An Economic Comparison of Organic and Conventional Dairy Production, and Estimations on the Cost of Transitioning to Organic Production

Produced by: the Northeast Organic Farming Association of Vermont's Dairy Technical Assistance Program
Written by: Lisa McCrory
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By Lisa McCrory, Northeast Organic Farming Association of Vermont

"What does it cost to produce Certified Organic Milk? What would I be paying in grain bills if I were to transition to organic production? Would my vet bills go down, would they go up, or would they stay the same? What would I get paid for my milk if it were organic? Where do I find supportive economic information to present to my loan officer?" These are some of the questions most often asked by farmers that are considering switching to organic milk production.

Because most of the available information is based on estimations and hear-say, some of our leading Vermont organic dairy farmers recommended that we create statistically relevant benchmarks using real numbers from certified organic dairy farms. The most effective way to collect this information was to use a system already in place. Agrifax, is a service provided by Yankee Farm Credit that works with dairy farmers to collect their farm income and expenses on a monthly basis, creating monthly and annual summaries. This company offered to assist us in collecting and evaluating the information from the participating farms.

Seven organic dairy farmers completed the information required to provide the benchmark data. The farms involved agreed to supply their income, expenses, and year-end balance sheets for 1998 and 1999. Their personal information would remain confidential and only averages of all the farms combined would be reported. A general description of the participating farmers (Table 1) is included in this report to assist the reader in understanding the types of operations involved.

Table 1: Basic Description of Organic Farms (1999 year)

Farm	1	2	3	4	5	6	7
# Milkers	45	65	75	30	35	40	35
Holstein (H) or Jersey (J)	J	J	J	J	H	H&J	J
Custom/Purchased feed			x				
Grows corn silage		x				x	
Harvest own hay/silage	x	x		x	x	x	x
Intensive Grazing	x	x	x	x	x	x	x
Seasonal Dairy				x			
Years Certified	4	4	2	4	4	5	4

Enclosed are three reports comparing the Agrifax averages of these 7 organic herds with the " 1999 Dairy Farm Summary" averages of 182 conventional herds (1). The organic herds averaged 46 cows per farm and the conventional herds averaged 65 cows per farm. Herd size and study group numbers are not equal, which may indicate a need for a more indepth study.

There are three summary tables comparing the conventional herds to the organic herds. They are titled 1) **Earnings Worksheet**, 2) **Balance Sheet Summary**, and 3) **Evaluation Factors** .

The **Earnings Worksheet** (Table 2) gave an average of the *receipts*, *expenses* and *net earnings* for these farms. Total cash receipts for each operation were the same, but the overall expenses were higher for the conventional farms. Net farm income, once *family living and Income taxes* and *depreciation* were accounted for, showed a 45% difference in net earnings on a per cow basis. The average organic operation earned $477 per cow while each conventional herd netted $255 per cow.

Change in inventory-raised livestock was $100.00 per cow for the organic dairies and -$1.00 per cow for the conventional farms. The organic dairy herds that participated in this study were closed herds that raised all their own replacements. Four of the seven organic dairy herds make money selling surplus heifers each year.

Some of the expense figures vary significantly between the two groups in the categories of *feed freight and trucking, labor, veterinary, medicine & breeding,* and *cow replacements*.

In comparing the feed category, it was decided to compile feed related activities such as *chemicals & sprays, custom work, fertilizer & sprays,* and *seed* (Feed and Crop Expense). When this was done, the organic dairy herds were only 21% higher in total expenses. Organic concentrates tend to be twice as expensive, so one would have expected a greater difference. This may be due to the fact that organic dairy farms tend to feed less grain to their animals and all the organic dairy herds in this study rotationally graze their animals during the growing season which can greatly reduce the needed volume of harvested feed and purchased grain. In future studies, it would be of benefit to separate the feed category into supplements, concentrates, and purchased forages, but that was not possible with the benchmark programs used.

Freight and trucking was more than twice as much for the conventional herds. This is probably due to the fact that the organic herds pay either a $5 stop-charge ($75/month) or have no hauling fee at all.

Labor was 32% less for the organic dairy herds and *Other Expenses* was 29% less. As mentioned earlier, the organic dairy herds did not buy any *cow replacements* in 1999, so they had no expense, while the conventional herds had a cost of $32 per cow (or $2080.00/yr).

Veterinary, Medicine and Breeding was 33% less for the organic operations. This category displays one of the greatest differences in management techniques between organic and conventional farms. To more fully understand these differences would require further study.

Table 2: EARNINGS WORKSHEET: Comparing Conventional Dairy Herds with Organic Dairy Herds During the 1999 Calendar Year

	Conventional	Organic
Herd Size:		
Number Farms	182	7
Average # cows	65	46
Receipts	**DOLLARS PER COW**	**DOLLARS PER COW**
Milk sales	$2,812.00	$3,030.00
Crop sales	$41.00	$1.00
Cattle sales	$157.00	$93.00
other	$183.00	$74.00
CASH RECEIPTS (a)	$3,193.00	$3,198.00
Accrual Adjustments		
Change in Inventory-Raised Livestock	$(1.00)	$50.00
VALUE OF FARM PRODUCTION (c)	$3,192.00	$3,248.00
Expenses	**Conventional**	**Organic**
Chemicals & Sprays	$37.00	$00.00
Custom	$46.00	$100.00
Feed	$661.00	$966.00
Fertilizer & Lime	$97.00	$47.00
Freight &Trucking (Marketing)	$111.00	$50.00
Gasoline, Fuel & Oil	$62.00	$58.00
Insurance	$63.00	$58.00
Interest	$165.00	$113.00
Labor	$196.00	$133.00
Rent	$60.00	$62.00
Repairs, Maintenance, Car &Truck	$230.00	$164.00
Seed & Plants	$43.00	$2.00
Supplies	$162.00	$154.00
Taxes	$82.00	$61.00
Utilities	$96.00	$87.00
Veterinary, Medicine & Breeding	$107.00	$64.00
Other	$94.00	$67.00
Cow Replacements	$32.00	$00.00
ADJUSTED CASH OPERATING EXPENSE (b)	$2,344.00	$2,186.00

Table 2: Earnings Worksheet (Continued)

Accrual Adjustments		
Depreciation	$292.00	$230.00
ADJUSTED FARM OPERATING EXPENSE (d)	$2,636.00	$2,414.00
NET FARM INCOME (a) - (b)	$849.00	$1,012.00
NET FARM EARNINGS (c) - (d)	$556.00	$834.00
Net non-farm Income	$121.00	$23.00
Family Living and Income Taxes	$(422.00)	$(380.00)
NET EARNINGS	**$255.00**	**$477.00**

The **Balance Sheet Summary** (Table 2) was created by collecting balance sheets at the end of 1998 and 1999 from the farmers. One can see that **Total Assets** between both groups were the same but **Total Liabilities** were 30% greater for the conventional herds. *Current liabilities* were 27% lower for the conventional herds while their *intermediate* and *long-term* loans were 65% and 23% greater (respectively).

Evaluation Factors (Table 4) lists income and expenses associated with milk production, expressed on a per-cow and per-hundred weight basis. Income from milk production was balanced against *feed and crop expenses*, and *labor and family living* per hundred weight of milk produced. It then summarized the *net worth per cow* based on the assets and debts, and concluded with the *percent return on assets and equity* of the whole farm operation. Though the costs per cow were higher on organic operations, milk price per hundred weight was also higher ($22.83 vs $15.01). The *Percent Return on Assets* and *Percent Return on Equity* for the organic herds were 34% and 37% greater than the conventional averages.

Table 3: BALANCE SHEET SUMMARY: Comparing Conventional Dairy Herds with Organic Dairy Herds during the 1999 Calendar Year.

	Conventional	Organic
Herd Size		
Number of Farms	182	7
Average # Cows	65	46
	ASSETS PER COW	**ASSETS PER COW**
Cash & Accounts Receivable	$400.00	$576.00
Feed & Crop Inventory	$480.00	$399.00
Supplies and Prepaid Expenses	$117.00	$74.00
Other Current Assets	$70.00	$8.00
TOTAL CURRENT ASSETS	$1,067.00	$1,057.00
Dairy Livestock	$1,393.00	$1,282.00
Vehicles, Machinery & Equipment	$1,850.00	$1,349.00
Other Intermediate Assets	$665.00	$393.00
TOTAL INTERMEDIATE ASSETS	$3,908.00	$3,024.00
Farm Real Estate	$4,229.00	$5,112.00
Other Fixed Assets	$30.00	$276.00
TOTAL FIXED ASSETS	$4,259.00	$5,388.00
TOTAL ASSETS	**$9,234.00**	**$9,470.00**
	LIABILITIES PER COW	**LIABILITIES PER COW**
Accounts Payable	$29.00	$56.00
Short Term Loans, CP of long-term and intermediate loans	$58.00	$228.00
Other Current Liabilities	$304.00	$253.00
TOTAL CURRENT LIABILITIES	$391.00	$537.00
Farm Credit Intermediate Term	$743.00	$32.00
Other Intermediate Liabilities	$200.00	$297.00
TOTAL INTERMEDIATE LIABILITIES	$943.00	$329.00
Farm Credit -Long-Term Liabilities	$576.00	$122.00
Other Long-Term Liabilities	$382.00	$623.00
TOTAL LONG-TERM LIABILITIES	$958.00	$745.00
TOTAL LIABILITIES	**$2,292.00**	**$1,610.00**
	NET WORTH PER COW	**NET WORTH PER COW**
OWNER'S NET WORTH	**$6,942.00**	**$7,860.00**
% NET WORTH	**75%**	**83%**

Table 4: EVALUATION FACTORS: Comparing Conventional Dairy Herds with Organic Dairy Herds During the 1999 Calendar Year

Herd Size	Conventional	Organic
Number of Farms	182	7
Average # Cows	65	46
Worker Equivalents	2	2
Cows Per Worker	33	23
Pounds of Milk Sold Per Worker	608,700	305,000
Pounds of Milk Sold	1,217,400	610,000
Pounds of Milk Sold Per Cow	18,729	13,261
Milk Price Per Cwt.	$15.01	$22.83
Feed Cost Per Cow	$661.00	$966.00
Feed Cost Per Cwt.	$3.53	$7.28
Feed as a Percent of Milk Sales	24%	32%
Feed and Crop Expense Per Cow	$884.00	$1,115.00
Feed and Crop Expense Per Cwt.	$4.72	$8.41
Labor and Family Living Per Cow	$588.00	$501.00
Labor and Family Living Per Cwt.	$3.14	$3.84
Milk Price Per Cwt	*** $15.01**	**$22.83**
Net Cost of Production/Cwt	*** $14.30**	**$19.17**
Net Income Per Cwt	**$ 0.71**	**$ 3.66**
Assets Per Cow	$9,234.00	$9,470.00
Debt Per Cow	$2,292.00	$1,610.00
Net Worth Per Cow	$6,942.00	$7,860.00
Percent Return on Assets (3)	4.70%	7.04%
Percent Return on Equity (4)	3.80%	6.06%

1) Feed and Crop Expense = Feed + Seed & Plants + Fertilizer + Chemicals & Sprays
2) Machinery Cost = Machinery Repairs + Machine Hire + Fuel & Oil + Machinery & Equipment Depreciation
3) Return on Assets = (Net Earnings + Interest) Divided by (Average Farm Assets)
4) Return on Equity = (Net Earnings) Divided by (Average Farm Net Worth)
* Based on farm average of 89 cows or less (pg 22 of 1999 Dairy Farm Summary)

Transitioning Costs:

When looking at these comparisons, organic dairy production looks like it is far more profitable than conventional dairy farming. An area that one must consider before deciding to produce organic milk is the cost of transitioning. There is no cookbook answer to how much this is going to affect a farmer. Everyone will have a slightly different answer depending on the land and animal management changes that they will be implementing,

Requirements for a farm that wants to produce organic milk under the VOF Standards (Vermont Organic Farmers) are:

1) All feed (including pasture) must come from land that is free of chemical fertilizers, herbicides, pesticides and genetically modified crops for at least 3 years, and
2) New herds entering certified organic production must be managed in accordance with **all** the VOF certification standards for the 90 days prior to selling milk or dairy products as certified organic.

Estimations for the purchase of organic grain during that 90 day period would cost the farmer, with a herd size of 50 milkers, over $5000 on concentrates alone (see Table 5). The table below is an example of what you could do for your farm projections. The cost for a 16% protein grain was based on April 2001 prices.

Table 5: Comparison of Conventional and Organic Grain Costs over a 90 Day Period

Comparison A

Pounds Grain Fed	**x 90 days**	**16% Org. Grain @ $300/Ton**	**16% Conv. Grain @ $150/Ton**
50 Cows @20 # grain/day	90,000 lbs (45 Ton)	$13,500.00	$ 6,750
15 Heifers @ 5# grain/day	6,750 lbs (3.375 Tons)	$ 1,012.00	$ 506
	(TOTAL)	$14,512.00	$ 7,256

Comparison B

Pounds Grain Fed	**x 90 days**	**16% Org. Grain @ $300/Ton**	**16% Conv. Grain @ $150/Ton**
50 Cows @ 15# grain/day	67,500 lbs (33.75 Tons)	$10,125.00	$ 5,062.00
15 Heifers @ 3# grain/day	4,050 lbs (2.025 Tons)	$ 608.00	$ 304.00
	(TOTAL)	$10,733.00	$ 5,366

There are many hidden costs that can seriously affect a farmer if he/she is not prepared. For this reason it is impossible to give anyone a straight answer when they want to know how much it will cost them to transition to organic dairy production. Some of these hidden costs may lie in the following areas:

1) Needing to purchase organic forage
2) Animal health: getting familiar with new health products and letting go of prohibited practices (antibiotics, dry cow therapies, routine use of parasiticides, etc)

3) Getting the cows accustomed to new grain
4) Unforeseen culling: you may find that some of animals don't fit into an organic operation
5) Transitioning your hay, pasture, crop land (if needed)
6) Learning curve: getting used to new management practices can also have some hidden costs that are very hard to estimate (for example NOT using antibiotics for treatment of mastitis, using pasture more intensively, drying cows off without 'dry cow treatment').

Using the Yankee Farm Credit Benchmark Program was very useful in understanding the economics of organic dairy farming. When comparing conventional and organic operations, distinct differences were found in the categories of *feed*, *labor, repairs, maintenance, car & truck, veterinary, medicine &breeding,* and *cow replacements.* Using the Agrifax benchmark programs, it was not possible to divide the above categories any further. Some suggested categories for future studies would be:

1) Divide *feed* category into: a) purchased grain, b) purchased forages, c) purchased supplements. This will help to distinguish the costs associated with the different feeding programs.

2) Provide a consistent definition for *labor*. To compare farmer labor from one farm to another, there needs to be a standard developed for that cost.

3) Divide *Veterinary, Medicine & Breeding* into 4 categories: a) Scheduled vet visits (ie monthly pregnancy checks),b) unscheduled vet visits, c) medical supplies, and d) breeding. These are good figures to use to evaluate health management.

4) In *Cattle sales* divide this into a) market beef sales, b) voluntary culls, c) involuntary culls, d) dairy stock, and e) calves.

This paper provides some answers of the most frequently asked questions with financial averages presented from leading farms in the conventional and organic dairy industry. We realize there are more important questions that are specific to each manager's operation. Not all the questions can be answered with economic evaluation. We feel that this comparison study will help to answer some of the economic questions so that managers can move on to more value oriented decisions. To be of continued assistance to farmers and resource professionals, further studies need to take place measuring both qualitative and quantitative parameters.

Endnotes:

(1) Dairy Farm Summary 1999 , a Joint Project of Northeast Farm Credit, by David Stafford, Jamie Block and Bill Zweigbaum, published by Farm Credit of Western New York, ACA, © 2000. For a copy, call (800) 929-7102.