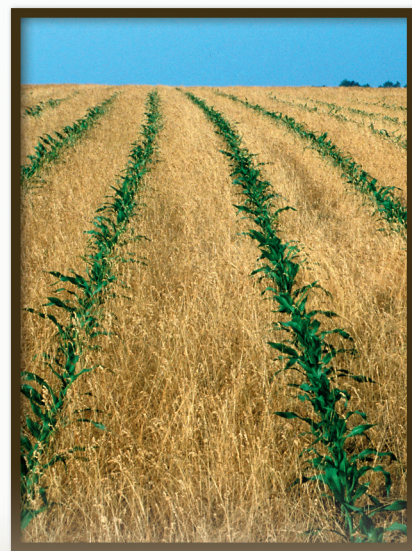
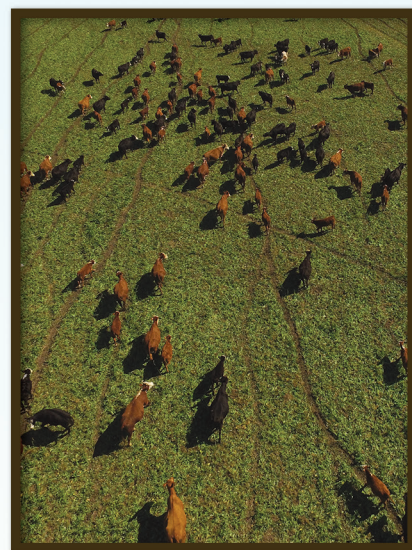
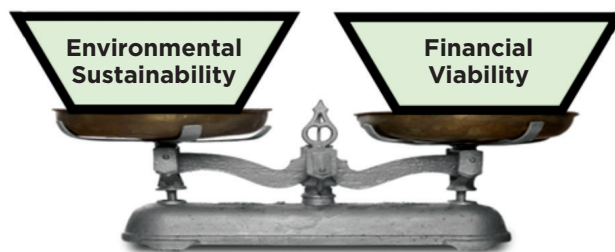


INFLUENCE OF INTENSIFIED ENVIRONMENTAL PRACTICES ON FARM PROFITABILITY

APRIL | 2022



EXPLORING THE IMPACT OF SELECTED PRACTICES ON FARM ECONOMICS



Farmer Balancing Act

There are costs and benefits from implementing farm practices that exceed normal practices in supporting environmental sustainability. Decisions to implement new practices are impacted by the balancing act of Environmental Sustainability and Financial Viability, as shown to the right.

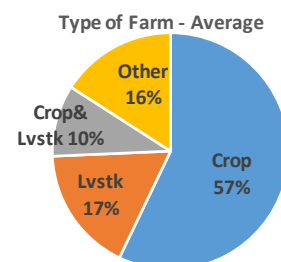
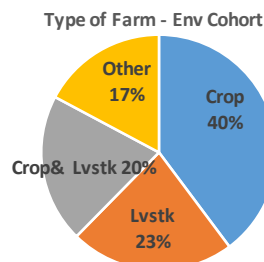
Early Trends Begin to Emerge

Starting in 2019, Water Quality certified farms through the Minnesota Department of Agriculture were identified as the “Environmental Cohort” for comparison to the MN Farm Business Management (FBM) Database. This report shares the third year of data for a broad overview of selected financial and crop production factors that provide an “early look” into longer term trend comparisons. This report moves to the next level by providing our first view of a 3-year trend, but is not intended to suggest that a long term trend is represented in this report. More information is provided in the “Perspective” section of this report.

Demographics

The 2021 MN FBM state database includes data from 2,293 producers who participate in the Minnesota State Farm Business Management Education program. The Environmental Cohort consists of 94 of those producers in 2021, up from 64 in 2020. The chart to the right illustrates that the Environmental Cohort represents a similar demographic to that found in the FBM state database, but does include more livestock enterprises. Even with that difference, it suggests that the decision to become a Water Quality Certified Farm is more likely a management decision than a situational decision.

Demographics	2019		2020		2021	
	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.
Number of Farms	53	2167	64	2246	94	2293
Total Crop Acres per Farm	666	775	774	786	742	781
Total Crop Acres/Cohort	35,298	1,679,425	49,536	1,765,356	69,748	1,790,833
Age of Operator	49.0	47.1	48.1	46.9	46.9	47.0
Years Farming	24.8	23.0	23.3	22.7	21.7	22.8
Beginning Farmers (<10 yrs)	7	629	12	669	24	698

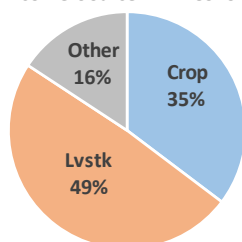


Income Statement	2019		2020		2021	
	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.
Gross Cash Farm Income	\$801,282	\$744,078	\$997,573	\$834,622	\$1,186,121	\$960,023
Gross Crop Income	\$288,110	\$339,431	\$271,276	\$351,453	\$418,556	\$468,446
Gross Livestock Income	\$342,249	\$257,226	\$497,272	\$273,958	\$580,741	\$310,291
Other Income	\$170,923	\$147,421	\$229,025	\$209,211	\$186,824	\$181,286
Total Cash Farm Expense	\$658,545	\$645,752	\$751,565	\$697,094	\$978,394	\$777,556
Net Cash Income	\$142,737	\$98,326	\$246,008	\$137,529	\$207,727	\$182,467
Inv Chg, Deprec, Cap Sales	-\$49,916	-\$24,683	-\$33,116	\$35,158	\$76,449	\$84,912
Average Net Farm Income	\$92,821	\$73,643	\$212,892	\$172,687	\$284,176	\$267,379
Median Net Farm Income	\$40,008	\$33,377	\$111,406	\$100,684	\$190,142	\$158,294

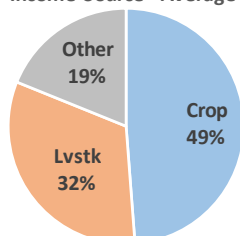
Financials At-A-Glance

A limited number of factors were selected to provide a brief financial overview for this report. On the income side, the data again shows that the Environmental Cohort generated more gross cash farm income than the State FBM database average. The data also shows that the Environmental Cohort farms generated more income from livestock.

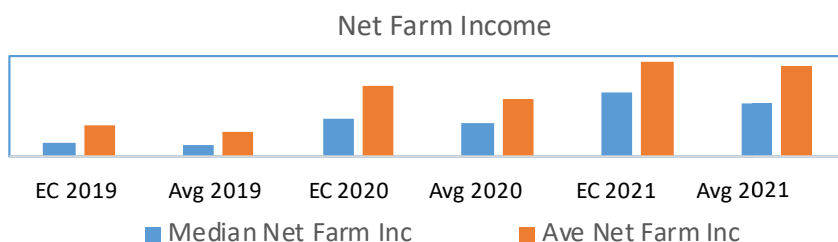
Income Source - Env Cohort



Income Source - Average

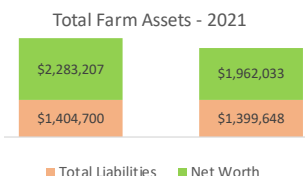


Along with the greater gross farm income, the Environmental Cohort farms incurred more cash farm expenses than the Average farm in all three years. The Net Farm Income for the Environmental Cohort was up significantly to \$284,176 in 2021, slightly above the \$267,379 for the Average farm. Median Net Farm Income was also significantly higher at \$190,142, compared to \$158,294 for the Average. Both income levels have increased each year since 2019.



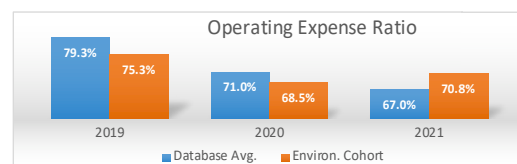
The owned value and the lender-supported value of

Balance Sheet (Market)	2019		2020		2021	
	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.
Total Assets	\$3,293,907	\$2,232,039	\$3,614,299	\$3,059,297	\$3,687,907	\$3,361,681
Total Liabilities	\$1,293,840	\$998,798	\$1,258,005	\$1,293,631	\$1,404,700	\$1,399,648
Net Worth	\$2,000,067	\$1,233,241	\$2,356,294	\$1,765,666	\$2,283,207	\$1,962,033



total assets on the Market Balance Sheet are shown here. Based on the first three years of data, the Environmental Cohort farms have a larger asset value and a larger net worth than the database average.

Selected Measures	2019		2020		2021	
	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.
Working Capital as % of GFI	25.1%	23.3%	43.3%	31.8%	44.6%	39.4%
Farm Debt to Asset Ratio	43.0%	46.0%	37.0%	45.0%	41.0%	44.0%
Term Debt Coverage Ratio	1.61	1.37	3.22	2.61	3.59	3.59
Operating Expense Ratio	75.3%	79.3%	68.5%	71.0%	70.8%	67.0%



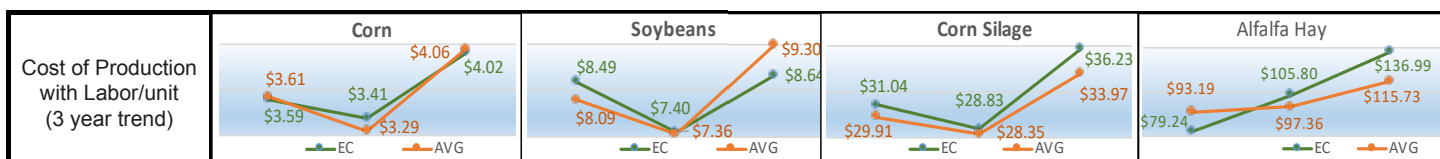
Farms in the Environmental Cohort continue to have a slightly stronger Debt to Asset Ratio, at 41% in 2021, compared to the database average of 44%. The Term Debt Coverage Ratio have increased steadily since 2019, with that ratio being the same for both cohorts in 2021. The Working Capital as a % of Gross Farm Income has been higher for the Environmental Cohort each year. The Operating Expense Ratio increased for the Environmental Cohort to 70.8%, compared to the stronger ratio of 67.0% for the database average. Increased revenue enabled producers to increase all 4 factors since 2019.

Crop Enterprises At-A-Glance

Four production costs that are potentially impacted by the changed practices of the Environmental Cohort have been selected to illustrate possible variations. On a per acre basis, since 2019, each group had costs that were lower and higher in a given year. In 2021, the Environmental Cohort continued to have a lower chemical cost per acre, with \$46.01 per acre in 2021 compared to the FBM database average of \$48.51.

Selected Costs	2019		2020		2021	
	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.
Seed Cost / crop acre	\$74.50	\$73.05	\$72.64	\$79.41	\$85.08	\$79.45
Fertilizer Cost / crop acre	\$70.26	\$73.75	\$69.58	\$81.28	\$111.53	\$111.65
Chemical Cost / crop acre	\$32.64	\$37.87	\$32.45	\$42.73	\$46.01	\$48.51
Fuel and Oil Cost / crop acre	\$33.29	\$32.68	\$30.24	\$29.09	\$50.81	\$36.12

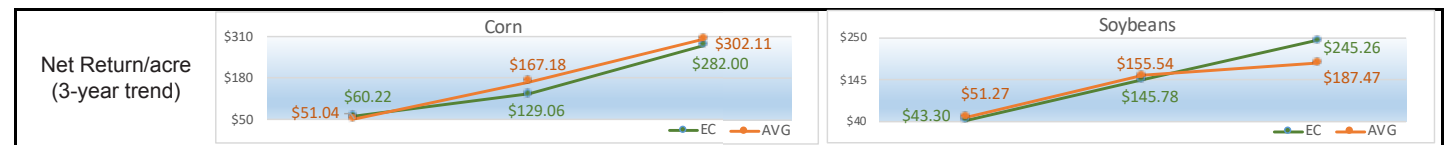
Four traditional crop enterprises were again selected from the primary crops raised by producers in each group: Corn, Soybeans, Corn Silage, and Alfalfa Hay. Expenses and management factors have been reduced to the items listed on the following tables for each crop. Below is a 3-year comparison of the Cost of Production with Labor per unit for each crop. The Cost of Production for each crop is relatively similar in most year, with the exception of Alfalfa Hay.



The table below includes data for selected factors that might suggest a higher correlation to the addition of intensified environmental practices. Each table shows a 3-year comparison of the Environmental Cohort and the State FBM Database. The data below shows that corn and soybean yields are higher for the Environmental Cohort, with the exception of 2020 in

Corn. The data also suggests that there is generally no ongoing cost-savings benefit to one set of practices vs the other. The two expenses that show a consistent 3-year trend in both crops is the Chemical Expense per acre and the Machinery Cost per acre, where the Database Average is lower than the Environmental Cohort.

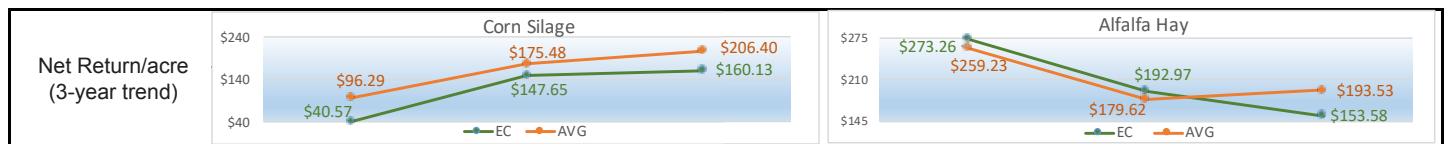
Crop Enterprises Owned & Rented Acres	Corn						Soybeans					
	2019		2020		2021		2019		2020		2021	
	EC	AVG	EC	AVG	EC	AVG	EC	AVG	EC	AVG	EC	AVG
Combined												
Number of Farms	37	1,394	45	1,447	50	1,435	31	1,286	38	1,313	49	1,344
Yield per acre	184.2	178.8	190.9	199.6	190.2	186.2	50.9	46.3	53.5	52.6	56.4	49.1
Seed Expense/acre	\$98.08	\$107.65	\$99.96	\$104.28	\$111.44	\$105.37	\$50.73	\$57.05	\$54.72	\$53.69	\$52.47	\$54.29
Fertilizer Expense/acre	\$118.70	\$128.31	\$125.10	\$125.76	\$156.01	\$137.97	\$25.12	\$22.19	\$28.29	\$20.53	\$37.76	\$24.49
Chemical Expense/acre	\$37.05	\$35.76	\$37.17	\$35.77	\$42.11	\$38.93	\$46.71	\$40.33	\$45.83	\$43.09	\$55.00	\$47.28
Fuel & Oil Expense/acre	\$23.66	\$25.63	\$17.74	\$21.48	\$26.82	\$26.61	\$16.00	\$16.03	\$10.99	\$13.46	\$16.01	\$16.13
Total dir & ovhd exp/ac	\$736.01	\$702.43	\$695.88	\$697.03	\$737.28	\$730.85	\$489.06	\$426.28	\$454.33	\$430.48	\$475.63	\$452.07
Net Return/acre	\$60.22	\$51.04	\$129.06	\$167.18	\$282.00	\$302.11	\$43.30	\$51.27	\$145.78	\$155.54	\$245.26	\$187.47
Machinery Cost/acre	\$149.90	\$136.66	\$156.59	\$140.19	\$165.99	\$152.98	\$102.49	\$87.68	\$97.99	\$89.39	\$105.40	\$95.22
Cost of Prod w Lbr/unit	\$3.59	\$3.61	\$3.41	\$3.29	\$4.02	\$4.06	\$8.49	\$8.09	\$7.40	\$7.36	\$8.64	\$9.30



In the table below, yields for corn silage and alfalfa hay were similar with the exception of 2021, where the Database Average had an edge with alfalfa hay. Selected production costs generally vary by group and by year. However, the Environmental Cohort does show less Chemical Expense per acre, with the

exception of corn silage in 2020; and less Total Direct and Overhead expenses per acre, with the exception of Corn Silage in 2021. Generally speaking, the Database Average has stronger factors in corn silage while the Environmental Cohort factors is stronger in alfalfa hay.

Crop Enterprises Owned & Rented Acres	Corn Silage						Alfalfa Hay					
	2019		2020		2021		2019		2020		2021	
	EC	AVG	EC	AVG	EC	AVG	EC	AVG	EC	AVG	EC	AVG
Combined												
Number of Farms	16	354	17	369	27	384	16	294	18	331	24	336
Yield per acre	20.4	20.5	21.8	22.8	17.6	18.3	4.7	4.5	4.0	4.4	3.5	4.2
Seed Expense/acre	\$97.54	\$109.86	\$105.57	\$100.75	\$101.34	\$99.84	NA	NA	NA	NA	NA	NA
Fertilizer Expense/ac	\$76.66	\$96.76	\$85.51	\$92.25	\$91.90	\$106.03	\$42.44	\$51.22	\$53.05	\$50.42	\$55.14	\$54.34
Chemical Expense/ac	\$35.88	\$38.50	\$37.15	\$36.38	\$38.19	\$40.63	\$3.01	\$5.51	\$3.95	\$8.57	\$7.70	\$10.82
Fuel & Oil Expense/ac	\$30.64	\$38.55	\$32.43	\$28.65	\$30.43	\$32.59	\$28.30	\$37.53	\$23.26	\$23.66	\$31.94	\$31.29
Total dir & ovhd exp/ac	\$651.96	\$652.35	\$647.34	\$680.07	\$705.10	\$691.16	\$391.01	\$419.85	\$418.74	\$426.34	\$434.14	\$449.55
Net Return/acre	\$40.57	\$96.29	\$147.65	\$175.48	\$160.13	\$206.40	\$273.26	\$259.23	\$192.97	\$179.62	\$153.58	\$193.53
Machinery Cost/acre	\$198.66	\$204.39	\$231.14	\$211.97	\$262.86	\$214.90	\$158.05	\$166.55	\$174.95	\$167.15	\$186.77	\$172.92
Cost of Prod w Lbr/unit	\$31.04	\$29.91	\$28.83	\$28.35	\$36.23	\$33.97	\$79.24	\$93.19	\$105.80	\$97.36	\$136.99	\$115.73



These tables continue to suggest that more annual data is necessary to provide information that can be used to make informed comparisons about cost benefits of intensified environmental practices. This

report continues to provide in-depth comparison data to aid in determining the overall implications of intensified practices on crop profitability.

A Perspective on Data Analysis

In order to determine the value of early data that is shared from a given study, it is necessary to consider that dataset before the initial study began and compare it to the reporting that occurs after the need for the study has been determined. Conclusions made based on data that does not include a historical perspective may have been made without all the information needed for a sound conclusion. This section of the report provides that historical perspective for the Environmental Cohort in the three years prior to the beginning of this dataset.

The Management Decision

Every day, farmers make management decisions that guide their business. When those decisions are directed by quality records and financial analysis, the opportunity for improved profitability greatly increases. With accurate information, combined with the farm family's goals, sound decisions can be made on what should continue and what should not continue in the business. The use of "Intensified Environmental Practices" goes beyond the typical management decision, however. It is a management decision that is influenced by a personal goal to "go to the next level" of environmentally sustainable practices, exceeding those commonly used by farmers today. That next level of practices requires a much closer look at the balancing act that was noted earlier.

A Historical Perspective on Farm Profitability

This study now has a 3-year dataset that has provided initial comparisons between the Environmental Cohort the FBM Database Average. Once that data is available, the question becomes "How did the farms in the Environmental Cohort compare to the State FBM Database Average during the 3 years prior to the start of the study?" Stated another way, "If the

current data shows a benefit, or a disadvantage; was that same tendency found in the data in prior years?"

In order to effectively compare prior years, one must ensure that the same farms are included in the dataset from the earlier time period. This was accomplished using FINBIN, which is managed by the University of Minnesota Center for Farm Financial Management. The data for the Environmental Cohort in the table below comes from 46 farmers who were enrolled in FBM for all six years, were Water Quality Certified in 2021, and are included in the data from the 94 farms in this report. The Average group includes 987 farms that were enrolled in FBM for all six years, were NOT Water Quality Certified in 2021, and are included in the data from the 2293 farms in the State FBM Database.

The following table provides summary data for the pre-study period (2016 to 2018) and the 3 years since the study began (2019 to 2021). To save space and reduce the quantity of numbers being shared, a 3-year average has been used to illustrate this comparison.

This table shows a 3-year average for each cohort and the percentage showing the comparison between the two. In general, the Environmental Cohort shows similar advantages (In the form of a 100+%) to the state average in each 3-year trend category. This suggests that producers who choose water quality certification have a management style that enhances profitability. The data does not suggest that the decision to become water quality certified resulted in greater income. The producers in the Environmental Cohort have shown greater income and business strength throughout the 6-year comparison. More data should be reviewed in order to comment in full confidence regarding this initial finding, however.

<u>Financial Factors</u>	Pre-Study 3-Year Average (2016 - 2018)			Post-Study 3-Year Average (2019 - 2021)		
	Environ. Cohort	State Avg.	EC as % of State Avg	Environ. Cohort	State Avg.	EC as % of State Avg
Gross Cash Farm Income	\$912,423	\$807,544	113%	\$1,124,347	\$973,963	115%
Gross Crop Income	\$324,913	\$443,330	73%	\$434,197	\$557,590	78%
Gross Livestock Income	\$464,712	\$251,900	184%	\$506,235	\$280,248	181%
Total Cash Farm Expense	\$768,789	\$693,072	111%	\$903,032	\$801,274	113%
Net Cash Income	\$143,634	\$114,472	125%	\$221,315	\$172,689	128%
Average Net Farm Income	\$92,135	\$65,224	141%	\$272,937	\$200,902	136%
Median Net Farm Income	\$44,795	\$38,467	116%	\$110,212	\$133,043	83%
Working Capital as % of GFI	45.2%	27.6%	164%	48.9%	35.2%	139%
Farm Debt to Asset Ratio	38%	45%	118%	38%	44%	116%
Term Debt Coverage Ratio	1.31	1.12	117%	3.30	2.53	130%
Operating Expense Ratio	80.7%	80.4%	100%	71.2%	71.4%	100%

COVER CROP ANALYSIS

Cover Crop Analysis Comparison

In 2021, a “first look” at “Crops grown with Cover Crops” has been added to this report. Farms providing data for these two pages are not necessarily part of the Environmental Cohort noted in the previous four pages of the report. The cover crop analysis provides a direct comparison of

practices used when incorporating cover crops and typical production practices. The tables on this page and the next page provide comparison data for: the crop raised after a cover crop, the cover crop itself, the combined enterprise of the primary crop with the cover crop expense included, and conventional statewide average data.

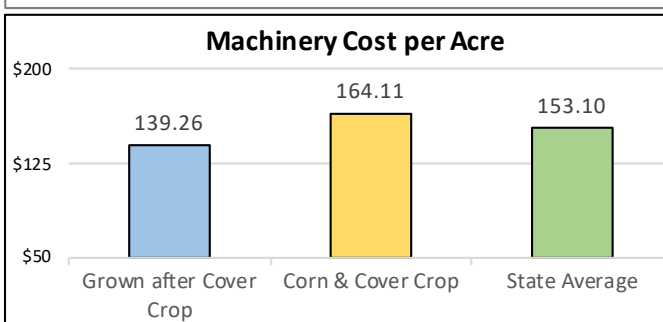
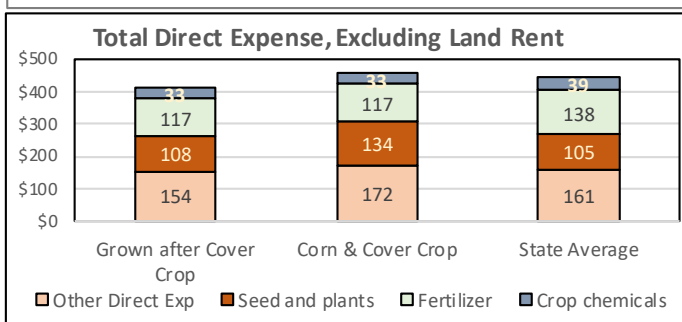
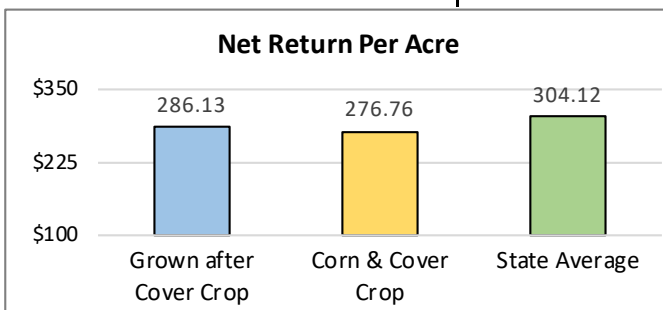
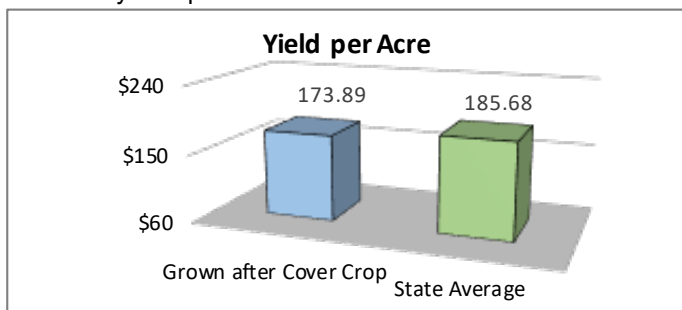
CORN WITH COVER CROP ENTERPRISE ANALYSIS

Minnesota Farm Business Management Database

(Farms Sorted By Return to Overhead)

*** Owned and Rented Acres Combined ***

	Grown after Cover Crop	Cover Crop Only	Corn & Cover Crop	Conventional State Avg.
Number of farms	6	6	6	1,420
Yield per acre (bu.)	173.89	-	-	185.68
Value Per Bushel	5.31	-	-	5.39
Other crop income per acre *	-	57.74	57.74	4.78
Gross return per acre	997.68	59.46	1057.14	1032.56
Selected Direct Expenses				
Seed and plants	108.19	25.51	133.69	105.32
Fertilizer	117.19	-	117.19	137.98
Crop chemicals	33.01	-	33.01	38.50
Crop insurance	27.34	-	27.34	26.55
Fuel & oil	20.09	4.50	24.59	26.47
Repairs	53.07	10.33	63.40	56.45
Custom hire	11.46	-	11.46	13.20
Land rent	205.74	-	205.74	152.95
Total direct expenses per acre	617.69	44.37	662.06	595.64
Return over direct exp per acre	379.99	15.09	395.08	436.92
Total overhead expenses per acre	93.86	24.46	118.32	132.79
Total dir & ovhd expenses per acre	711.55	68.83	780.38	728.43
Net return per acre	286.13	(9.37)	276.76	304.12
Net return over labor & management	213.92	(27.01)	186.91	247.88
Cost of Production with labor & mgt	4.08	-	4.20	4.06
Machinery cost per acre	139.26	24.85	164.11	153.10



* Other crop income includes government payments for conservation related production practices

COVER CROP ANALYSIS

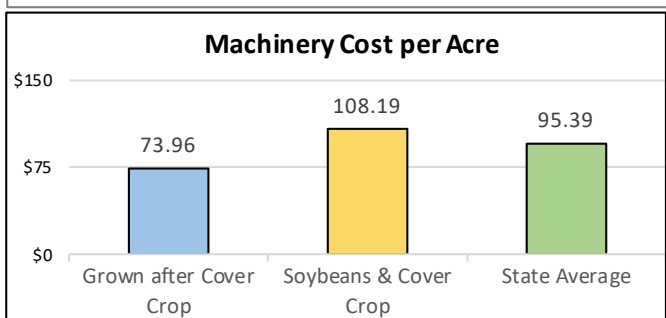
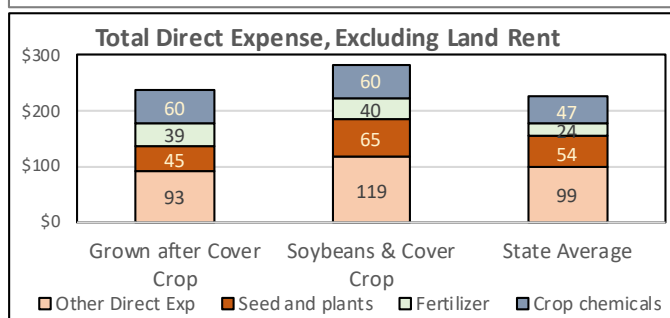
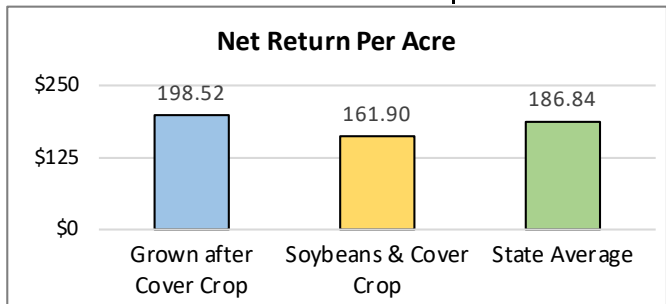
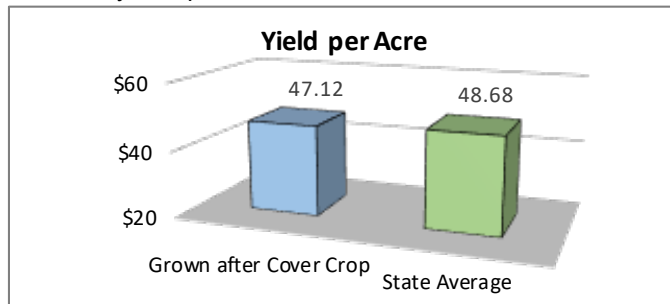
SOYBEANS WITH COVER CROP ENTERPRISE ANALYSIS

Minnesota Farm Business Management Database

(Farms Sorted By Return to Overhead)

*** Owned and Rented Acres Combined ***

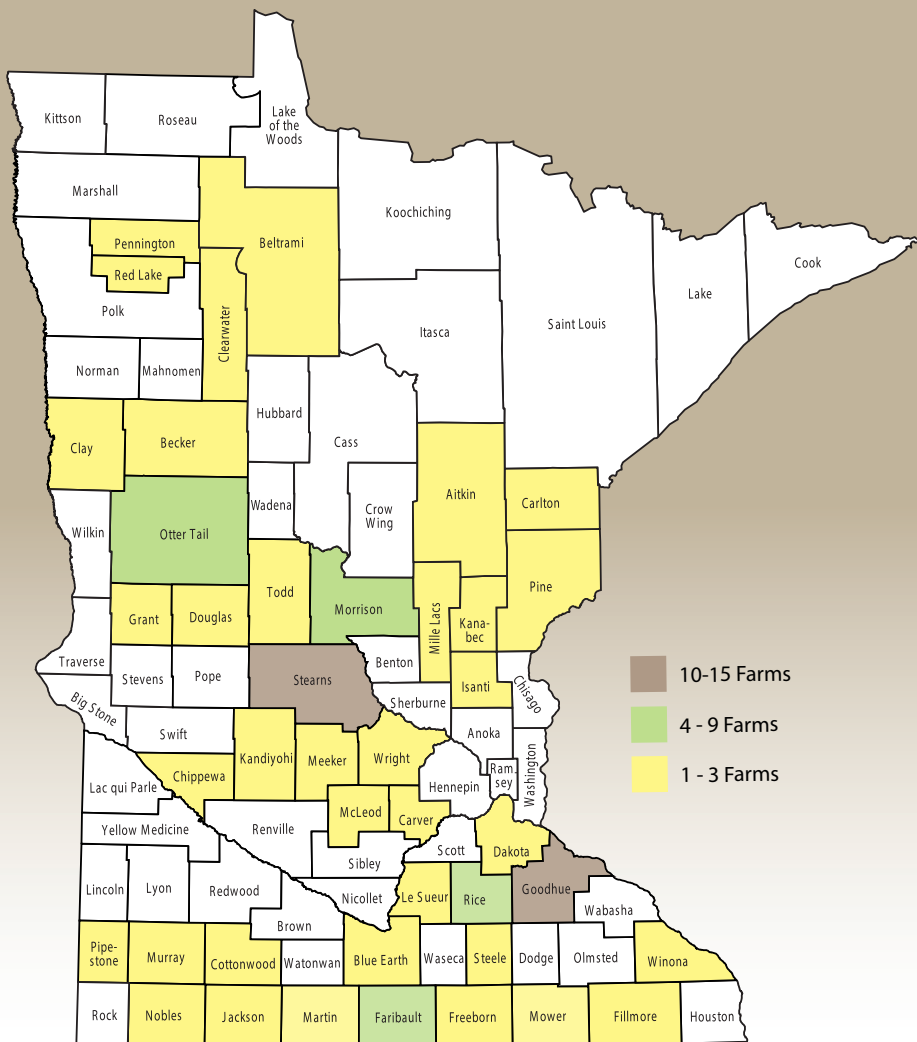
	Grown after Cover Crop	Cover Crop Only	Soybeans & Cover Crop	Conventional State Avg.
Number of farms	11	11	11	1,328
Yield per acre (bu.)	47.12	-	-	48.68
Value Per Bushel	12.69	-	-	12.45
Other crop income per acre *	-	36.11	36.11	5.98
Gross return per acre	637.40	55.67	693.08	635.19
Selected Direct Expenses				
Seed and plants	44.69	19.94	64.62	53.97
Fertilizer	39.33	0.34	39.68	23.85
Crop chemicals	59.77	-	59.77	46.60
Crop insurance	29.68	-	29.68	23.65
Fuel & oil	11.20	6.05	17.25	16.01
Repairs	23.09	11.67	34.76	33.88
Custom hire	14.17	3.19	17.37	9.53
Land rent	134.91	9.39	144.29	137.58
Total direct expenses per acre	371.67	55.49	427.16	361.33
Return over direct exp per acre	265.73	0.18	265.92	273.86
Total overhead expenses per acre	67.21	36.80	104.02	87.02
Total dir & ovhd expenses per acre	438.88	92.30	531.18	448.36
Net return per acre	198.52	(36.62)	161.90	186.84
Net return over labor & management	157.46	(56.43)	101.04	153.59
Cost of Production with labor & mgt	9.35	-	10.88	9.30
Machinery cost per acre	73.96	34.23	108.19	95.39



* Other crop income includes government payments for conservation related production practices

These two tables and the related charts demonstrate the general differences in production and expenses between farms using cover crops and the typical operation. The limited number of farms with cover crop enterprises in this first year reminds us that care must be taken when interpreting the data. As the number of farms

reporting the use of cover crops increases in the future, using newly developed reporting practices; more comprehensive comparison data will be available. This "first look" data provides foundational information, leading to those expanded comparisons in future years.



SOURCES OF DATA

The 94 producers who provided data for this report have all earned a Minnesota Water Quality Certification from the MN Department of Agriculture. Those producers are located in 42 of Minnesota's 87 counties. Those counties are highlighted on the map.



MINNESOTA FARM BUSINESS MANAGEMENT EDUCATION PROGRAMS

Vision: *To provide educational opportunities for students to be successful in a competitive agricultural environment.*

Mission: *To deliver management education for decision-making that achieves an individual's business goals.*

Guiding Principles:

1. Improved Quality of Life in Rural Communities
2. Achievement of Student Goals
3. Awareness of the Global Importance of Agriculture
4. Integrity in Student Interaction
5. Timely and Student-Focused Programming

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