Organic Dairy Farm Performance, 2020
Wisconsin and Minnesota -- Farm Highlights

By Dr. Larry Tranel, Dairy Specialist
Iowa State University Extension and Outreach, NE/SE Iowa

Wisconsin **(WI)** and Minnesota **(MN)** organic dairy farm performance in 2020 was analyzed on nine dairies, not exactly the same farms from the 2019 data. Dairies selected were 1) considered to be good examples of organic dairies in their region and 2) willingness to complete the financial analysis and share information for others to learn. This analysis provides results broken into three categories of Average **(AVE)**; Higher Profit **(HP)** and Lower Profit **(LP).** No Grass Milk **(GM)** dairies were analyzed in WI or MN.

The AVE farm had 229 cows. The HP dairies averaged 182 cows per farm; the LP dairies averaged 267 cows per farm. Similar to previous years, the HP dairies (as measured by cost of production per cwt. eq., return on assets, and return per hour of unpaid labor), outperformed their farm larger counterparts. This data set again verifies that "bigger isn't always better' in common "economy of scale" theory.

The AVE dairy had 4.53 acres per cow with 3.99 and 4.83 for the HP and LP farms, respectively. Average assets was $18,213 and 25,100 for the HP and LP farms, respectively, and highly related to the higher acres per cow owned or operated and relative machinery levels, too.

The AVE milk price was $29.24 and was similar at $29.26 and $29.22 for the HP and LP farms, respectively but ranged from $27.00 to $30.99, both ends were in the LP group. Milk income averaged $4,842 with the HP farms averaging $5,569 and the LP farms $4,445, or a significant 25% higher for the HP farms. This 2020 milk income was approximately $300-$500 higher than in 2019 for the various groups.

Milk income would mostly equate from milk components, milk quality and milk production factors. The HP farms had estimated protein at 3.09% and butterfat at 4.13% with annual milk production per cow at 18,751. The LP farms had estimated protein at 3.12% and butterfat at 4.02% with annual milk production per cow at 14,426, or 23% lower than the HP farms, almost exactly the difference in 2019 data. One farm in the 2020 data milked with a robotic milking system achieving a milk production level of 21,422 pounds per cow annually while the lowest producing farm produced 12,488 pounds per cow.

Other Income and Expense Highlights

Cull cow sales per cow were $164 and $207 for the HP and LP farms respectively. Calf sales were similar at around $49 per cow. Crop sales per cow averaged $21 and $307 for the HP and LP farms, respectively. Past data is year's past often showed the HP farms having more crop sales. Realize feed inventory may vary with crop sales from year to year depending upon crop marketing and tax strategies. Other income, including government payments, averaged $1,490 and $871 per cow for the HP and LP farms, respectively. Due to CO-VID payments, 2020 governments payments on average were more than double from 2019 which was $586 and $480 per cow for HP and LP farms, respectively.

Total cash income was $7,292 and $5,880 for the HP and LP farms, respectively, 24% higher for the HP farms, almost exactly the same percentage increase as the milk production per cow for the HP farms. These two factors would seem heavily related, though some past data sets had an inverse relationship with profitability and milk production per cow.

On the expense side, veterinary and medicine per cow averaged $51 and $74 for the HP and LP farms, respectively. Dairy/farm supplies averaged $216 and $180 for HP and LP farms, respectively. Breeding fees averaged $64 and $60 for the HP and LP farms, respectively.

Feed purchased per cow averaged $1,588 and $615 for the HP and LP farms respectively. This should be considered relative to milk production, land quality and acres operated. The HP farms operated an approximate 0.8 acres less per cow. Purchased feed expense was $6.03 and $3.01 per cwt.eq. for the HP and LP farms respectively.

Seed and fertilizer expense was $467 and $552 for the HP and LP farms, respectively. This is the first time in this series of organic data sets where the LP farms spent more than the HP farms. Fuel, gas and oil expense averaged $218 per cow. Utility expense per cow was $120 and $78 for the HP and LP farms, respectively. Interest expense is not included as a cash expense in this analysis as all assets, whether owned or borrowed against, are charged an equity charge to even the playing field among farms for profitability analysis sake.

Labor hired is often related to size of herd, wage rates, milk production and labor efficiency factors. The HP farms, with 32% fewer cows as the LP farms had $561 per cow in hired labor versus the LP farms which had $809 per cow. Rent, lease and hire was $533 and $814 per cow for the HP and LP farms, respectively.

Property taxes per cow were $80 and $73 for the HP and LP farms, respectively. Farm insurance averaged $116 and $207 for the HP and LP farms, respectively, a significant difference between the groups that did not show in 2019 data. Other cash expenses averaged $333 and $392 for the HP and LP farms, respectively. Total cash expense was $4,852 and $4,610 for the HP and LP farms, respectively, only a $242 difference compared to a $1,412 difference in cash incomes.

Net cash income per cow, less interest paid, was $2,440 and $1,270 for the HP and LP farms, respectively—a $1,170 difference. The difference in 2020 versus 2019 was somewhat similar to the increase in government program payments due to CO-VID in 2020. Adjusting for inventory changes gives net farm income per cow of $2,443 and $747 for the HP and LP farms, respectively—a $1,696 difference. Equity charges per cow at 4% across all the assets averaged $897 and $1,004 for the HP and LP farms, respectively. This gives a return to unpaid labor per cow of $1,547 and -$257 for the HP and LP farms, respectively—an $1,290 difference.

Labor and Cost of Production Analysis

The net return to unpaid labor means little without further analysis in order to know how many unpaid full-time equivalents (FTE's) of labor need to be paid from the net return to labor. The unpaid labor hours per cow was 31 and 25 for the HP and LP farms, respectively. The total labor FTE's (3,000 hours per FTE annually) was 3.82 and 6.68 for the HP and LP farms, respectively. Knowing the LP farms are more than another third bigger than the size of the HP farms, this higher unpaid labor hours and total FTE's seems normal.

The bottom line on labor is to compare the labor earnings on a per hour basis. For all the labor, both paid and unpaid, on a per cow basis, the return was $30.28 and $6.89 for the HP and LP, respectively. For the unpaid labor, the return was $53.89 and -$6.10 for the HP and LP farms, respectively. Two farms in 2020 were not in the data set in 2019 and significantly changed the results. This is a caution in using small data sets. On the LP farms, the hired labor got paid, the owner/operator did not, after taking an equity charge prior to the return to labor.

The average cost of production per cwt. equivalent for all the farms was $28.90 with an income of $29.24 for a net return, all costs included of $0.33. The average cost of production per cwt. equivalent for the HP farms was $24.86 with an income of $29.26 for a net return, all costs included of $4.40. The average cost of production per cwt. equivalent for LP farms was $32.14 with an income of $29.22 for a net return, all costs included of -$2.92. The profitability of the HP farms was significantly higher than data from many previous years. It shows the resiliency, both financially and mind-set wise for certain farmers to deal with financial and mental stress. It is suspected the additional government payments dramatically assisted these farms as well.

Efficiencies of Labor, Livestock and Land

Profitability is often an equation of efficient resource use. Labor efficiency is often touted as a most important factor. Return to all labor per FTE averaged $51,855 and was $90,836 and $20,671 for the HP and LP farms, respectively. Each FTE is given a cost of $40,000 per year meaning the HP farms gained profit of $50,836 per unpaid FTE employed above break-even. The LP farms were short $19,329 per unpaid FTE employed to break-even.

The number of cows per FTE was 47 and 39 for the HP and LP farms, respectively, showing the HP dairies were more efficient with labor per cow wise. And, on a cwt. of milk sold per FTE, the results were 8,946 and 5,663 for the HP and LP farms, respectively. Realize the one robotic herd can skew these numbers in a small sample size like this. All labor costs per cow were $1,038 and $1,081 for the HP and LP farms, respectively. Milk production per cow, as calculated earlier was 23% lower on the LP farms.

Capital costs per cow (depreciation and interest/equity charge) were $1,359 and $1,160 for the HP and LP farms, respectively. Fixed cost per cow (depreciation, interest, repair, taxes, insurance) were $2,066 and $1,925 for the HP and LP farms, respectively. Pounds of milk sold per crop acre averaged 4,728 and 3,554 for the HP and LP farms, respectively and averaged 4,075 for all the farms in the study with a low of 1,998 pounds and a high of 6,126 pounds of milk sold per acre operated (high end was robot herd).

All labor as a percent of total costs averaged 15.73% and 18.50% was similar between the HP and LP farms, averaging 17.27% across all the farms. Fixed costs as a percent of total costs averaged 31.39% and 32.84% for the HP and LP farms, respectively. Labor and capital seemed more significant in 2020 compared to 2019 data. Correlations in lower labor cost per cwt. eq. relative to profitability have shown considerable strength in previous data.

Profit Analysis

The net farm income from operations (NFIFO) is derived by taking cash incomes minus cash expenses, then adjusting it for inventory changes of ending values minus beginning values. This NFIFO has only the opportunity costs of unpaid labor and unpaid equity as the only remaining costs left. Typically, the equity charge is taken out first in order to arrive at a net return to labor (preferably per FTE and per hour worked). The adjusted net farm income was $444,086 and $199,064 for the HP and LP farms, respectively.

The HP dairies outshined the LP dairies in the profit equation. The HP dairies had a **Return on Assets** (ROA) of 8.19% (double the 2019 data) and the LP dairies averaged 1.61% (similar to 2019 data). The HP dairies had an **Operating Profit Margin** (OPM) of 23.36% and the LP dairies earned 6.51% which is a low OPM for an organic and grazing type dairy. The HP dairies also did better in the **Asset Turnover Ratio** (ATO) with 38.40% or can basically gross enough income to pay for all the assets owned on the farm in just over three years and the LP dairies at 25.02% or basically gross enough income to pay for all the assets in four years. An ATO less than three years or less (33%) is good.

Profit = (Price – Cost) x Volume **or** ROA = OPM x ATO

So, the HP farms reach benchmark levels in both OPM and ATO which was not the case in 2019 data. For the LP farms, the OPM and ATO need improvement, stemming mostly from the income side of the equation, especially in milk production per cow and per FTE laborer.

The Dairy TRANS Profit Performance Rating, an overall measure of total farm performance was 56.27% for all the herds and averaged 78.04% and 38.86% for the HP and LP farms, respectively. Again, realize these are not "average" organic dairy herds in the study as better examples of organic dairy farms were targeted with the study. Thus, the average organic dairy is suspected to show results probably closer to the average of the LP farms as speculated by this author's experience in working with organic dairy farm financial analysis around the country.

There are stark differences between the HP and LP dairies. More detail for various years and regions can be found in other articles within this series. For more information visit the ISU Dairy Team at: www.extension.iastate.edu/dairyteam The Dairy TRANS Financial Analysis software was used for this study. For more information regarding this software and dairy financial analysis, please contact this author.

WI/MN Organic Model Farms 2020	Average -- All Farms ORGANIC	/Cow	(9)	Average -- Higher Profit ORGANIC	/Cow	(4)	Average - Lower Profit ORGANIC	/Cow	(5)
Productive Crop Acres Operated	1,038	4.53		725	3.99		1,288	4.83	
Average Number of Cows	229			182			267		
Total Assets on Farm	**$5,188,816**	**$22,670**		**$3,310,283**	**$18,213**		**$6,691,642**	**$25,100**	
Milk Price	**$29.24**			**$29.26**			**$29.22**		
Milk Hundred weight Equiv.	51,522	225		47,897	264		54,421	204	
Milk Hundredweights	38,627	169		34,536	190		41,901	157	
Milk Sales	**$1,108,204**	**$4,842**		**$1,012,250**	**$5,569**		**$1,184,967**	**$4,445**	
Cull Cow Sales	$44,001	$192		$29,862	$164		$55,312	$207	
Calf Sales	$11,249	$49		$8,504	$47		$13,446	$50	
Crop Sales	$47,096	$206		$3,777	$21		$81,751	$307	
Other Income	$249,351	$1,089		$270,876	$1,490		$232,131	$871	
Total Cash Income	**$1,459,901**	**$6,378**	/Cwt.Eq.	**$1,325,268**	**$7,292**	/Cwt.Eq.	**$1,567,607**	**$5,880**	/Cwt.Eq.
Vet and Medicine	$15,121	$66	$0.29	$9,235	$51	$0.19	$19,829	$74	$0.36
Dairy/Farm Supplies	$44,103	$193	$0.86	$39,342	$216	$0.82	$47,912	$180	$0.88
Breeding Fees	$14,024	$61	$0.27	$11,630	$64	$0.24	$15,939	$60	$0.29
Dairy Feed Purchased	$219,396	$959	$4.26	$288,632	$1,588	$6.03	$164,008	$615	$3.01
OtherFeed Purchased	$0	$0	$0.00	$0	$0	$0.00	$0	$0	$0.00
Repairs	$120,369	$526	$2.34	$93,352	$514	$1.95	$141,982	$533	$2.61
Seed, Chem, Fert	$119,510	$522	$2.32	$84,918	$467	$1.77	$147,183	$552	$2.70
Fuel, Gas, and Oil	$49,794	$218	$0.97	$37,807	$208	$0.79	$59,383	$223	$1.09
Utilities	$21,264	$93	$0.41	$21,828	$120	$0.46	$20,812	$78	$0.38
Interest Paid	$0	$0	$0.00	$0	$0	$0.00	$0	$0	$0.00
Labor Hired	$165,210	$722	$3.21	$101,994	$561	$2.13	$215,783	$809	$3.97
Rent, Lease & Hire	$163,670	$715	$3.18	$96,878	$533	$2.02	$217,105	$814	$3.99
Property Taxes	$17,375	$76	$0.34	$14,604	$80	$0.30	$19,592	$73	$0.36
Farm Insurance	$39,993	$175	$0.78	$21,058	$116	$0.44	$55,142	$207	$1.01
Other Cash Expense	**$84,970**	**$371**	**$1.65**	**$60,599**	**$333**	**$1.27**	**$104,468**	**$392**	**$1.92**
Total Cash Expense	$1,074,799	$4,696	$20.86	$881,875	$4,852	$18.41	$1,229,138	$4,610	$22.59
Net Cash Income	**$385,102**	**$1,682**	**$7.47**	**$443,393**	**$2,440**	**$9.26**	**$338,469**	**$1,270**	**$6.22**
Inventory Change	-$77,139	-$337	-$1.50	$693	$4	$0.01	-$139,405	-$523	-$2.56
Net Farm Income	**$307,963**	**$1,345**	**$5.98**	**$444,086**	**$2,443**	**$9.27**	**$199,064**	**$747**	**$3.66**
Equity @ 4%	$221,084	$966	$4.29	$163,003	$897	$3.40	$267,549	$1,004	$4.92
Return to Labor	**$86,879**	**$380**	**$1.69**	**$281,084**	**$1,547**	**$5.87**	**-$68,485**	**-$257**	**-$1.26**
Accounts Receivable	-$18,681	-$82	-$0.36	$0	$0	$0.00	-$33,626	-$126	-$0.62
Feed Inventory	$28,473	$124	$0.55	$70,334	$387	$1.47	-$5,016	-$19	-$0.09
Supplies and Other	-$2,144	-$9	-$0.04	-864	-$5	-$0.02	-$3,168	-$12	-$0.06
Breeding Livestock	$10,564	$46	$0.21	11,513	$63	$0.24	$9,805	$37	$0.18
Income Change	$18,212	$80	$0.35	80,983	$446	$1.69	-$32,005	-$120	-$0.59
Prepaid Expenses	-$9,321	-$41	-$0.18	5,244	$29	$0.11	-$20,972	-$79	-$0.39
Accounts Payable	$0	$0	$0.00	0	$0	$0.00	$0	$0	$0.00
Machinery & Equipment	$37,291	$163	$0.72	-1,206	-$7	-$0.03	$68,089	$255	$1.25
Land and Buildings	-$11,244	-$49	-$0.22	-16,964	-$93	-$0.35	-$6,668	-$25	-$0.12
Other Adjustments	$0	$0	$0.00	0	$0	$0.00	$0	$0	$0.00
Expense Change	-$16,727	-$73	-$0.32	12,926	$71	$0.27	-$40,449	-$152	-$0.74
Capital Purchases Minus Sales Adj.	$112,078	$490	$2.18	67,363	$371	$1.41	$147,849	$555	$2.72
Depreciation FM Value	$86,030	$376	$1.67	85,533	$471	$1.79	$86,428	$324	$1.59
Unpaid Labor Cost	$79,704	$348	$1.55	$73,833	$406	$1.54	$84,400	$317	$1.55
Unpaid Labor Hours	6,146	27		5,634	31		6,556	25	
Unpaid Labor FTE's	2.05			1.88			2.19		
Total FTE's (=3000 hrs/yr)	5.41			3.82			6.68		
All Labor Earnings/Hour	$17.29			$30.28			$6.89		
Unpaid Labor Earnings/Hr	**$20.56**			**$53.89**			**-$6.10**		

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Cash Income	$1,459,901	$6,378	$1,325,268	$7,292	$1,567,607	$5,880
+ Inventory (Feed, Livestock, Supplies)	$18,212	$80	$80,983	$446	-$32,005	-$120
Total Income	$1,478,113	$6,458	$1,406,251	$7,737	$1,535,603	$5,760
Cash Costs	$1,074,799	$4,696	$881,875	$4,852	$1,229,138	$4,610
+ Inventory Costs (Accts Pay, Prepaid, Dep	$95,351	$417	$80,289	$442	$107,400	$403
+ Overhead Costs (Opp Cost Labor&Equity)	$300,788	$1,314	$236,836	$1,303	$351,949	$1,320
Total Costs	$1,470,937	$6,426	$1,199,000	$6,597	$1,688,487	$6,333
Net Profit Return Over Costs	**$7,175**	**$31**	**$207,251**	**$1,140**	**-$152,885**	**-$573**
Income per Cwt. of Milk Sold	$29.24		$29.26		$29.22	
Expense per Cwt. Equivalent	$28.90		$24.86		$32.14	
Net Income per Cwt.Eq.	$0.33		$4.40		-$2.92	
Adjusted Gross Return per FTE **Labor**	$272,751		$352,450		$208,991	
Return to All Labor per FTE **Labor**	$51,855		$90,836		$20,671	
Number of Cows per FTE **Labor**	42		47		39	
Cwts. of Milk Sold per FTE **Labor**	7,122		8,946		5,663	
All **Labor** Costs per **Cow**	$1,062		$1,038		$1,081	
Pounds of Milk Sold per **Cow**	16,348		18,751		14,426	
Capital Invested per Cow	$20,823		$21,259		$20,475	
Capital Cost per Cow	$1,248		$1,359		$1,160	
Fixed Cost per Cow (DIRTI)	$1,988		$2,066		$1,925	
Net Farm Income per Crop Acre	$372		$596		$193	
Lbs. Milk Produced per Crop Acre	4,075		4,728		3554	
Adj. Gross Cash Income/Crop Acre	$1,563		$1,896		$1,296	
Machinery Investment/Crop Acre	$881		$1,118		$691	
Fuel, Gas and Oil Cost/Crop Acre	$47		$53		$42	
Repair Cost per Crop Acre	$129		$128		$130	
Fert/Chem/Seed Cost/Crop Acre	$110		$113		$108	
Livestock over Total Investment %	11.80%		13.09%		10.76%	
Cash Exp./Cash Inc.w/o Labor&Int	62.76%		59.36%		65.48%	
All Labor as Percent of Total Costs	17.27%		15.73%		18.50%	
Fixed Cost as Percent of Total Cost	32.19%		31.39%		32.84%	
**Net Farm Income From Operations	$307,963		$444,086		$199,064	
****Rate of Return on Assets**	**4.53%**		**8.19%**		**1.61%**	
**Rate of Return on Equity	4.53%		8.19%		1.61%	
****Operating Profit Margin**	**14.00%**		**23.36%**		**6.51%**	
****Asset Turnover Ratio**	**30.97%**		**38.40%**		**25.02%**	
**Operating Expense Ratio	72.97%		63.98%		80.17%	
**Depreciation Expense Ratio	5.40%		5.92%		4.99%	
**Net Farm Income Ratio	23.26%		30.10%		17.79%	
Dairy TRANS Profit Status is	**Poor-Superb**		**Average-Superb**		**Poor-Fair**	
Dairy TRANS Peformance Rating	**56.27%**		**78.04%**		**38.86%**	

by Larry Tranel, Dairy Field Specialist, Iowa State University Extension

***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.*