

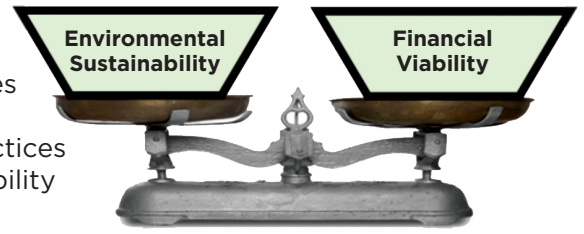
INFLUENCE OF INTENSIFIED ENVIRONMENTAL PRACTICES ON FARM PROFITABILITY

MAY | 2024



EXPLORING THE IMPACT OF SELECTED PRACTICES ON FARM ECONOMICS

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



BALANCING ACT

AN EXPANDING DATABASE AND A FIRST LOOK AT LIVESTOCK ENTERPRISE DATA

This report is now in its 5th year. The database has expanded from the initial 53 farms in 2019 to 126 farms in 2023. Past data has recognized that the farms in this Cohort generate more income from livestock than the average farm in the FBM State Database. This report will show a first look at the Dairy enterprise for these farms on page six, along with an overview of the FBM State Database in relation to National Agricultural Statistics Service (NASS) data for Minnesota.

This is the 3rd year of data with a pre- and post-study comparison of the farmers in the Environmental

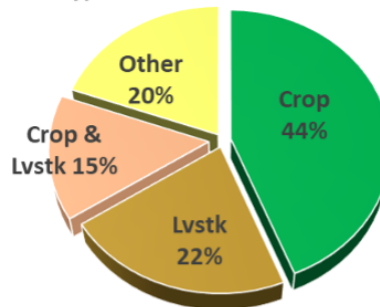
Cohort. This comparison has shown that this Cohort had a financial advantage over the FBM State Database average before this study began. That comparison has recognized that those producers who achieve water quality certification have a management style that enhances profitability. This report moves forward to focus on a 3-year trend and a 5-year average for the demographic and financial data, target a 3-year trend for the crop and livestock data, and continue to evaluate the pre- and post-study comparisons using a 5-year average.

Demographics	5-Year Avg.		2021		2022		2023	
	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.
Number of Farms	88	2,235	94	2293	101	2154	126	2317
Total Crop Acres per Farm	754	790	742	781	831	808	729	800
Total Crop Acres/Cohort	72,256	1,767,412	69,748	1,790,833	83,931	1,740,432	91,854	1,853,600
Age of Operator	48.1	47.1	46.9	47.0	48.3	47.2	48.4	47.4
Years Farming	22.9	22.9	21.7	22.8	23.3	23.0	22.4	22.8
Beginning Farmers (<10 yrs)	23	662	24	698	23	623	35	687

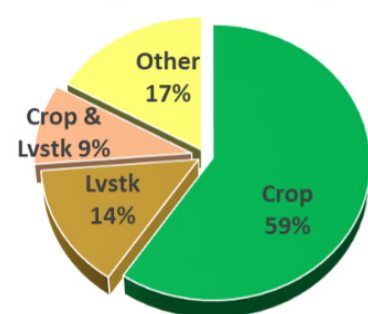
Demographics

The 2023 MN FBM State Database includes data from 2,317 producers who participate in the Minnesota State Farm Business Management Education (FBM) program. The Environmental Cohort consists of 126 of those producers in 2023, up from 101 in 2022. The table and charts here illustrate that the Environmental Cohort continues to represent a similar demographic to that found in the FBM State Database, and continues to include a greater percentage of livestock enterprises. The 5-year average brings that similarity into single factors over time.

Type of Farm - Env Cohort



Type of Farm - Average



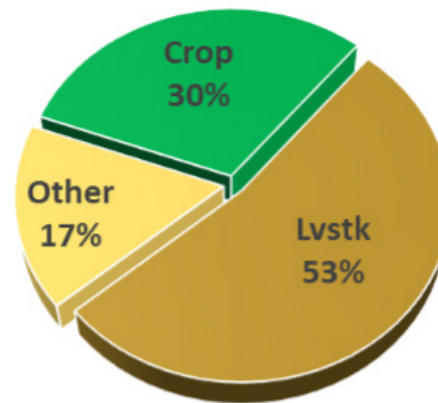
Financials At-A-Glance

The 2023 data again shows that the Environmental Cohort generated more gross cash farm income and net farm income than the FBM State Database average. This data also shows that the farms in the Environmental Cohort generated more income from livestock sales. The 5-year average shows the summary of all factors over the full term of this report.

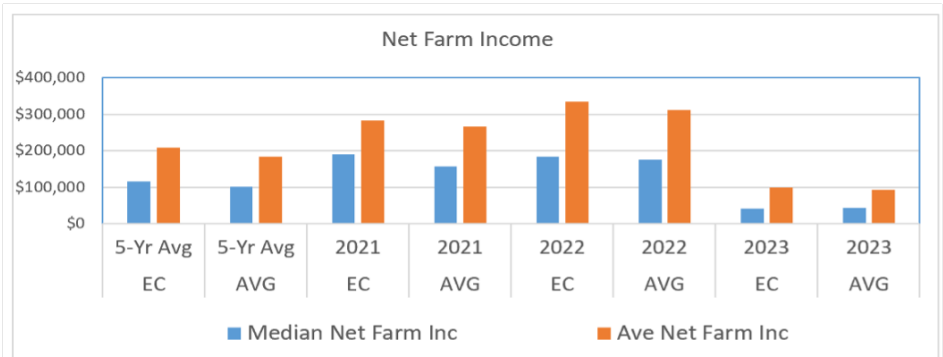
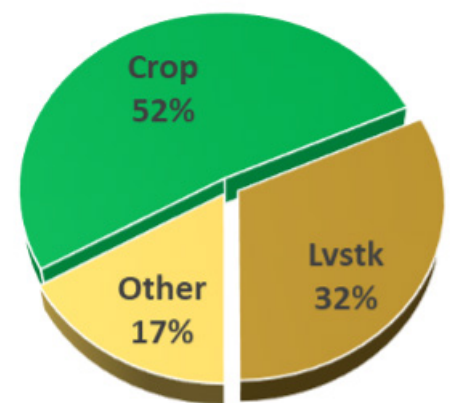
Income Statement	5-Year Avg.		2021		2022		2023	
	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.
Gross Cash Farm Income	\$1,189,775	\$947,396	\$1,186,121	\$960,023	\$1,397,679	\$1,092,140	\$1,286,889	\$1,099,812
<i>Crop Sales</i>	\$417,816	\$473,804	\$418,556	\$468,446	\$554,751	\$607,954	\$436,845	\$611,435
<i>Livestock Sales</i>	\$584,442	\$298,278	\$580,741	\$310,291	\$677,019	\$334,348	\$674,573	\$325,729
<i>Other Income</i>	\$187,517	\$175,314	\$186,824	\$181,286	\$165,909	\$149,838	\$175,471	\$162,648
Total Cash Farm Expense	\$976,129	\$784,431	\$978,394	\$777,556	\$1,138,814	\$893,176	\$1,091,684	\$904,500
Net Cash Income	\$213,647	\$162,966	\$207,727	\$182,467	\$258,866	\$198,964	\$195,205	\$195,312
Inv Chg, Deprec, Cap Sales	-\$4,416	\$20,324	\$76,449	\$84,912	\$75,926	\$112,288	-\$95,427	-\$101,376
Average Net Farm Income	\$209,231	\$183,289	\$284,176	\$267,379	\$334,792	\$311,252	\$99,778	\$93,936
Median Net Farm Income	\$116,205	\$102,460	\$190,142	\$158,294	\$183,787	\$176,616	\$41,360	\$44,596

In 2023, with reduced income in the production sector overall, the margins tightened between the Environmental Cohort and the FBM State Database average. Net Cash Income for both Cohorts was very similar in 2023. With Net Farm Income dropping significantly in both instances, the Environmental Cohort was slightly above the State Database average farm, \$99,778 compared to \$94,596. Median Net Farm Income for the Environmental Cohort, however, was below the average for the first time, \$41,360 compared to \$44,596. This is the lowest level of average and median net farm income for both groups since the beginning of this study in 2019. Both the recent three years of data and the 5-year average indicate that the Environmental Cohort farms continue to have a slightly larger asset value and net worth on the Market Value Balance Sheet

Income Source - Env Cohort



Income Source - Average

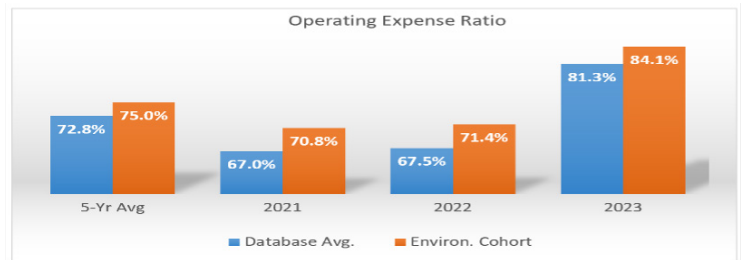


Balance Sheet (Market)	5-Year Avg.		2021		2022		2023	
	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.
Total Assets	\$3,800,084	\$3,274,069	\$3,687,907	\$3,361,681	\$4,018,685	\$3,791,346	\$4,015,827	\$3,889,238
Total Liabilities	\$1,402,553	\$1,371,996	\$1,404,700	\$1,399,648	\$1,508,376	\$1,552,675	\$1,435,274	\$1,601,661
Net Worth	\$2,397,531	\$1,902,073	\$2,283,207	\$1,962,033	\$2,510,309	\$2,238,671	\$2,580,553	\$2,287,577

The Working Capital as a % of Gross Farm Expense for the Environmental Cohort is slightly below the State Database average for the second straight year, while the 5-year average has the Environmental Cohort slightly above. Farms in the Environmental Cohort continue to have a slightly stronger Debt to Asset Ratio, at 38% in

Selected Measures	5-Year Avg.		2021		2022		2023	
	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.
Working Capital as % of Exp.	57.2%	51.8%	63.1%	50.3%	67.8%	68.1%	48.8%	51.1%
Farm Debt to Asset Ratio	39.5%	44.3%	41.0%	44.0%	40.0%	43.0%	38.0%	44.0%
Debt Coverage Ratio	2.56	2.30	3.41	2.51	3.48	3.35	1.48	1.33
Operating Expense Ratio	75.0%	72.8%	70.8%	67.0%	71.4%	67.5%	84.1%	81.3%

2023, compared to the State Database average of 44%. The Debt Coverage Ratio increased steadily until 2023, when reduced income levels lowered both ratios, with the Environmental Cohort being slightly stronger. Operating Expense Ratio weakened significantly for both cohorts in 2023, with the State Database average ratio being slightly stronger.



Crop Production Costs

This report continues to focus on the four production costs in the table below that typically would have a higher correlation to expanded use of intensified environmental practices. The trend continues in 2023 where the Environmental Cohort has a lower fertilizer

and chemical cost per acre, and the 5-year average supports that difference. The FBM State Database average continued to show a lower fuel & oil and seed cost, and in the 5-year averages.

Selected Costs	5-Year Avg.		2021		2022		2023	
	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.	Environ. Cohort	Database Avg.
Seed Cost / crop acre	\$81.84	\$81.72	\$85.08	\$79.45	\$87.80	\$86.72	\$81.71	\$89.29
Fertilizer Cost / crop acre	\$104.95	\$108.57	\$111.53	\$111.65	\$129.44	\$145.59	\$109.97	\$128.39
Chemical Cost / crop acre	\$48.84	\$51.20	\$46.01	\$48.51	\$59.41	\$63.29	\$56.39	\$62.59
Fuel and Oil Cost / crop acre	\$48.70	\$39.83	\$50.81	\$36.12	\$58.81	\$53.18	\$53.73	\$47.59

Crop Enterprises At-A-Glance

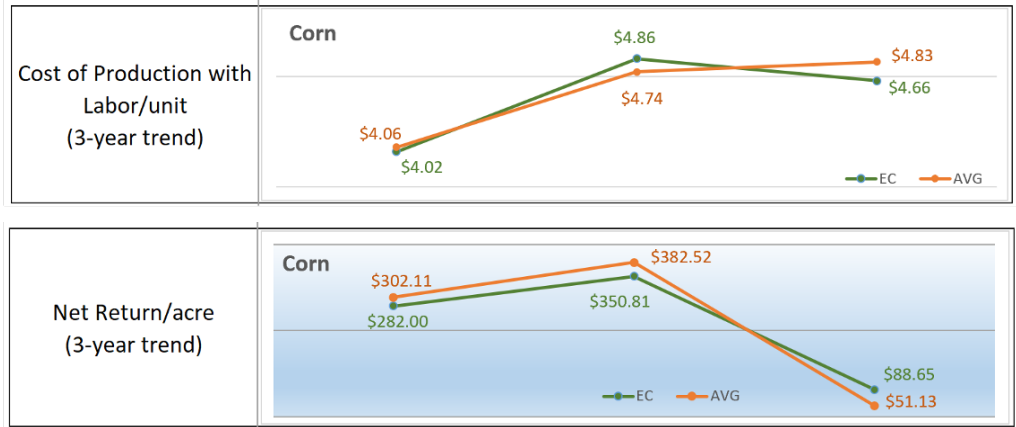
In 2023, three traditional crop enterprises were selected: Corn, Soybeans, and Alfalfa Hay. Selected expenses and management factors from each crop enterprise table are listed in a 3-year summary table for each crop.

Below each table is a comparison of the Net Return per acre and the Cost of Production with Labor & Mgmt per unit.

The data for Corn continues to show that yields and direct expenses are

Crop Enterprises Owned & Rented Acres Combined	Corn					
	2021		2022		2023	
	EC	AVG	EC	AVG	EC	AVG
Number of Farms	50	1,435	70	1,425	67	1,544
Yield per acre	190.2	186.2	198.0	203.8	185.8	192.6
Seed Expense/acre	\$111.44	\$105.37	\$109.44	\$111.81	\$112.66	\$116.87
Fertilizer Expense/acre	\$156.01	\$137.97	\$208.12	\$217.74	\$199.13	\$232.00
Chemical Expense/acre	\$42.11	\$38.93	\$51.96	\$52.25	\$54.70	\$54.16
Fuel & Oil Expense/acre	\$26.82	\$26.61	\$39.82	\$39.89	\$30.02	\$36.34
Total dir & ovhd exp/ac	\$737.28	\$730.85	\$902.91	\$905.46	\$904.79	\$937.49
Net Return/acre	\$282.00	\$302.11	\$350.81	\$382.52	\$88.65	\$51.13
Crop Insurance/acre	\$20.93	\$27.77	\$3.83	\$4.83	\$79.33	\$58.66
Gov. Payments/acre	\$1.18	\$1.29	\$1.06	\$0.32	NA	NA
Machinery Cost/acre	\$165.99	\$152.98	\$197.61	\$185.71	\$201.44	\$189.22
Cost of Prod w Lbr/unit	\$4.02	\$4.06	\$4.86	\$4.74	\$4.66	\$4.83

higher for the Environmental Cohort in some years and higher for the FBM State Database average in other years, suggesting that there is generally no ongoing cost-saving benefit to one set of practices vs the other. The Cost of Production chart illustrates this same situation. The one factor that shows a consistent trend is the Machinery Cost per acre, where the FBM Database average is lower than the Environmental Cohort. The Environmental Cohort had a higher Net Return per acre for the first time in four years.

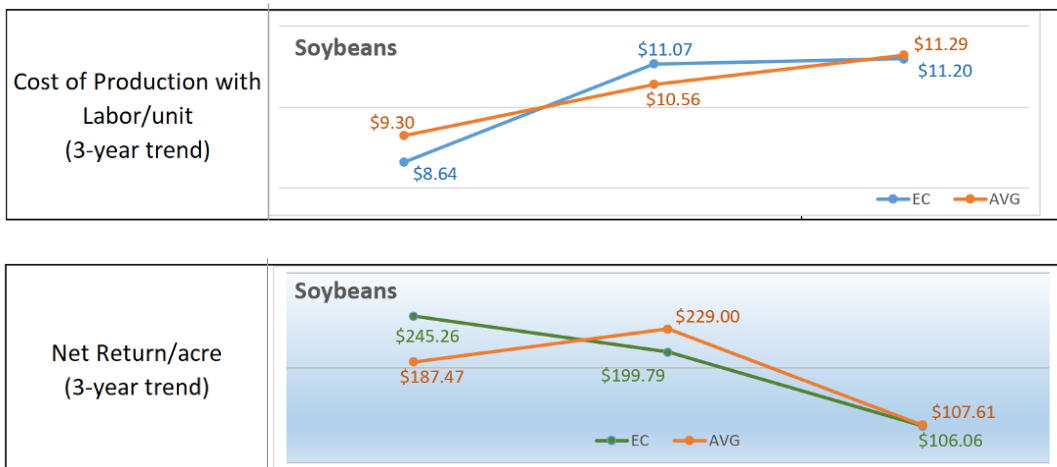


Soybeans

The data for Soybeans shows that the Environmental Cohort has higher fertilizer costs each year but generally lower expenses for the other items listed in this 3-year trend. The FBM State Database average has a higher yield and net return in the last two years of this study. Each year, for several factors, the difference is so minor that there is limited cost-saving benefit to one set of practices vs the other. Other than Fertilizer costs, the factors listed would, on average, be very similar for the 3-year trend period.

Crop Enterprises Owned & Rented Acres Combined	Soybeans					
	2021		2022		2023	
	EC	AVG	EC	AVG	EC	AVG
Number of Farms	49	1,344	59	1,342	58	1,439
Yield per acre	56.4	49.1	51.2	53.0	49.6	50.9
Seed Expense/acre	\$52.47	\$54.29	\$55.19	\$56.60	\$55.95	\$59.34
Fertilizer Expense/acre	\$37.76	\$24.49	\$38.73	\$34.07	\$49.33	\$46.88
Chemical Expense/acre	\$55.00	\$47.28	\$61.49	\$61.88	\$65.82	\$66.05
Fuel & Oil Expense/acre	\$16.01	\$16.13	\$22.71	\$24.39	\$18.04	\$22.09
Total dir & ovhd exp/ac	\$475.63	\$452.07	\$529.83	\$528.25	\$555.61	\$562.22
Net Return/acre	\$245.26	\$187.47	\$199.79	\$229.00	\$106.06	\$107.61
Crop Insurance/acre	\$18.69	\$23.48	\$4.93	\$7.82	\$27.71	\$21.20
Gov. Payments/acre	\$0.97	\$2.47	\$0.93	\$0.36	NA	NA
Machinery Cost/acre	\$105.40	\$95.22	\$113.22	\$114.42	\$127.27	\$117.39
Cost of Prod w Lbr/unit	\$8.64	\$9.30	\$11.07	\$10.56	\$11.20	\$11.29

This Cost of Production chart illustrates that production practices for these two groups result in total Costs of Production that are very similar over time.



For the 3-year comparison, the FBM State Database average has the advantage of a higher Net Return per acre in the past two years. The largest single year advantage, however, was for 2021 when the Environmental Cohort had greater Net Return per acre.

Alfalfa Hay

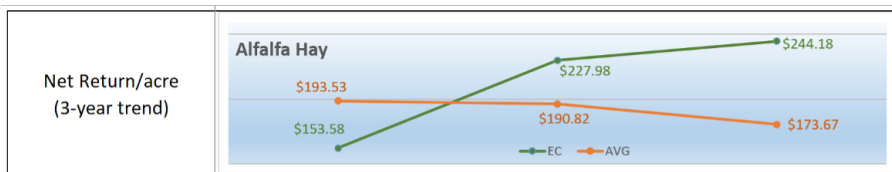
Yields for Alfalfa Hay were similar with the exception of 2021, where the FBM State Database average had an edge. Selected expenses indicate that the Environmental Cohort generally had lower costs per acre, with individual

Crop Enterprises Owned & Rented Acres Combined	Alfalfa Hay					
	2021		2022		2023	
	EC	AVG	EC	AVG	EC	AVG
Number of Farms	24	336	23	317	29	318
Acres	92	104	94	99	92	103
Yield per acre	3.5	4.2	4.6	4.5	4.3	4.2
Seed Expense/acre	NA	NA	\$0.54	\$1.02	NA	\$1.57
Fertilizer Expense/ac	\$55.14	\$54.34	\$82.55	\$75.97	\$78.25	\$73.04
Chemical Expense/ac	\$7.70	\$10.82	\$11.65	\$11.52	\$8.00	\$13.37
Fuel & Oil Expense/ac	\$31.94	\$31.29	\$45.58	\$47.33	\$38.96	\$42.80
Total dir & ovhd exp/ac	\$434.14	\$449.55	\$500.42	\$506.03	\$464.25	\$516.33
Net Return/acre	\$153.58	\$193.53	\$227.98	\$190.82	\$244.18	\$173.67
Crop Insurance/acre	\$0.01	\$6.62	\$13.08	\$2.26	\$4.59	\$3.77
Gov. Payments/acre	\$0.11	\$0.21	NA	\$0.13	NA	NA
Machinery Cost/acre	\$186.77	\$172.92	\$192.01	\$199.98	\$188.05	\$202.02
Cost of Prod w Lbr/unit	\$136.99	\$115.73	\$116.70	\$123.39	\$117.26	\$132.33

years where various factors showed the FBM State Database average had the advantage. The Environmental Cohort also had higher returns in the recent two years of this study.



The Cost of Production was lower for the Environmental Cohort in the last two years.



Net Return per acre was stronger for the Environmental Cohort in 2022 and 2023.

The Crop Enterprise tables continue to suggest any advantage in individual costs and returns varies for each group each year. After five years of comparative data, it is difficult to suggest ongoing cost benefits of intensified environmental crop production practices. This report will continue to add data annually to aid in understanding the overall implications of intensified practices on crop profitability.

Pre-Study and Post-Study Data adds Perspective

The 2023 report was expanded to five years of pre-study data from producers enrolled in the FBM program since 2014. The data for the Environmental Cohort comes from **35 farms** that were enrolled all 10 years and are included in the data from the **126 farms** in this report. The FBM State Database average group includes **651 farms** that were enrolled all 10 years but NOT Water Quality Certified in 2023.

A 5-year average is used to show the trend comparison, 2014 to 2018 and 2019 to 2023.

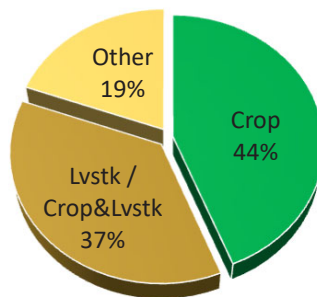
This table includes that average and a percentage comparison. The Environmental Cohort continues to show similar advantages (In the form of a 100+%) over the State Database average for most factors. Crop sales are less due to a higher level of livestock on the Environmental Cohort farms, while ROA and operating expense ratio were basically even between the two.

Financial Factors	Pre-Study 5-Year Average (2014 - 2018)			Post-Study 5-Year Average (2019 - 2023)		
	Environ. Cohort	State Avg.	EC as % of State Avg	Environ. Cohort	State Avg.	EC as % of State Avg
Gross Cash Farm Income	\$1,107,057	\$856,424	129%	\$1,439,488	\$1,127,373	128%
Crop Sales	\$329,156	\$457,357	72%	\$487,301	\$634,048	77%
Livestock Sales	\$619,419	\$263,919	235%	\$703,184	\$309,118	227%
Total Cash Farm Expense	\$897,404	\$723,380	124%	\$1,147,186	\$907,442	126%
Net Cash Income	\$209,653	\$133,044	158%	\$292,302	\$219,931	133%
Average Net Farm Income	\$144,543	\$72,127	200%	\$303,506	\$227,224	134%
Median Net Farm Income	\$53,697	\$41,232	130%	\$124,305	\$148,078	84%
Working Capital as % of OE	61.7%	37.5%	164%	75.6%	57.4%	132%
Farm Debt to Asset Ratio	35%	44%	124%	33%	42%	127%
Rate of Return on Assets	3.54%	2.34%	151%	6.88%	6.84%	101%
Debt Coverage Ratio	172.20%	109.00%	158%	342.60%	234.60%	146%
Operating Expense Ratio	77.9%	80.2%	97%	73.8%	71.8%	103%
Total net worth change	\$101,638	\$62,691	162%	\$259,794	\$240,936	108%

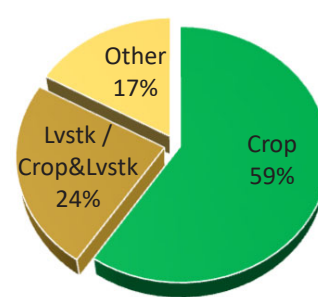
Livestock Enterprises At-A-Glance

The Income Source data noted earlier in this report indicates that the Environmental Cohort generates more income from livestock than the FBM State Database average. These two charts, based on the number of farms by type, show that the Environmental Cohort has 13% more livestock and livestock & crop farm types than the FBM State Database average, and 15% less crop farms.

Percent Farms by Type - Env. Cohort



Percent Farms by Type - DB Average

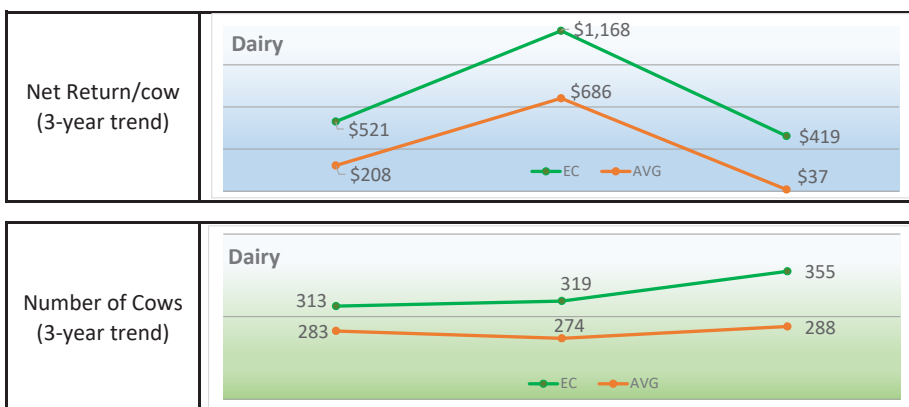


Livestock Enterprise	Dairy (Excluding Organic, Organic Transition)					
	2021		2022		2023	
	EC	AVG	EC	AVG	EC	AVG
Number of Farms	18	276	17	243	18	249
Gross Margin / cow	\$5,049	\$4,524	\$6,440	\$5,740	\$5,442	\$5,037
Feed Cost / cow	\$2,658	\$2,424	\$3,256	\$2,908	\$3,015	\$2,780
Net Return / cow	\$521	\$208	\$1,168	\$686	\$419	\$37
Gov. Payments /cow	\$258	\$251	\$41	\$32	\$268	\$259
Avg. Milk Price / cwt	\$18.98	\$18.41	\$25.34	\$24.24	\$19.96	\$19.14
Milk Produced / cow	26,931	25,285	26,810	25,485	27,158	25,918
Number of Cows	313	283	319	274	355	288

The Dairy enterprise was submitted by more farms than other livestock enterprises in the Environmental Cohort, so Dairy was selected to highlight. The table on the left includes selected income, expense, and management factors

from the Dairy enterprise report. Based on this Dairy data alone, one can see how a greater percentage of livestock on the farm can lead to generating greater income for the Environmental Cohort.

The Environmental Cohort had the advantage in all factors in the table except Feed Cost per cow. This Cohort had a significantly higher Net Return/cow and had an average herd size larger than the FBM State Database average. As this study continues into the 6th year, and beyond, it will be important to evaluate the trend data for Dairy and other livestock enterprises when possible.

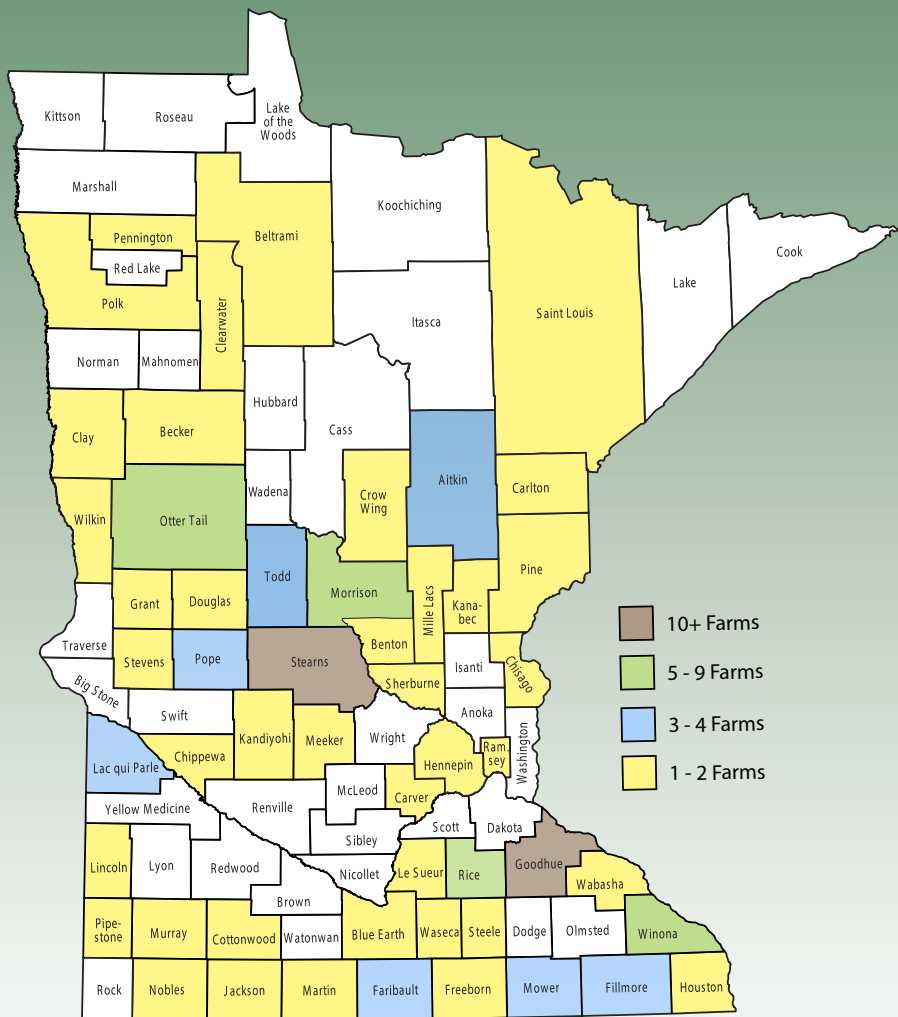


Farm Business Management and Minnesota NASS Data - A Brief Overview

Demographics - 2022	FBM	MN NASS
Number of Farms	2,129	65,531
Average Farm Size in Acres	795	388
Average Age of Operator	47.2	57.1
Years of Farming per Operator	23.0	26.1
Percent Beginning Farmers (<11 yrs farming)	29%	14%

Financial Factors - 2022	FBM	MN NASS	
Percent of Farms over:	\$100,000 Ag Product Sales	90.5%	36.2%
	\$500,000 Ag Product Sales	57.8%	17.7%
	500 Acres of Land Farmed	47.3%	19.7%
Production Expenses per Farm	\$881,598	\$317,111	
Net Cash Income from Operations / Farm	\$198,964	\$141,869	

“The USDA National Agricultural Statistics Service (NASS) conducts hundreds of surveys every year and prepares reports covering virtually every aspect of U.S. agriculture.” The NASS database includes all MN farms generating \$1,000 or more of sales/production, while the FBM State Database includes farmers choosing to enroll in FBM. These two tables provide a window into selected factors to illustrate the demographic and financial aspects of these two comprehensive databases.



SOURCES OF DATA

The 126 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 the 52 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.*

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1. Improved Quality of Life in 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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