

Economics of NE WI and MI Organic Dairy Farms, 2016

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The Midwest has many geographical regions that differ in environmental and cultural factors including soil productivity, land prices, and types of dairy farms. Despite the differences, it is amazing that organic dairy farms in the Midwest tend to gravitate toward somewhat similar results in profitability.

Eight farms in NE Wisconsin and Michigan were studied that were deemed to be moderately to highly profitable. Most of the farms selected in this study tend to use modernized, conventional dairy facilities combined with labor efficient milking systems. Six other farms were also studied but deemed not profitable enough to provide for and sustain adequate family living. Many of these farms used quite antiquated stall barn facilities that lacked cow comfort.

The eight more profitable herds selected for this study compete quite well financially with previous organic dairy farm studies in the Midwest and Eastern U.S. For analysis purposes, the results are reported in comparison for the "Average" (AVE) of the eight herds; the "HP" (HP) four herds; and the "Lower Profit" (LP) four herds. Note that this is a small data set but relative to other studies, these farms would tend to be representative of more profitable organic dairy farms in the Midwest.

Highlights from the Comparison of the Farms

The eight AVE farms had 103 cows on 423 acres or 4.12 acres per cow. The four HP farms averaged 145 cows with 611 acres per farm or 4.21 acres per cow. The four LP farms averaged 60 cows with 235 acres per farm or 3.91 acres per cow. The **milk sold per cow*** was 14,034 lbs. for the AVE herd; 14,455 lbs. for the HP herds; 13,613 lbs. for the LP herds. The HP herds averaged 813 more pounds of milk sold per cow annually with a pay price \$0.97 per cwt. lower than the LP farms. Milk production per cow ranged from 12,368 lbs. to 18,171 per cow annually for the HP farms and from 8,672 to 18,904 for the LP farms.

Milk sales per cow were \$4,747 for the AVE herd; \$4,825 for the HP herds; and \$4,557 for the LP herds or \$268 less than the HP herds, even with a \$0.97/cwt higher milk price. Cull cow sales were \$99 for the AVE herd; \$93 for the HP herds; and \$114 for the LP herds. Thus, on average, both the HP and LP farms had low cull rates. Crop sales were three times higher on the LP versus HP farms. With cull cows, crops and all other sales included, the AVE herd had **Total Cash Income per cow** of \$5,275; the HP herds had \$5,234; and the LP herds had \$5,373--\$139 higher than the HP herds.

On the expense side **Veterinary and Medicine** expense was \$7 per cow lower for the HP herds relative to the LP herds. **Breeding Fees** were \$19 higher for the LP herds versus the HP herds which is opposite most studies.

The **Purchased Feed Expense** was \$811 per cow on the HP herds and \$700 per cow on the LP herds—a \$111 per cow difference. Thus, the HP herds bought 14% more feed than the LP HERDS with 6.1% more milk sold per cow on similar acres per cow, depending on how it is calculated. *If the total number of cows from each farm is added and then divided by the sum of all the cows from each farm, the HP herds have 0.3 acres more per cow (4.21 vs. 3.91). However, if the average number of cows from each farm is added, then divided by the average number of cows from each farm, the HP farms have 0.12 acres less productive acres per cow. So, the difference in purchased feed cost per cow is probably mainly due to the higher production level of the HP herds.*

Seed and Fertilizer expense was \$294 per cow for the AVE herd; \$307 for the HP herds; and \$262 for the LP herds, again with similar acres per cow. Again, the tendency shows for the HP herds in various studies to spend more in the seed and fertilizer category. Note that changes in pre-paid expenses could alter this difference somewhat as pre-paid expenses are often in the seed and fertilizer category which was not broken out on some farms.

Utility expenses per cow were \$72 for the AVE herd; \$65 for the HP herds; and \$90 for the LP herd—a \$25 per cow difference. **Labor Hired** per cow was \$540 for the AVE herd; \$577 for the HP herds; and \$450 for the LP herds—a \$127 difference between the HP and LP herds but very typical with the difference in herd sizes. The **Other Cash Expense** was \$186 higher for the LP farms versus the HP farms. **Total Cash Expense** per cow was \$3,177 for the AVE herd; \$3,181 for the HP herds; and \$3,165 for the LP herds—all relatively similar.

Net Cash Income per cow was \$2,098 for the AVE herds; \$2,053 for the HP herds; and \$2,208 for the LP herds. Using Net Cash Income for profit comparison can be very misleading due to the *paid versus unpaid labor issue* and also due to the *interest expense versus equity charge issue*. In this analysis, interest expenses were not included and total assets were charged 4% so as to better compare farms.

Inventory change per cow was \$169 for the AVE herd; -\$230 for the HP herds; and \$23 for the LP herds to give a **Net Farm Income** per cow of \$2,268 for the AVE herd; \$2,283 for the HP herds; and \$2,231 for the LP herds. Still, it is unfair to draw conclusions at this point due to lack of full accounting of both unpaid labor and equity/asset charges.

Labor Efficiency and Returns to Labor

After subtracting an **Equity Charge of 4%** across all farm assets of \$847 for the AVE herd; \$802 for the HP herds; and \$955 for the LP herds. The **Return to Unpaid Labor** per cow was \$1,421 for the AVE herd; \$1,481 for the HP herds; and \$1,276 for the LP herds. Again, conclusions comparing profits is still not possible as the unpaid labor is cost is still not considered at this point.

The annual unpaid labor hours was 5,300 herd for the AVE herd; 5,750 for the HP herds; and 4,850 for the LP herds. This translates into unpaid labor hours per cow at 52 for the AVE herd; 40 for the HP herds; and 81 for the LP herds.

Thus, the LP herds have over twice as much *unpaid* labor per cow yet to be accounted (this is similar to the 2016 ANCHOR farm study data). Dividing the Return to Labor by the unpaid labor hours gives a **Labor Earnings per Hour** of \$28.12 for the AVE herd; \$39.99 for the HP herds; and \$16.25 for the LP herds. For the Owner-Operator, the HP herds were much more profitable per hour worked.

However, if the Net Farm Income plus Labor Hired expense is spread over total hours worked, both paid and unpaid (owner-operator) then we see a different story. The **Return to All Labor per Hour Worked** was \$20.68 for the AVE herd; \$24.62 for the HP herds; and \$14.14 for the LP herds. So, the HP farms have over twice the returns per unpaid labor hour for the Owner-Operator and \$10.48 more return for all labor per hour work. Thus, the HP farms had a much more productive workforce in comparison to the LP farms.

A Full Time Equivalent (FTE) is 3,000 hours annually. The **Adjusted Gross Return per FTE Laborer** was \$195,413 for the AVE herd; \$232,613 for the HP herds; and \$158,512 for the LP herds. **Return to ALL Labor per FTE** was \$62,923 for the AVE herd; \$81,938 for the HP herds; and \$43,909 for the LP herds (*not in table*). **Number of Cows per FTE** was 35 for the AVE herd; 42 for the HP herds; and 29 for the LP herds. One herd achieved 70 cows per FTE.

Pounds of Milk Sold per FTE was 454,900 for the AVE herd; 569,600 for the HP herds; and 340,200 for the LP herds. **All Labor Costs per Cow** was \$1,267 for the AVE herds; \$1,042 for the HP herds; and \$1,491 for the LP herds. **All Labor as a Percent of Total Costs** was 24% for the AVE herd; 22% for the HP herds; and 26% for the LP herds. *The HP herds outshined the LP herds in all labor efficiency factors.*

Capital Efficiency and Fixed Costs

Capital Cost per Cow (includes Depreciation and Interest/Equity Charges) was \$1,195 for the AVE herd; \$1,119 for the HP herds; and \$1,271 for the LP herds. **Fixed Costs per Cow** (includes Depreciation, Interest, Repairs, Taxes and Insurance) was \$1,686 for the AVE herd; \$1,614 for the HP herds; and \$1,748 for the LP herds. **Capital Invested per Cow** was \$21,201 for the AVE herd; \$20,124 for the HP herds; and \$22,278 for the LP herds. **Fixed Cost as a Percent of Total Costs** was 31.69% for the AVE herd; 32.61% for the HP herds; and 30.77% for the LP herds.

Cropping and Other Efficiencies

Net Farm Income per Crop Acre was \$682 for the AVE herd; \$778 for the HP herds; and \$586 for the LP herds. **Pounds of Milk Produced per Crop Acre** was 3,937 for the AVE herd; 4,394 for the HP herds; and 3,479 for the LP herds. **Machinery Investment per Crop Acre** was \$843 for the AVE herd; \$595 for the HP herds; and \$1,090 for the LP herds. The HP herds benefited from spreading machinery costs over more acres.

Fertilizer and Seed Cost per Crop Acre was \$76 for the AVE herd; \$87 for the HP herds; and \$64 for the LP herds. This is another data set showing the HP herds spend more on crop inputs than the LP. The **Livestock over Total Investment Percent** was very similar between 14 and 15% for all categories.

Cost of Production and Returns to Assets

To calculate **cost of production**, all non-milk income was divided by the milk price, then added to milk cwt. sold to obtain a **cwt. eq.** total. The AVE herd had a milk price of \$35.07/cwt of milk sold with a cost of \$30.88/cwt eq for a net income of \$4.19/cwt eq. The HP herds had a milk price of \$34.59/cwt with a cost of \$28.15/cwt eq for a net income of \$6.44/cwt eq. The LP herds had a milk price of \$35.56/cwt. with a cost of \$33.61/cwt eq for a net income of \$1.95/cwt eq.

Return to Assets (ROA) is an important, all-inclusive measure that marries the net worth statement and the net farm income statement giving a percent return that can be compared to the outside financial markets. But, compare with caution as various farms rent or lease land, cows and/or machinery, rather than own which can greatly affect this measure. This survey shows the AVE herds receiving **Return to Assets** of 7.55%; the HP herds receiving 9.28%; and LP herds receiving 5.82%.

The **Operating Profit Margin** (OPM) was 27.02% for the AVE herd; 33.07% for the HP herds; and 20.98% for the LP herds. The **Asset Turnover Ratio** (ATO) was 28.62% for the AVE herd; 28.22% for the HP herds and 28.92% for the LP herds. The Asset Turnover Ratio is lower than the desired benchmark of 33% for all categories, often due to a combination of over-investment in capital per cow or lower milk production per cow. This is important for the Profit Equation where:

$$\text{Profit or ROA} = (\text{Price-Cost}) \text{ or } \text{OPM} \times \text{Volume or ATO}$$
$$9.28\% = 33.07\% \times 28.22\%$$

Summary

These Organic Dairy Farms in NE Wisconsin and Michigan show good profitability in 2016. The LP herds have respectable profitability that compete quite well with the average of other dairy production systems while the HP herds demonstrated great ability to compete quite well with the best of other types of non-organic dairy systems.

However, the dairy farms studied and not included in this study demonstrate that dairy fundamentals such as cow comfort, business diligence, and labor efficient facilities are needed in order to attain profits high enough to sustain family living.

Author's Side Comment

This study again proves that good profits can be attained from organic dairy production. Higher profit organic and grazing farms tend to be in the 100 plus cow category. But, as the ANCHOR organic farm study in Wisconsin shows, the organic farms in the 240 – 520 cow number range do not perform better, depending on how profitability is defined. And, as the 2016 Millionaire Model Dairy Farms in Iowa show in comparison to conventional and conventional-grazing farms, the milk price is the major determining factor in comparative profitability whereby a simple \$1-\$2 per cwt. change in organic or conventional milk price either way can drastically change comparative profitability. Bottom line, all dairy systems studied can be profitable.

**Note: The "average" is calculated as the sum of the individual farms for each item, not a previous item's sum divided by another item's sum, which yields slightly different results.*

Organic Dairy Farms NE WI/MI 2016	Average of All 8 Farms			Average of Higher Profit Farms(4)			Average of Lower Profit Farms (4)		
	/Cow			/Cow			/Cow		
Productive Crop Acres Operated	423	4.12		611	4.21		235	3.91	
Average Number of Cows	103			145			60		
Total Assets on Farm	\$2,189,954	\$21,365		\$2,929,916	\$20,206		\$1,449,992	\$24,167	
Milk Price	\$35.07			\$34.59			\$35.56		
Milk Hundred weight Equiv.	16,929	165		23,857	165		10,000	167	
Milk Hundredweights	14,092	137		20,364	140		7,820	130	
Milk Sales	\$486,557	\$4,747		\$699,695	\$4,825		\$273,419	\$4,557	
Cull Cow Sales	\$10,181	\$99		\$13,550	\$93		\$6,812	\$114	
Calf Sales	\$6,850	\$67		\$11,205	\$77		\$2,495	\$42	
Crop Sales	\$14,195	\$138		\$12,368	\$85		\$16,022	\$267	
Other Income	\$22,885	\$223		\$22,135	\$153		\$23,635	\$394	
Total Cash Income	\$540,668	\$5,275	/Cwt. Eq.	\$758,953	\$5,234	/Cwt. Eq.	\$322,383	\$5,373	/Cwt. Eq.
Veterinary, Medicine	\$5,558	\$54	\$0.33	\$7,590	\$52	\$0.32	\$3,526	\$59	\$0.35
Dairy Supplies	\$21,516	\$210	\$1.27	\$31,899	\$220	\$1.34	\$11,133	\$186	\$1.11
Breeding Fees	\$1,973	\$19	\$0.12	\$1,966	\$14	\$0.08	\$1,981	\$33	\$0.20
Feed Purchased	\$79,830	\$779	\$4.72	\$117,640	\$811	\$4.93	\$42,020	\$700	\$4.20
Repairs	\$31,915	\$311	\$1.89	\$40,328	\$278	\$1.69	\$23,503	\$392	\$2.35
Seed, Chem, Fert	\$30,105	\$294	\$1.78	\$44,498	\$307	\$1.87	\$15,712	\$262	\$1.57
Fuel, Gas, and Oil	\$10,794	\$105	\$0.64	\$12,940	\$89	\$0.54	\$8,648	\$144	\$0.86
Utilities	\$7,414	\$72	\$0.44	\$9,428	\$65	\$0.40	\$5,400	\$90	\$0.54
Interest Paid -- not included	\$0.00			\$0.00			\$0.00		
Labor Hired	\$55,338	\$540	\$3.27	\$83,696	\$577	\$3.51	\$26,981	\$450	\$2.70
Rent, Lease and Hire	\$34,120	\$333	\$2.02	\$50,905	\$351	\$2.13	\$17,335	\$289	\$1.73
Property Taxes	\$7,586	\$74	\$0.45	\$11,905	\$82	\$0.50	\$3,268	\$54	\$0.33
Farm Insurance	\$8,358	\$82	\$0.49	\$12,388	\$85	\$0.52	\$4,329	\$72	\$0.43
Other Cash Expense	\$31,088	\$303	\$1.84	\$36,094	\$249	\$1.51	\$26,083	\$435	\$2.61
Total Cash Expense	\$325,597	\$3,177	\$19.23	\$461,274	\$3,181	\$19.33	\$189,919	\$3,165	\$18.99
Net Cash Income	\$215,071	\$2,098	\$12.70	\$297,679	\$2,053	\$12.48	\$132,463	\$2,208	\$13.25
Inventory Change	\$17,361	\$169	\$1.03	\$33,347	\$230	\$1.40	\$1,375	\$23	\$0.14
Net Farm Income	\$232,432	\$2,268	\$13.73	\$331,026	\$2,283	\$13.88	\$133,838	\$2,231	\$13.38
Equity @ 4%	\$86,767	\$847	\$5.13	\$116,242	\$802	\$4.87	\$57,292	\$955	\$5.73
Return to Labor	\$145,665	\$1,421	\$8.60	\$214,784	\$1,481	\$9.00	\$76,546	\$1,276	\$7.65
Inventory Adjustments--Feed	\$24,397	\$238	\$1.44	\$28,711	\$198	\$1.20	\$20,083	\$335	\$2.01
Supplies and Other	\$3,201	\$31	\$0.19	\$6,401	\$44	\$0.27	\$0	\$0	\$0.00
Breeding Livestock	\$17,444	\$170	\$1.03	\$28,225	\$195	\$1.18	\$6,663	\$111	\$0.67
Income Change	\$45,041	\$439	\$2.66	\$63,337	\$437	\$2.65	\$26,745	\$446	\$2.67
Prepaid Expenses	-\$2,859	-\$28	-\$0.17	-\$925	-\$6	-\$0.04	-\$4,793	-\$80	-\$0.48
Accounts Payable	\$0	\$0	\$0.00	\$0	\$0	\$0.00	\$0	\$0	\$0.00
Machinery & Equipment	-\$1,682	-\$16	-\$0.10	-\$5,513	-\$38	-\$0.23	\$2,148	\$36	\$0.21
Land and Buildings	-\$692	-\$7	-\$0.04	-\$11,546	-\$80	-\$0.48	\$10,162	\$169	\$1.02
Other Adjustments	\$1,741	\$17	\$0.10	\$2,368	\$16	\$0.10	\$1,114	\$19	\$0.11
Expense Change	\$3,492	\$34	\$0.21	\$15,615	\$108	\$0.65	-\$8,631	-\$144	-\$0.86
Capital Purchases Minus Sales Adj.	\$24,188	\$236	\$1.43	\$14,375	\$99	\$0.60	\$34,001	\$567	\$3.40
Depreciation COST	\$85,267	\$832	\$5.04	\$99,996	\$690	\$4.19	\$70,537	\$1,176	\$7.05
Depreciation FM Value	\$26,687	\$260	\$1.58	\$31,683	\$219	\$1.33	\$21,691	\$362	\$2.17
Unpaid Labor Cost	\$63,750	\$622	\$3.77	\$70,000	\$483	\$2.93	\$57,500	\$958	\$5.75
Unpaid Labor Hours	5,300	52		5,750	40		4,850	81	
Labor Full Time Equivalent	3.24			4.04			2.44		
Labor Earnings Per Hour	\$28.12			\$39.99			\$16.25		
Gross Income per Cwt. Eq.	\$35.07			\$34.59			\$35.56		
Gross Expense per Cwt. Eq.	\$30.88			\$28.15			\$33.61		
Net Income per cwt.	\$4.19			\$6.44			\$1.95		

Organic Dairy Farms NE WI/MI 2016	Average of All 8 Farms		Average of Higher Profit		Average of Lower Profit	
	/Cow		Farms(4)	/Cow	Farms (4)	/Cow
Cash Income--	\$540,668	\$5,275	\$758,953	\$5,234	\$322,383	\$5,373
Adjusted Income	\$45,041	\$439	\$63,337	\$437	\$26,745	\$446
Total Income	\$585,709	\$5,714	\$822,290	\$5,671	\$349,128	\$5,819
Cash Costs	\$325,597	\$3,177	\$461,274	\$3,181	\$189,919	\$3,165
Adjusted Costs	\$27,680	\$270	\$29,990	\$207	\$25,370	\$423
Overhead Costs	\$150,517	\$1,468	\$186,242	\$1,284	\$114,792	\$1,913
Total Costs	\$503,794	\$4,915	\$677,506	\$4,672	\$330,081	\$5,501
RETURN OVER COSTS	\$81,915	\$799	\$144,784	\$999	\$19,046	\$317
Adj. Gross Return per FTE Labor.....	\$195,413		\$232,613		\$158,212	
Return to All Labor per FTE Labor.....	\$62,923		\$81,938		\$43,909	
Number of Cows per FTE Labor.....	35		42		29	
Cwts. of Milk Sold per FTE Labor.....	4,549		5,696		3,402	
Pounds of Milk Sold per Cow.....	14,034		14,455		13,613	
Productive Crop Acres per Cow.....	3.83		3.77		3.89	
Capital Cost per Cow.....	\$1,195		\$1,119		\$1,271	
All Labor Costs per Cow.....	\$1,267		\$1,042		\$1,491	
Fixed Cost per Cow (DIRTI)	\$1,686		\$1,614		\$1,758	
Capital Invested per Cow.....	\$21,201		\$20,124		\$22,278	
Net Farm Income per Crop Acre.....	\$682		\$778		\$586	
Lbs. Milk Produced per Crop Acre.....	3,937		4,394		3,479	
Adj. Gross Cash Income/Crop Acre.....	\$1,655		\$1,800		\$1,510	
Machinery Investment/Crop Acre	\$843		\$595		\$1,090	
Fuel, Gas and Oil Cost/Crop Acre.....	\$28		\$23		\$34	
Repair Cost per Crop Acre.....	\$88		\$84		\$93	
Fert/Chem/Seed Cost/Crop Acre.....	\$76		\$87		\$64	
Livestock over Total Investment %	14.50%		14.06%		14.94%	
Cash Exp./Cash Inc.w/o Labor&Int.....	50.95%		49.39%		52.52%	
All Labor as Percent of Total Costs.....	24.04%		22.10%		25.98%	
Fixed Cost as Percent of Total Cost.....	31.69%		32.61%		30.77%	
**Net Farm Income From Operations	\$232,432		\$331,026		\$133,838	
**Rate of Return on Assets.....	7.55%		9.28%		5.82%	
**Rate of Return on Equity.....	7.55%		9.28%		5.82%	
**Operating Profit Margin.....	27.02%		33.07%		20.98%	
**Asset Turnover Ratio.....	28.62%		28.22%		29.02%	
**Operating Expense Ratio.....	55.26%		54.69%		55.83%	
**Depreciation Expense Ratio.....	4.78%		4.00%		5.56%	
**Net Farm Income Ratio.....	39.88%		41.25%		38.50%	
Dairy TRANS Profit Status is.....	Average to Superb		Good/Superb		Average/Good	
Dairy TRANS Performance Rating	68.38%		77.50%		59.25%	

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For more information visit the ISU Dairy Team at: www.extension.iastate.edu/dairyteam

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