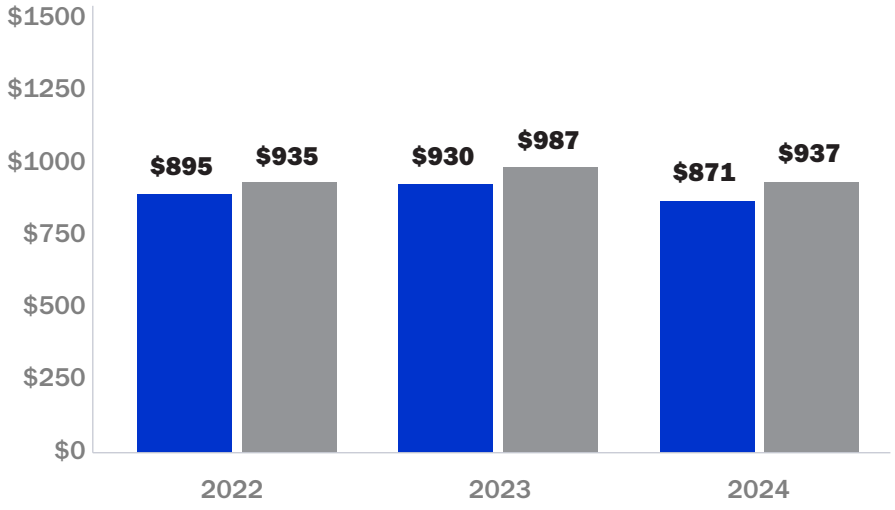


Total expenses

Total direct and overhead expenses of the corn and cover crop combined enterprise were lower than the region's average corn acre without cover crops for all three years of this analysis.

For two out of three years of the analysis, the average **fertilizer expense for fields planted with a cover crop was lower than that of the region's average corn acre** without cover crops.

The corn acres in the cohort reported considerably lower land costs than the region's average corn acre without cover crops for all three years.

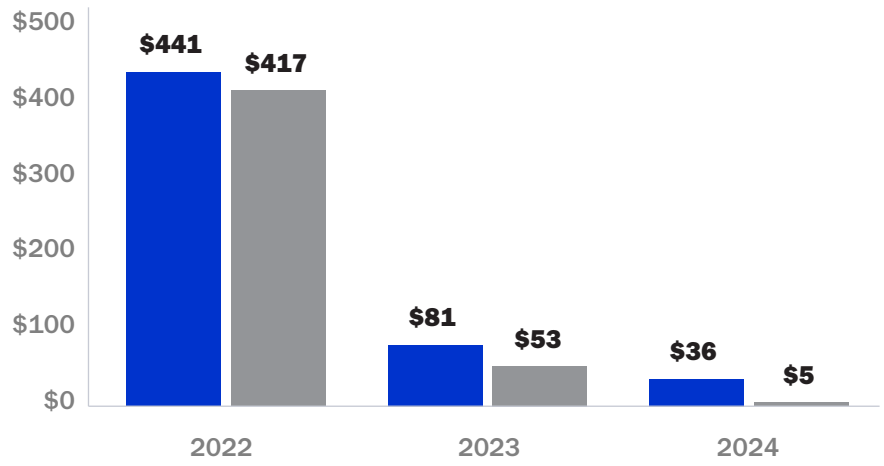


Net return

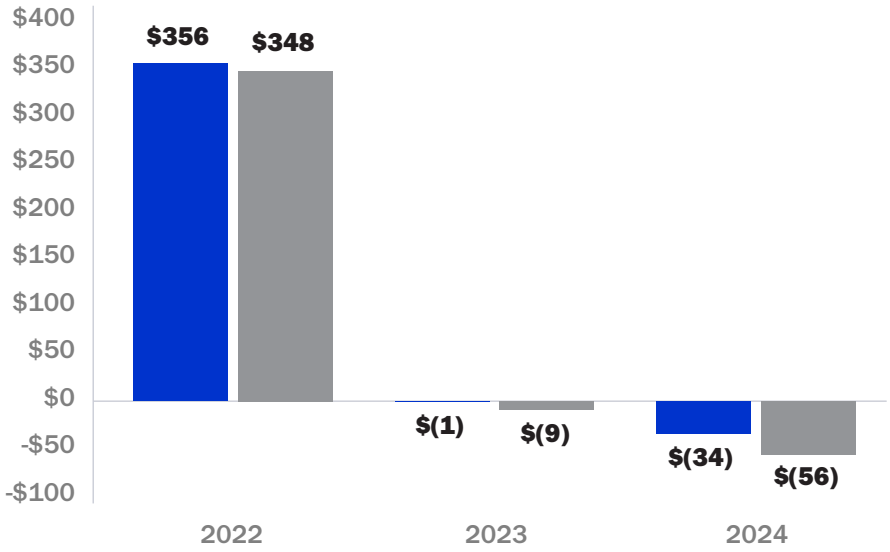
Net return (before labor and management charge) of the corn and cover crop combined enterprise was consistently higher than the region's average corn acre without cover crops.

Net return after factoring in labor and management charge was also higher each year of the analysis for corn fields planted after a cover crop.

Net returns before labor and management



Net returns after labor and management



Cost of production

The cost of production per bushel of the corn and cover crop combined enterprise was lower each year of this analysis compared to corn acres that were planted without a cover crop in the region.

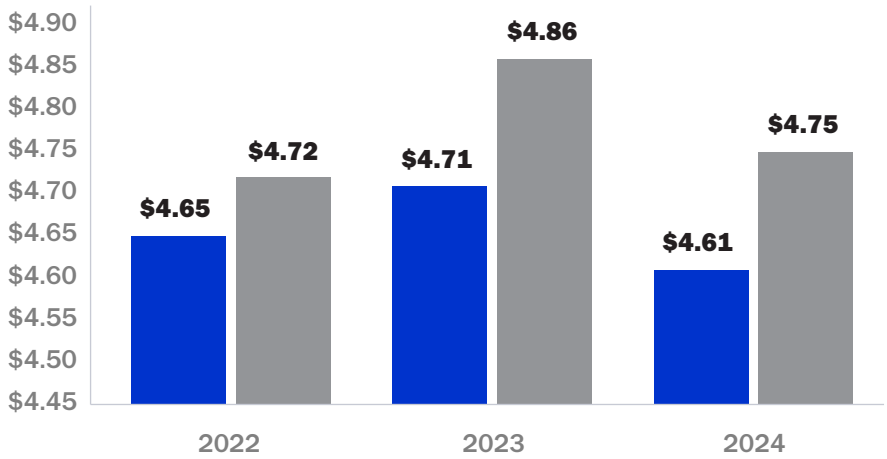


TABLE 6 | Southern Minnesota corn on owned and rented land

	2022 RESULTS				2023 RESULTS				2024 RESULTS			
	Corn grown after cover crop (1)	Cover crop enterprise (2)	Corn combined with cover crop (3) = (1) + (2)	Corn in region with no cover crop (4)	Corn grown after cover crop (1)	Cover crop enterprise (2)	Corn combined with cover crop (3) = (1) + (2)	Corn in region with no cover crop (4)	Corn grown after cover crop (1)	Cover crop enterprise (2)	Corn combined with cover crop (3) = (1) + (2)	Corn in region with no cover crop (4)
Number of enterprises	12	12	**12**	**1138**	16	16	**16**	**1246**	13	13	**13**	**1181**
Yield (bushels per acre)	196.62	0.00	**0.00**	**211.58**	184.87	0.00	**0.00**	**202.14**	163.13	0.00	**0.00**	**179.59**
Value per bushel	$6.46	$0.00	**$0.00**	**$6.37**	$4.70	$0.00	**$0.00**	**$4.82**	$4.39	$0.00	**$0.00**	**$4.44**
Product return per acre[1]	$1269.86	$1.24	**$1271.10**	**$1347.25**	$871.10	$1.36	**$872.46**	**$974.06**	$717.84	$5.61	**$723.45**	**$797.63**
Crop insurance income per acre	$4.28	$0.00	**$4.28**	**$5.22**	$131.14	$0.00	**$131.14**	**$58.86**	$125.32	$0.00	**$125.32**	**$98.00**
Government payment income per acre[2]	$0.00	$26.53	**$26.53**	**$0.00**	$0.00	$6.53	**$6.53**	**$0.00**	$43.68	$10.48	**$54.16**	**$42.30**
Other income per acre[3]	$33.81	$0.00	**$33.81**	**-$0.72**	$0.72	$0.00	**$0.72**	**$6.47**	$4.81	$0.00	**$4.81**	**$4.11**
Gross return per acre	$1307.95	$27.77	**$1335.72**	**$1351.75**	$1,002.96	$7.89	**$1,010.85**	**$1,039.39**	$891.65	$16.09	**$907.74**	**$942.04**
Production expenses ($ per acre)												
Seed	$114.08	$25.98	**$140.06**	**$115.37**	$114.84	$27.26	**$142.10**	**$122.42**	$131.25	$25.40	**$156.65**	**$128.65**
Fertilizer	$206.74	$0.00	**$206.74**	**$218.98**	$224.73	$0.00	**$224.73**	**$243.74**	$195.74	$0.05	**$195.79**	**$192.04**
Chemicals	$62.37	$0.00	**$62.37**	**$54.81**	$65.34	$0.00	**$65.34**	**$58.31**	$54.94	$0.00	**$54.94**	**$51.36**
Crop insurance	$29.15	$0.51	**$29.66**	**$35.78**	$28.44	$0.00	**$28.44**	**$32.02**	$22.49	$0.00	**$22.49**	**$29.52**
Machinery cost[4]	$148.05	$31.41	**$179.46**	**$187.49**	$147.35	$28.01	**$175.36**	**$192.10**	$160.22	$25.87	**$186.09**	**$189.89**
Land costs[5]	$175.07	$0.00	**$175.07**	**$223.50**	$207.29	$0.00	**$207.29**	**$238.93**	$165.88	$0.00	**$165.88**	**$244.01**
Other expenses	$90.29	$11.30	**$101.59**	**$98.68**	$75.46	$11.11	**$86.57**	**$98.98**	$76.58	$12.89	**$89.47**	**$101.77**
Total direct and overhead expense per acre	$825.75	$69.20	**$894.95**	**$934.61**	$863.45	$66.38	**$929.83**	**$986.50**	$807.10	$64.21	**$871.31**	**$937.24**
Net return per acre	$482.20	-$41.43	**$440.77**	**$417.14**	$139.51	-$58.49	**$81.02**	**$52.89**	$84.55	-$48.12	**$36.43**	**$4.80**
Labor and management charge per acre	$69.19	$15.46	**$84.65**	**$69.22**	$67.93	$14.31	**$82.24**	**$61.88**	$59.06	$11.46	**$70.52**	**$60.78**
Net return over labor and management per acre	$413.01	-$56.89	**$356.12**	**$347.92**	$71.58	-$72.80	**-$1.22**	**-$8.99**	$25.49	-$59.58	**-$34.09**	**-$55.98**
Cost of production w/ labor and management per bushel	$4.36	-	**$4.65**	**$4.72**	$4.31	-	**$4.71**	**$4.86**	$4.24	-	**$4.61**	**$4.75**
Net value per bushel[6]	$6.46	-	**$6.46**	**$6.35**	$4.70	-	**$4.71**	**$4.84**	$4.39	-	**$4.40**	**$4.45**

	2022 RESULTS				2023 RESULTS				2024 RESULTS			
	Corn grown after cover crop (1)	Cover crop enterprise (2)	Corn combined with cover crop (3) = (1) + (2)	Corn in region with no cover crop (4)	Corn grown after cover crop (1)	Cover crop enterprise (2)	Corn combined with cover crop (3) = (1) + (2)	Corn in region with no cover crop (4)	Corn grown after cover crop (1)	Cover crop enterprise (2)	Corn combined with cover crop (3) = (1) + (2)	Corn in region with no cover crop (4)
Gross return per acre	$1307.95	$27.77	$1335.72	$1351.75	$1002.96	$7.89	$1010.85	$1039.39	$891.65	$16.09	$907.74	$942.04
Total direct expenses per acre	$709.43	$50.90	$760.33	$784.31	$733.20	$48.96	$782.16	$827.84	$685.59	$46.89	$732.48	$760.30
Return over direct expense per acre	**$598.52**	**-$23.13**	**$575.39**	**$567.44**	**$269.76**	**-$41.07**	**$228.69**	**$211.55**	**$206.06**	**-$30.80**	**$175.26**	**$181.74**
Total overhead expense per acre	$116.32	$18.30	$134.62	$150.30	$130.25	$17.42	$147.67	$158.65	$121.51	$17.32	$138.83	$$176.94
Net return per acre	**$482.20**	**-$41.43**	**$440.77**	**$417.14**	**$139.51**	**-$58.49**	**$81.02**	**$52.90**	**$84.55**	**-$48.12**	**$36.43**	**$4.80**
Labor and management charge	$69.19	$15.46	$84.65	$69.22	$67.93	$14.31	$82.24	$61.88	$59.06	$11.46	$70.52	$60.78
Net return over labor and management per acre	**$413.01**	**-$56.89**	**$356.12**	**$347.92**	**$71.58**	**-$72.80**	**-$1.22**	**-$8.98**	**$25.49**	**-$59.58**	**-$34.09**	**-$55.98**

Values displayed may not calculate correctly due to rounding.

TABLE FORMULA

GROSS RETURN PER ACRE	−	TOTAL DIRECT EXPENSE PER ACRE	=	RETURN OVER DIRECT EXPENSE PER ACRE
RETURN OVER DIRECT EXPENSE PER ACRE	−	TOTAL OVERHEAD EXPENSE PER ACRE	=	NET RETURN PER ACRE
NET RETURN PER ACRE	−	LABOR & MANAGEMENT CHARGE	=	NET RETURN OVER LABOR & MANAGEMENT PER ACRE

SOYBEANS
in Southern Minnesota on owned and rented land combined

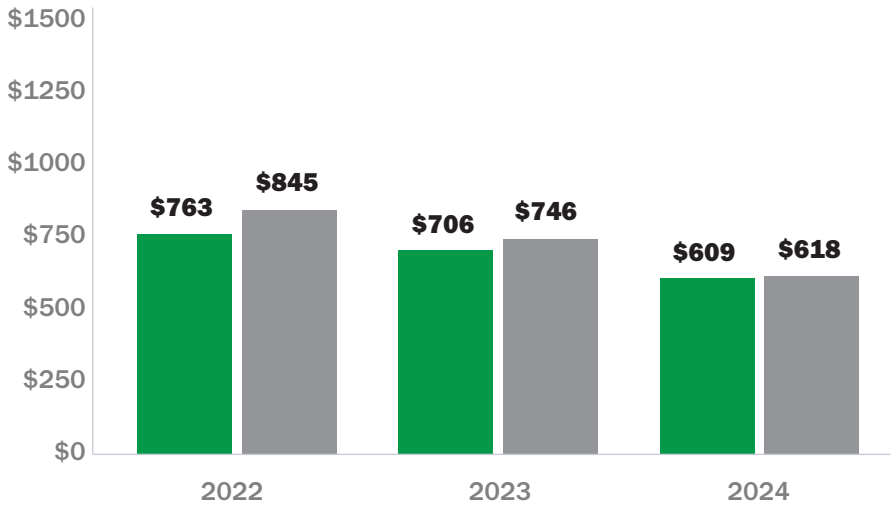
FIGURE 4 | **Profitability comparisons**

KEY RESULTS

Soybeans combined with cover crop **Soybean fields without cover crop**

Gross returns

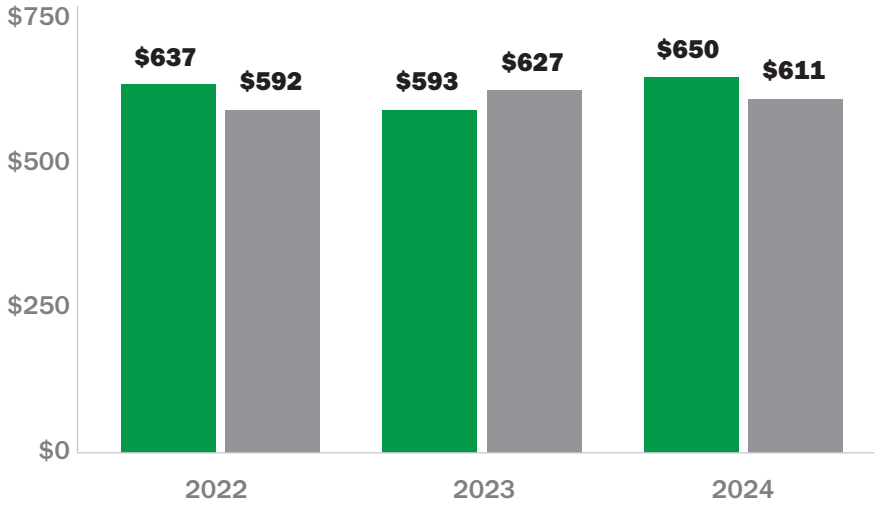
Gross return of the soybean and cover crop combined enterprise was slightly lower than the average soybean acre in Southern Minnesota not using cover crops across all three years of this analysis.



Total expenses

Total direct and overhead expenses of the soybean and cover crop combined enterprise were higher than the region's average acre without cover crops in two of the three years of this analysis.

The soybean acres in the cohort reported considerably lower land costs than the region's average soybean acre without cover crops for all three years.

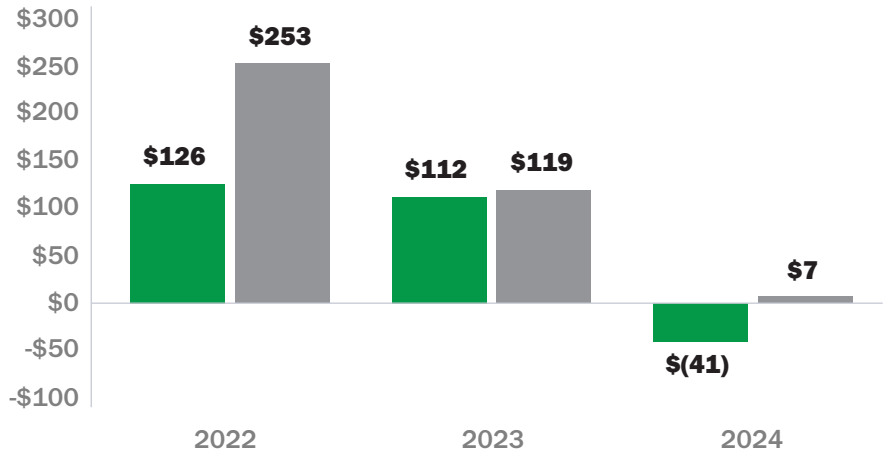


Net return

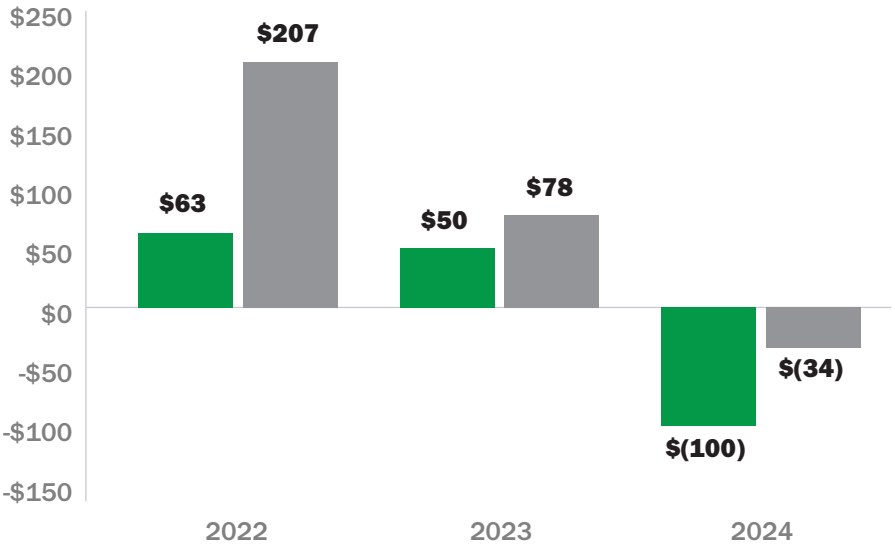
Net return (before labor and management charge) of the soybean and cover crop combined enterprise was lower than the region's average soybean acre not using cover crops across all three years.

Similar results were observed for net return after factoring in a labor and management charge.

Net returns before labor and management



Net returns after labor and management



Cost of production

The cost of production of the soybean and cover crop combined enterprise was higher in each year of this analysis compared to soybean acres that were planted without a cover crop in the region.

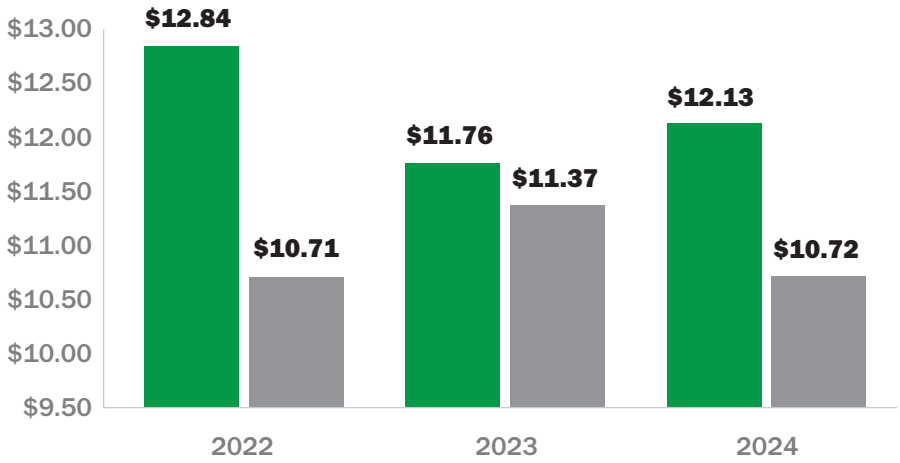


TABLE 7 | Southern Minnesota soybeans on owned and rented land

	2022 RESULTS				2023 RESULTS				2024 RESULTS			
	Soybeans grown after cover crop (1)	Cover crop enterprise (2)	Soybeans combined with cover crop (3) = (1) + (2)	Soy fields in region with no cover crop (4)	Soybeans grown after cover crop (1)	Cover crop enterprise (2)	Soybeans combined with cover crop (3) = (1) + (2)	Soy fields in region with no cover crop (4)	Soybeans grown after cover crop (1)	Cover crop enterprise (2)	Soybeans combined with cover crop (3) = (1) + (2)	Soy fields in region with no cover crop (4)
Number of enterprises	15	15	**15**	**1044**	13	13	**13**	**1134**	14	14	**14**	**1103**
Yield (bushels per acre)	51.92	0.00	**0.00**	**58.99**	51.68	0.00	**0.00**	**56.49**	49.37	0.00	**0.00**	**50.84**
Value per bushel	$13.97	$0.00	**$0.00**	**$14.22**	$12.70	$0.00	**$0.00**	**$12.74**	$10.03	$0.00	**$0.00**	**$10.06**
Product return per acre[1]	$725.53	$4.90	**$730.43**	**$838.89**	$656.26	$2.27	**$658.53**	**$719.71**	$495.29	$9.93	**$505.22**	**$511.57**
Crop insurance income per acre	$5.48	$0.00	**$5.48**	**$5.96**	$38.41	$0.00	**$38.41**	**$23.81**	$63.40	$0.00	**$63.40**	**$73.27**
Government payment income per acre[2]	$0.00	$25.31	**$25.31**	**$0.00**	$0.00	$7.74	**$7.74**	**$0.00**	$30.01	$7.93	**$37.94**	**$29.97**
Other income per acre[3]	$1.80	$0.00	**$1.80**	**-$0.04**	$0.89	-$0.01	**$0.88**	**$2.46**	$2.15	$0.00	**$2.15**	**$2.81**
Gross return per acre	$732.81	$30.21	**$763.02**	**$844.81**	$695.56	$10.00	**$705.56**	**$745.98**	$590.85	$17.86	**$608.71**	**$617.62**
Production expenses ($ per acre)												
Seed	$53.49	$24.45	**$77.94**	**$54.56**	$56.75	$27.69	**$84.44**	**$57.17**	$66.95	$18.96	**$85.91**	**$56.69**
Fertilizer	$61.95	$0.00	**$61.95**	**$34.55**	$67.49	$0.00	**$67.49**	**$50.99**	$50.79	$0.00	**$50.79**	**$39.85**
Chemicals	$81.44	$2.03	**$83.47**	**$69.23**	$77.02	$0.00	**$77.02**	**$72.04**	$60.45	$0.00	**$60.45**	**$64.93**
Crop insurance	$33.03	$0.72	**$33.75**	**$33.11**	$33.16	$0.00	**$33.16**	**$28.91**	$29.02	$0.00	**$29.02**	**$26.13**
Machinery cost[4]	$102.47	$32.27	**$134.74**	**$125.74**	$95.19	$29.89	**$125.08**	**$128.15**	$124.09	$33.89	**$157.98**	**$125.55**
Land costs[5]	$201.23	$0.00	**$201.23**	**$221.10**	$145.76	$0.00	**$145.76**	**$234.56**	$202.29	$0.00	**$202.29**	**$238.74**
Other expenses	$36.32	$7.64	**$43.96**	**$53.36**	$46.69	$13.53	**$60.22**	**$55.00**	$48.03	$15.40	**$63.43**	**$59.01**
Total direct and overhead expense per acre	$569.93	$67.11	**$637.04**	**$591.65**	$522.06	$71.11	**$593.17**	**$626.82**	$581.62	$68.25	**$649.87**	**$610.90**
Net return per acre	$162.88	-$36.9	**$125.98**	**$253.16**	$173.50	-$61.11	**$112.39**	**$119.16**	$9.23	-$50.39	**-$41.16**	**$6.72**
Labor and management charge per acre	$48.50	$14.97	**$63.47**	**$46.26**	$46.71	$16.13	**$62.84**	**$41.55**	$44.43	$14.32	**$58.75**	**$40.31**
Net return over labor and management per acre	$114.38	-$51.87	**$62.51**	**$206.90**	$126.79	-$77.24	**$49.55**	**$77.61**	-$35.20	-$64.71	**-$99.91**	**-$33.59**
Cost of production w/ labor and management per bushel	$11.77	-	**$12.84**	**$10.71**	$10.24	-	**$11.76**	**$11.37**	$10.75	-	**$12.13**	**$10.72**
Net value per bushel[6]	$13.97	-	**$14.04**	**$14.21**	$12.70	-	**$12.71**	**$12.76**	$10.03	-	**$10.13**	**$10.09**

	2022 RESULTS				2023 RESULTS				2024 RESULTS			
	Soybeans grown after cover crop (1)	Cover crop enterprise (2)	Soybeans combined with cover crop (3) = (1) + (2)	Soy fields in region with no cover crop (4)	Soybeans grown after cover crop (1)	Cover crop enterprise (2)	Soybeans combined with cover crop (3) = (1) + (2)	Soy fields in region with no cover crop (4)	Soybeans grown after cover crop (1)	Cover crop enterprise (2)	Soybeans combined with cover crop (3) = (1) + (2)	Soy fields in region with no cover crop (4)
Gross return per acre	$732.81	$30.21	$763.02	$844.81	$695.56	$10.00	$705.56	$745.98	$590.85	$17.86	$608.71	$617.62
Total direct expenses per acre	$505.43	$53.26	$558.69	$484.59	$423.90	$49.00	$472.90	$514.42	$490.33	$46.97	$537.30	$491.05
Return over direct expense per acre	**$227.38**	**-$23.05**	**$204.33**	**360.22**	**$271.66**	**-$39.00**	**$232.66**	**$231.56**	**$100.52**	**-$29.11**	**$71.41**	**$126.57**
Total overhead expense per acre	$64.50	$13.85	$78.35	107.06	$98.16	$22.11	$120.27	$112.40	$91.29	$21.28	$112.57	$119.85
Net return per acre	**$162.88**	**-$36.9**	**$125.98**	**253.16**	**$173.50**	**-$61.11**	**$112.39**	**$119.16**	**$9.23**	**-$50.39**	**-$41.16**	**$6.72**
Labor and management charge	$48.50	$14.97	$63.47	46.26	$46.71	$16.13	$62.84	$41.55	$44.43	$14.32	$58.75	$40.31
Net return over labor and management per acre	**$114.38**	**-$51.87**	**$62.51**	**206.90**	**$126.79**	**-$77.24**	**$49.55**	**$77.61**	**-$35.20**	**-$64.71**	**-$99.91**	**-$33.59**

Values displayed may not calculate correctly due to rounding.

TABLE FORMULA

GROSS RETURN PER ACRE	−	TOTAL DIRECT EXPENSE PER ACRE	=	RETURN OVER DIRECT EXPENSE PER ACRE
RETURN OVER DIRECT EXPENSE PER ACRE	−	TOTAL OVERHEAD EXPENSE PER ACRE	=	NET RETURN PER ACRE
NET RETURN PER ACRE	−	LABOR & MANAGEMENT CHARGE	=	NET RETURN OVER LABOR & MANAGEMENT PER ACRE

CONCLUSION

Early findings from the three years of cover crop financial data collected in Minnesota provide valuable insights into the costs and returns of cover crops, as well as their impact on the primary commodity crops.

From 2022 to 2024, cover crop costs varied significantly depending on their intended use, with a median of $42 per acre. Rye silage, grown for feed, was the only cover crop type with a positive median gross return. Cost-share programs helped reduce expenses for some fields, covering 54% of direct costs on average for fields that received incentive payments, but their overall impact across the cohort was modest, offsetting just 15% of total costs.

Comparison of the 20% most profitable cover crop fields and the 20% least profitable cover crop fields revealed that profitable cover crop fields typically generated more income from harvested production and incentive payments while having more effective cost management.

The report also assessed how cover crops influenced the financial performance of subsequent corn and soybean enterprises. During the 2022-2024 period, corn acres that followed cover crops were consistently more profitable than the regional average without cover crops, while soybean acres were less profitable.

These results should be interpreted in the context of various influencing factors, such as land productivity, management practices, weather and market conditions.

Comprehensive benchmarking analysis of the cover crop cohort will continue over time as the program advances. This analysis will help further identify trends, assess long-term performance and better understand the characteristics of the most profitable cover crop enterprises.

ENDNOTES

1. Production returns include yield x value per unit for the commodity crop plus any secondary crop products, like corn stalk bales.

   For cover crop fields, only a total production return value is provided. There is no yield detail as this is the average production for all cover crop enterprises, therefore varying production units are present.

2. Government payment income for the commodity crop includes ARC or PLC payments received during the year and any additional disaster or ad hoc payments related to the production year.

   For cover crop fields, government payment income consists of conservation and other support payments related to planting the cover crop.

3. Other crop income includes income from hedging gains or losses or other miscellaneous crop income.
4. Machinery cost includes fuel, repairs, custom hire, machinery lease expense, interest expense on intermediate term debts and machinery depreciation.
5. For enterprises containing rented and owned land combined, the land cost includes land rent, real estate taxes and interest on long term debts.
6. Net value per unit is the value per unit adjusted for hedging gains or losses.