

Anchor Organic Dairy Farm Performance in Wisconsin, 2016

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An “Anchor” Organic Dairy Farm is defined as an organic dairy farm considered a “top performer” relative to peer organic dairy farms and tends to be a bit larger than average in cow numbers and crop acres. This study aims to target hand-selected farms fitting that definition. Ten herds were part of the study. This analysis provides overall results and compares four of the larger farms averaging 365 cows per herd with the smaller farms averaging 104 cows per herd.

The average of the ten farms had 208 cows on 940 acres or about 4.5 acres per cow. The four larger farms ranged in size from 240 to 518 cows per farm with acreages ranging from 1,200 to 2,580 acres or about 4.5-4.6 acres per cow. Six smaller farms ranged in size from 83-121 cows per farm with acreages ranging from 235 to 632 acres or about 4.4-4.5 acres per cow. For analysis purposes, the results are reported in comparison for the AVERAGE of the ten herds, the LARGER four herds, and the SMALLER six herds.

Note that this is a small data set which, by this author’s experience, is representative of top performing organic dairies. These dairies have enough “economy of scale” to be competitive with the best of dairy producers using organic, grazing, and/or conventional production practices. Most of the farms selected in this study tend to use modernized conventional dairy facilities combined with labor efficient milking systems.

Highlights from the Comparison of the Farms

The **Milk sold per cow** was 16,044 lbs. for the AVERAGE herd; 16,384 lbs. for the LARGER herds; 15,816 lbs. for the SMALLER herds. The LARGER herds tended to milk a higher percentage of Holsteins which explains the higher milk production levels and probably also the lower pay price. Milk production per cow ranged from 12,368 lbs. to 18,981 per cow annually across the ten farms.

Milk sales per cow were \$5,627 for the AVERAGE herd; \$5,751 for the LARGER herds; and \$5,337 for the SMALLER herds or \$414 less than the LARGER herds. Cull cow sales were \$225 for the AVERAGE herd; \$263 for the LARGER herds; and \$134 for the SMALLER herds. It is concluded that with almost double the value of cull cow sales, that cull rates on the LARGER herds were significantly higher than the SMALLER herds. Crop sales were 22% higher on the LARGER versus SMALLER farms. With cull cows, crops and all other sales included, the AVERAGE herd had **Total Cash Income** of \$6,429; the LARGER herds had \$6,615; and the SMALLER herds had \$5,994 or \$621 less Total Cash Income than the LARGER herds.

The SMALLER herds more than make up the cash income difference with lower “total” cash expenses. **Veterinary and Medicine** expense was \$30 per cow lower for the larger herds which tend to have a herdperson specialized enough to

do more cow health care. **Breeding Fees** were \$18 higher for the LARGER herds versus the SMALLER herds.

With similar acres per cow, the **Purchased Feed Expense** was \$610 per cow on the LARGER herds and \$860 per cow on the SMALLER herds—a \$250 per cow difference. Thus, the LARGER herds bought 30% less feed than the SMALLER HERDS with 3.3% more milk sold per cow. It seems some “economy of scale” comes into feed production and/or feed procurement for the LARGER herds or they simply may have less feed waste or shrink. Or, they could be more productive in their cropping operations because of their use of more crop inputs. **Seed and Fertilizer** expense was \$471 per cow for the AVERAGE herd; \$543 for the LARGER herds; and \$301 for the SMALLER herds, again with similar acres per cow. This represents a \$242 per cow difference that makes up the feed purchased difference between the LARGER and SMALLER herds. 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 \$98 for the AVERAGE herd; \$84 for the LARGER herds; and \$132 for the SMALLER herd—a significant \$48 per cow difference. **Hired labor** per cow was \$751 for the AVERAGE herd; \$915 for the LARGER herds; and \$368 for the SMALLER herds—a \$547 difference between the LARGER and SMALLER herds. A full labor efficiency and returns to labor analysis will follow.

The only other cash expense worth noting is the **Rent/Lease and Hire** expense with the SMALLER herds spending \$69 more per cow. It is worthy to note this because some of the SMALLER herds tended to rent a higher percentage of land and facilities than the LARGER herds—one of the reasons for both less assets, capital costs, fixed costs per cow and possibly a reason for higher returns to assets as well.

Total Cash Expense per cow was \$4,263 for the AVERAGE herd; \$4,468 for the LARGER herds; and \$3,782 for the SMALLER herds—a \$686 difference between the LARGER and SMALLER herds. A major reason for this difference could simply be the LARGER herds paying a higher percentage of the labor while the SMALLER herds have a higher percentage of their labor as “Unpaid Labor” which is not accounted for in the cash expenses.

Net Cash Income per cow was \$2,166 for the AVERAGE herds; \$2,147 for the LARGER herds; and \$2,212 for the SMALLER 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 all assets were charged 4% so as to better compare farms.

Inventory change per cow was -\$185 for the AVERAGE herd; -\$269 for the LARGER herds; and \$11 for the SMALLER herds to give a **Net Farm Income** per cow of \$1,981 for the AVERAGE herd; \$1,878 for the LARGER herds; and \$2,223 for the SMALLER 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 per cow of \$877 for the AVERAGE herd; \$978 for the LARGER herds; and \$638 for the SMALLER herds, the **Return to Unpaid Labor** per cow was \$1,104 for the AVERAGE herd; \$900 for the LARGER herds; and \$1,585 for the SMALLER herds.

The annual unpaid labor hours was 6,898 herd for the AVERAGE herd; 9,195 for the LARGER herds; and 5,367 for the SMALLER herds. This translates into unpaid labor hours per cow at 33 for the AVERAGE herd; 25 for the LARGER herds; and 52 for the SMALLER herds. Thus, the SMALLER herds have over twice as much *unpaid* labor per cow yet to be accounted. Dividing the Return to Labor by the unpaid labor hours gives a **Labor Earnings per Hour** of \$34.14 for the AVERAGE herd; \$37.58 for the LARGER herds; and \$31.85 for the SMALLER herds. For the Owner-Operator, the LARGER herds were 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 \$23.31 for the AVERAGE herd; \$22.65 for the LARGER herds; and \$24.85 for the SMALLER herds. So, the LARGER farms are more profitable for the Owner-Operator but the SMALLER farms had more Return to ALL Labor per Hour Worked. This factor usually does not show in profit analysis but seems worthy of consideration when comparing profitability on herd size.

A Full Time Equivalent (FTE) is 3,000 hours annually. The **Adjusted Gross Return per FTE Laborer** was \$250,060 for the AVERAGE herd; \$239,079 for the LARGER herds; and \$257,381 for the SMALLER herds. **Return to ALL Labor per FTE** was \$74,625 for the AVERAGE herd; \$67,559 for the LARGER herds; and \$79,335 for the smaller herds. **Number of Cows per FTE** was 39 for the AVERAGE herd; 37 for the LARGER herds; and 41 for the SMALLER herds. One herd achieved 70 cows per FTE. **Pounds of Milk Sold per FTE** was 624,700 for the AVERAGE herd; 606,600 for the LARGER herds; and 636,900 for the SMALLER herds. **All Labor Costs per Cow** was \$1,099 for the AVERAGE herds; \$1,233 for the LARGER herds; and \$1,010 for the SMALLER herds. **All Labor as a Percent of Total Costs** was 19.97% for the AVERAGE herd; 21.92% for the LARGER herds; and 18.67% for the SMALLER herds. *The SMALLER herds outshined the LARGER herds in all labor efficiency factors, except Return to Unpaid Labor per Hour.*

Capital Efficiency and Fixed Costs

The SMALLER herds also outshined the LARGER herds in capital efficiency. **Capital Cost per Cow** (includes Depreciation and Interest/Equity Charges) was \$1,030 for the AVERAGE herd; \$1,242 for the LARGER herds; and \$889 for the SMALLER herds. **Fixed Costs per Cow** (includes Depreciation, Interest, Repairs, Taxes and Insurance) was \$1,569 for the AVERAGE herd; \$1,830 for the LARGER herds; and \$1,395 for the SMALLER herds. **Fixed Costs as a Percent of Total Costs** was 28% for the AVERAGE herd; 30.99% for the LARGER herds; and 25.45% for the SMALLER herds. **Capital Invested per Cow** was \$17,449 for the AVERAGE herd; \$21,488 for the LARGER herds; and \$14,757 for the SMALLER herds. *Bottom line is SMALLER herds were more capital efficient but realize the issue of rent versus own may play a major factor here.*

Cropping and Other Efficiencies

Net Farm Income per Crop Acre was \$491 for the AVERAGE herd; \$414 for the LARGER herds; and \$543 for the SMALLER herds. **Pounds of Milk Produced per Crop Acre** was 3,742 for the AVERAGE herd; 3,681 for the LARGER herds; and 3,783 for the SMALLER herds.

Machinery Investment per Crop Acre was \$616 for the AVERAGE herd; \$550 for the LARGER herds; and \$659 for the SMALLER herds. The LARGER herds benefited from spreading machinery costs over more acres. **Fertilizer and Seed Cost per Crop Acre** was \$82 for the AVERAGE herd; \$104 for the LARGER herds; and \$68 for the SMALLER herds. Again, the LARGER herds spent more on crop inputs than the smaller, resulting in less feed purchased per cow with similar acres per cow (within 3%).

The **Livestock over Total Investment Percent** was 18% for the AVERAGE herd; 14% for the LARGER herds; and 20.5% for the SMALLER herds. Knowing livestock tends to be more profitable than machinery and land assets, this factor begs comment that lower profitability of the LARGER herds relative to the SMALLER may be due in part to over-investment in higher priced facilities or simply due to more land and facility ownership versus more renting of those assets by the SMALLER farms.

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 cwts. sold to obtain a **cwt. eq.** total. The AVERAGE herd had a milk price of \$34.19/cwt of milk sold with a cost of \$29.65/cwt eq for a net income of \$4.53/cwt eq. The LARGER herds had a milk price of \$34.09/cwt with a cost of \$30.56/cwt eq for a net income of \$3.53/cwt eq. The SMALLER herds had a milk price of \$34.25/cwt. with a cost of \$29.05/cwt eq for a net income of \$5.20/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 AVERAGE herds receiving **Return to Assets** of 9.84%; LARGER herds receiving 6.97%; and SMALLER herds receiving 11.75%. It is worthy to note that two SMALLER herds were renting the dairy facilities and due to a small percentage of assets owned, earned returns to assets of 15.27% and 23.19%. These two herds, since only in a data set of six, greatly skew this ROA measure. The other four SMALLER herds averaged an 8% return on assets for better comparison purposes with the LARGER herds who owned more of their dairy facilities.

The **Operating Profit Margin** (OPM) was 25.16% for the AVERAGE herd; 24.8% for the LARGER herds; and 25.39% for the SMALLER herds. The **Asset Turnover Ratio** (ATO) was 39.85% for the AVERAGE herd; 27.92% for the LARGER herds and 47.8% for the SMALLER herds. The Asset Turnover Ratio is lower than desired for the LARGER herds again alluding to an over-investment in capital for the number of cows. This is important for the Profit Equation:
Profit or ROA = (Price-Cost) or OPM x Volume or ATO
9.84% = 25.26% x 39.85%

Organic Dairy Farms Anchor Farms 2016	Average of All 10 Farms			Average 4 Larger Farms			Average 6 Smaller Farms		
	80-518 cows	/Cow		240-515 cows	/Cow		80-125 cows	/Cow	
Productive Crop Acres Operated	940	4.51		1658	4.54		461	4.44	
Average Number of Cows	208			365			104		
Total Assets on Farm	\$4,611,505	\$22,128		\$8,955,616	\$24,519		\$1,715,430	\$16,521	
Milk Price	\$34.19			\$34.09			\$34.25		
Milk Hundred weight Equiv.	39,938	192		70,747	194		19,398	187	
Milk Hundredweights	34,335	165		61,610	169		16,153	156	
Milk Sales	\$1,172,698	\$5,627		\$2,100,446	\$5,751		\$554,200	\$5,337	
Cull Cow Sales	\$46,794	\$225		\$96,157	\$263		\$13,886	\$134	
Calf Sales	\$17,243	\$83		\$32,288	\$88		\$7,213	\$69	
Crop Sales	\$52,141	\$250		\$96,525	\$264		\$22,552	\$217	
Other Income	\$50,990	\$245		\$90,664	\$248		\$24,541	\$236	
Total Cash Income	\$1,339,867	\$6,429	/Cwt. Eq.	\$2,416,080	\$6,615	/Cwt. Eq.	\$622,391	\$5,994	/Cwt. Eq.
Veterinary, Medicine	\$15,835	\$76	\$0.40	\$24,531	\$67	\$0.35	\$10,038	\$97	\$0.52
Dairy Supplies	\$47,454	\$228	\$1.19	\$73,277	\$201	\$1.04	\$30,239	\$291	\$1.56
Breeding Fees	\$11,205	\$54	\$0.28	\$21,574	\$59	\$0.30	\$4,292	\$41	\$0.22
Feed Purchased	\$142,620	\$684	\$3.57	\$222,648	\$610	\$3.15	\$89,269	\$860	\$4.60
Repairs	\$89,442	\$429	\$2.24	\$169,822	\$465	\$2.40	\$35,856	\$345	\$1.85
Seed, Chem, Fert	\$98,105	\$471	\$2.46	\$198,369	\$543	\$2.80	\$31,263	\$301	\$1.61
Fuel, Gas, and Oil	\$32,131	\$154	\$0.80	\$58,364	\$160	\$0.82	\$14,642	\$141	\$0.75
Utilities	\$20,431	\$98	\$0.51	\$30,588	\$84	\$0.43	\$13,660	\$132	\$0.70
Interest Paid -- not included	\$0			\$0		\$0.00	\$0		\$0.00
Labor Hired	\$156,600	\$751	\$3.92	\$334,163	\$915	\$4.72	\$38,224	\$368	\$1.97
Rent, Lease and Hire	\$143,516	\$689	\$3.59	\$244,030	\$668	\$3.45	\$76,507	\$737	\$3.94
Property Taxes	\$11,466	\$55	\$0.29	\$21,007	\$58	\$0.30	\$5,105	\$49	\$0.26
Farm Insurance	\$23,148	\$111	\$0.58	\$41,930	\$115	\$0.59	\$10,627	\$102	\$0.55
Other Cash Expense	\$96,441	\$463	\$2.41	\$191,560	\$524	\$2.71	\$33,028	\$318	\$1.70
Total Cash Expense	\$888,393	\$4,263	\$22.24	\$1,631,861	\$4,468	\$23.07	\$392,748	\$3,782	\$20.25
Net Cash Income	\$451,474	\$2,166	\$11.30	\$784,219	\$2,147	\$11.08	\$229,644	\$2,212	\$11.84
Inventory Change	-\$38,604	-\$185	-\$0.97	-\$98,267	-\$269	-\$1.39	\$1,172	\$11	\$0.06
Net Farm Income	\$412,870	\$1,981	\$10.34	\$685,952	\$1,878	\$9.70	\$230,816	\$2,223	\$11.90
Equity @ 4%	\$182,714	\$877	\$4.57	\$357,396	\$978	\$5.05	\$66,260	\$638	\$3.42
Return to Labor	\$230,156	\$1,104	\$5.76	\$328,555	\$900	\$4.64	\$164,556	\$1,585	\$8.48
Inventory Adjustments--Feed	\$11,434	\$55	\$0.29	-\$13,539	-\$37	-\$0.19	\$28,083	\$270	\$1.45
Supplies and Other	-\$1,407	-\$7	-\$0.04	-\$7,500	-\$21	-\$0.11	\$2,655	\$26	\$0.14
Breeding Livestock	\$15,060	\$72	\$0.38	\$19,750	\$54	\$0.28	\$11,933	\$115	\$0.62
Income Change	\$25,087	\$120	\$0.63	-\$1,289	-\$4	-\$0.02	\$42,671	\$411	\$2.20
Prepaid Expenses	\$13,006	\$62	\$0.33	\$24,090	\$66	\$0.34	\$5,617	\$54	\$0.29
Accounts Payable	\$12,044	\$58	\$0.30	\$0	\$0	\$0.00	\$20,074	\$193	\$1.03
Machinery & Equipment	\$58,104	\$279	\$1.45	\$56,918	\$156	\$0.80	\$58,895	\$567	\$3.04
Land and Buildings	\$761	\$4	\$0.02	-\$42,034	-\$115	-\$0.59	\$29,291	\$282	\$1.51
Other Adjustments	\$2,378	\$11	\$0.06	\$3,728	\$10	\$0.05	\$1,477	\$14	\$0.08
Expense Change	-\$62,204	-\$298	-\$1.56	-\$42,701	-\$117	-\$0.60	-\$75,205	-\$724	-\$3.88
Capital Purchases Minus Sales Adj.	\$125,895	\$604	\$3.15	\$139,680	\$382	\$1.97	\$116,704	\$1,124	\$6.02
Depreciation COST	\$168,254	\$807	\$4.21	\$347,888	\$952	\$4.92	\$48,498	\$467	\$2.50
Depreciation FM Value	\$64,282	\$308	\$1.61	\$124,844	\$342	\$1.76	\$23,908	\$230	\$1.23
Unpaid Labor Cost	\$83,000	\$398	\$2.08	\$107,500	\$294	\$1.52	\$66,667	\$642	\$3.44
Unpaid Labor Hours	6,898	33		9,195	25		5,367	52	
Labor Full Time Equivalent	5.53			9.75			2.72		
Labor Earnings Per Hour	\$34.14			\$37.58			\$31.85		
Gross Income per Cwt. Eq.	\$34.19			\$34.09			\$34.25		
Gross Expense per Cwt. Eq.	\$29.65			\$30.56			\$29.05		
Net Income per cwt.	\$4.53			\$3.53			\$5.20		

Organic Dairy Farms Anchor Farms 2016	Average of All 10 Farms		Average of Larger Farms		Average of Smaller Farms	
	/Cow		Farms(4)	/Cow	Farms (6)	/Cow
Cash Income--	\$1,339,867	\$6,429	\$2,416,080	\$6,615	\$622,391	\$5,994
Adjusted Income	\$25,087	\$120	-\$1,289	-\$4	\$42,671	\$411
Total Income	\$1,364,954	\$6,550	\$2,414,791	\$6,611	\$665,062	\$6,405
Cash Costs	\$888,393	\$4,263	\$1,631,861	\$4,468	\$392,748	\$3,782
Adjusted Costs	\$63,691	\$306	\$96,979	\$266	\$41,499	\$400
Overhead Costs	\$265,714	\$1,275	\$464,896	\$1,273	\$132,926	\$1,280
Total Costs	\$1,217,798	\$5,844	\$2,193,736	\$6,006	\$567,173	\$5,462
RETURN OVER COSTS	\$147,156	\$706	\$221,055	\$605	\$97,890	\$943
Adj. Gross Return per FTE Labor.....	\$250,060		\$239,079		\$257,381	
Return to All Labor per FTE Labor.....	\$74,625		\$67,559		\$79,335	
Number of Cows per FTE Labor.....	39		37		41	
Cwts. of Milk Sold per FTE Labor.....	6,247		6,066		6,369	
Pounds of Milk Sold per Cow.....	16,044		16,384		15,816	
Productive Crop Acres per Cow.....	4.58		4.62		4.55	
Capital Cost per Cow.....	\$1,030		\$1,242		\$889	
All Labor Costs per Cow.....	\$1,099		\$1,233		\$1,010	
Fixed Cost per Cow (DIRTI)	\$1,569		\$1,830		\$1,395	
Capital Invested per Cow.....	\$17,449		\$21,488		\$14,757	
Net Farm Income per Crop Acre.....	\$491		\$414		\$543	
Lbs. Milk Produced per Crop Acre.....	3,742		3,681		3,783	
Adj. Gross Cash Income/Crop Acre.....	\$1,489		\$1,434		\$1,525	
Machinery Investment/Crop Acre	\$616		\$550		\$659	
Fuel, Gas and Oil Cost/Crop Acre.....	\$31		\$32		\$31	
Repair Cost per Crop Acre.....	\$84		\$91		\$80	
Fert/Chem/Seed Cost/Crop Acre.....	\$82		\$104		\$68	
Livestock over Total Investment %	17.89%		14.00%		20.48%	
Cash Exp./Cash Inc.w/o Labor&Int.....	55.23%		52.97%		56.74%	
All Labor as Percent of Total Costs.....	19.97%		21.92%		18.67%	
Fixed Cost as Percent of Total Cost.....	27.67%		30.99%		25.45%	
**Net Farm Income From Operations	\$412,870		\$685,952		\$230,816	
**Rate of Return on Assets.....	9.84%		6.97%		11.75%	
**Rate of Return on Equity.....	9.95%		6.97%		11.93%	
**Operating Profit Margin.....	25.16%		24.80%		25.39%	
**Asset Turnover Ratio.....	39.85%		27.92%		47.80%	
**Operating Expense Ratio.....	62.71%		65.14%		61.08%	
**Depreciation Expense Ratio.....	4.04%		4.71%		3.60%	
**Net Farm Income Ratio.....	33.20%		30.00%		35.33%	
Dairy TRANS Profit Status is.....	Average to Superb		Average/Superb		Average/Good/Great	
Dairy TRANS Performance Rating	76.10%		63.50%		84.50%	
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***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.

In Summary, these ANCHOR Organic Dairy Farms show good profitability in 2016. The SMALLER 100 cow herds have demonstrated great ability to compete quite well with the LARGER herds in the 360 cow range, especially with both labor and capital efficiency. LARGER herds returned more per unpaid labor hour but SMALLER herds returned more per total labor hours worked, both paid and unpaid. Overall, these ANCHOR organic dairy herds on average are top performing organic herds that compete quite well with other non-organic production systems of various sizes for cost of production, return to assets and return to unpaid labor hour. For more information visit the ISU Dairy Team at: www.extension.iastate.edu/dairyteam

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