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Timothy J. Dalton
Robert Parsons
Richard Kersbergen
Glenn Rogers
Dennis Kauppila
Lisa McCrory
Lisa A. Bragg
Qingbin Wang

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Timothy J. Dalton, Associate Professor
Department of Agricultural Economics, Kansas State University, Manhattan, KS 66503

Robert Parsons, Extension Associate Professor
Department of Community Development and Applied Economics, University of Vermont, Burlington, VT 05405

Richard Kersbergen, Extension Professor
University of Maine Cooperative Extension, University of Maine, Orono, ME 04469

Glenn Rogers, Extension Professor
University of Vermont Extension, University of Vermont, Burlington, VT 05405

Dennis Kauppila, Extension Associate Professor
University of Vermont Extension, University of Vermont, Burlington, VT 05405

Lisa McCrory, Dairy Consultant
NOFA-Vermont, Richmond, VT 05477

Lisa A. Bragg, Research Associate
School of Economics, University of Maine, Orono, ME 04469

Qingbin Wang, Associate Professor
Department of Community Development and Applied Economics, University of Vermont, Burlington, VT 05405

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Any opinions, findings, conclusions, or recommendations expressed in this presentation are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.

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INTRODUCTION

The purpose of this bulletin is to provide an insight into the relative financial performance of organic dairy farming through the examination of three years of detailed farm financial records. Farm financial records were collected in person by trained enumerators from organic dairy operations in Maine and Vermont for the 2004–2006 production years. These farm records are complemented by surveys on farm and farmer characteristics along with farmers' motivational interests for organic dairy production and performance satisfaction. This report, therefore, provides a rich financial perspective on the evolution of organic dairy farming performance unlike single season surveys.[1]

The research on organic dairy is driven by the recent growth in demand for and supply of organic milk. Recent research indicates that the consumer base for organic food products continues to expand, and this generalization extends to organic milk consumption (Dimitri and Venezia 2007). These "new" organic consumers are "households headed by a person age 45 years or younger, those with the highest level of education, Asian and Black households, and households located in the South or Central U.S. regions" (Dimitri and Venezia 2007: 16). These observations are based upon analyses of household food consumption patterns and allude to increased demand for organic milk in the future.

To meet this demand, increasing numbers of dairy farmers have taken up organic dairy farming. Preliminary survey data indicate that nearly 80% of organic dairy farmers were attracted by higher milk prices and production contracts that set consistent prices throughout the year. Conventional milk prices are characterized by volatility, ranging from record lows in 2003 to all-time highs in 2007. Given these market alternatives, continued strong demand for organic milk, current high prices for conventional milk, and escalating feed and fuel prices, farmers considering making the transition to organic production face a challenging decision without many sources of information on financial costs and returns. Therefore multi-year studies like this one are much needed by farmers, lenders, and policymakers.

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[1]See also the ERS/USDA Briefing Room on Organic Agriculture and the section under dairy cost of production: http://www.ers.usda.gov/Briefing/Organic/. This site contains information and links to the 2005 ARMS database which sample conventional as well as organic farms on a nationally representative scale.

One of the most extensive single-year studies to date is the 2005 Agricultural Resource Management (ARMS) survey that reached farms nationwide (McBride and Greene 2007). In this bulletin where possible, we compare results from New England organic dairy farms to the 2005 ARMS survey. We also compare information on the financial performance of New England organic farms with a set of conventional dairy farms (89 cows or fewer) from the annual Northeast Farm Credit "Northeast Dairy Farm Summary" (NEDFS) (Sobson et al. 2005, 2006, 2007). And we look at the future of organic dairy in the New England region given the recent change in feed and fuel prices.

BACKGROUND

There are few rigorous studies on the costs of producing organic milk in the United States despite the growth of this segment and the increased interest in it. The situation is particularly acute in the Northeast and upper Midwest where there is a small but rapidly growing organic dairy sector. Organic milk production has been the fastest growing agricultural sector in New England, with Vermont going from just two certified organic farms in 1993 to more than 200 in 2008. Maine has seen similar growth, going from 25 farms in 1997 to 68 certified organic dairy farms today. No other states have as high a concentration of organic dairy farms.

The 2005 ARMS survey of U.S. milk producers elicited data from both organic dairy producers and non-organic producers. McBride and Green (2007) estimated that operating costs on organic farms was $4.92 per cwt higher than on conventional dairies, and when combined with depreciation costs, $5.55 per cwt higher. Butler (2002) also studied the cost of organic production, using a sample of farms that was too small for general inferences. The earliest report of organic profitability examined a small number of farms in Vermont, but still showed a $4.30 per cwt higher cost of production than conventional dairy farms (McCrory 2001).

This study builds on this understanding of organic milk production by tracking the costs and returns to the 2004, 2005, and 2006 production years. During these three years, cost and returns have varied and merit investigation to identify the factors that have affected overall profitability.

FARM SIZE AND EARNINGS IN 2004, 2005, AND 2006

During the three study years, the average herd size of the representative farm grew by nearly 30% and milk output by almost 24%, but the average milk sold per cow declined from the 2004 high of 14,060 lbs/cow. The larger herd size reflects more new farms in the study rather than farms adding more cows. When compared to the ARMS data, this herd size was similar to organic dairy farms located in the Northeast and upper Midwest, but much smaller than the average herd size for "all farms," which included farms from all regions.[2] The rolling herd average was also quite similar between the two studies. According to the ARMS report, the rolling herd average on all organic farms was 13,522 lbs in 2005. This is comparable to the sample of Maine and Vermont farms in this study (Table 1).

Table 1. Farm, herd size, and milk production for farms in 2004–2006.

	2004		2005		2006	
	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.
Number of farms in study	30	NA	44	NA	41	NA
Average number of milk cows	48.8	15.4	56.4	30.2	62.7	34.2
Annual milk sold (cwt per farm)	6,890	2,783	7,401	4,957	8,528	5,080
Average milk shipped per cow (lbs)	14,060	3,416	12,619	3,324	13,455	2,567
Milk sales per farm ($)	158,096	65,841	184,144	122,320	245,350	145,604
Total farm revenue ($)	178,536	75,602	211,098	142,492	293,554	182,763
Total farm expenses ($)	149,625	67,886	177,750	120,252	229,585	147,446
Net farm earnings ($)	(6,090)	28,676	(1,652)	44,017	28,970	52,547

[2]Farms in Minnesota, New York, Pennsylvania, Vermont, and Wisconsin had average herd sizes of 59, 53, 46, 62, and 65, respectively, while the average of all farms, including these aforementioned states plus California, Idaho, Indiana, Iowa, Maine, Michigan, Ohio, Oregon, and Washington, was 81 cows.

The average price paid per hundredweight of milk differed between the two studies, with the ARMS database reporting $21.88 while this study reported a milk price more than three dollars per hundredweight higher at $24.94 (Table 2). This difference can be explained by a regional premium paid to organic dairy producers in the Northeast by the three major processors. The revenue of farms in this study also exceeded the revenue earned by farms in the ARMS study by $3.86 per cwt, but we caution against strict comparisons of these numbers because the sources of revenue captured in the two studies may differ.

Turning to a comparison across the three years, the average price received per cwt of milk increased by nearly 26% ($5.87/cwt), reflecting revisions in the base price structure that dairies paid to farmers and also the premiums paid for quality and components. The organic milk price in the Northeast remained fairly constant from 2000 to 2005. Milk prices increased to encourage greater organic production as consumer demand was exceeding supply (McCrory 2001). It is also interesting to note that dairy cattle sales more than

Table 2. Organic dairy income by source for 2004–2006 ($/cwt nominal).

	2004	2005	2006
Income			
Milk sales	22.97	24.94	28.84
Dairy cattle sales	0.44	0.50	1.05
Cull cow sales	0.49	0.63	0.54
Bob/veal calf sales	0.15	0.16	0.18
Crop sales	0.11	0.19	0.17
Government and MILC payments	1.00	0.81	1.67
Patronage dividends	0.13	0.16	0.11
Other	0.50	0.82	0.74
Total Cash Receipts	$25.79	$28.21	$33.30
Accrual Revenue Adjustments			
Livestock inventory	0.46	0.59	1.00
Breeding livestock purchases	(0.24)	(0.10)	(0.37)
Accounts receivable	0.16	0.21	0.29
Hay	(0.08)	(0.08)	0.19
Grain	0.07	(0.09)	(0.01)
Total Accrual Revenue	$0.38	$0.53	$1.11
Total Farm Revenue	$26.16	$28.75	$34.41

doubled in 2006 reflecting the strong demand for organic livestock driven by nearly 100 farms making the transition to organic in Vermont alone. The third important difference between the three years was the increase in Milk Income Loss Contract (MILC) and government payments received by farmers, and by farms located in Maine, owing to state-specific dairy support programs in addition to MILC.

When all income sources were combined, farm cash receipts averaged $33.30/cwt in 2006, which is an 18% increase over 2005 and 29% over 2004. When accrued revenue adjustments are included, total farm revenue grew by 20% between 2004 and 2005 and 31% between 2004 and 2006. The factors driving these changes include higher base and component prices for milk, greater livestock sales due to the strong market for organic animals, and an increase in government payments, particularly to Maine producers.

COST STRUCTURE

Similar to revenues, the cost structure of dairy production not only increased in absolute value, but it also changed at per cow and per cwt terms as total milk production increased. This allowed fixed and quasi-fixed costs to be distributed over greater output. For variable inputs, the impact of higher average output should not affect usage rates. Changes in these operating expenses could reflect the impact of higher prices and quantity adjustments along with differing usage intensities resulting from efficiency gains. These efficiency gains may reflect the accrued impact of learning by producing as most of the farms are relatively new to organic production practices.[3] Few, if any, cost centers experienced a decrease in the absolute cost per cwt, but those that did were relatively unimportant, in financial terms, to the total cost of production. Automobile, chemical, taxes and veterinary costs declined over time, but their combined total share of the cash expense amounts to only 7%.

Eighty percent of operating costs are linked to eight cost centers. They are, in order of importance: (1) purchased feed,[4] (2) hired labor, (3) repairs, (4) supplies, (5) interest, (6) custom hire, (7) utilities,

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[3]Current organic certification rules require following organic regulation for one year for dairy cows and three years for farmland. Farmers were invited to participate in the survey only after they had a full year of operating under organic certification.

[4]For organic dairy farms, grain and supplements accounted for 90.0% of purchased feed in 2005 and 88.3% in 2005.

and (8) fuel and oil. Unpaid family labor, if included in the operating expense category, would fit in between purchased feed and hired labor. These categories are nearly identical with conventional budgets in the NEDFS.[5] Organic dairies devote a larger share of their operating budget to purchased feed, hired labor, and custom hire, but a lower share of their budget to interest, fuel and oil, and utilities than conventional farms. Although few New England dairy farms raise grain, they devoted nearly the same share of their budgets to repairs and supplies as regional conventional dairy farms.

The three-year study period saw increases in the eight most important inputs (Table 3). There are several factors that can explain why these costs have increased including greater intensity of usage, higher prices for the inputs (for example, feed, labor, and interest), or a combination of both. When examining feed costs, it is interesting to note that the average price of an organic dairy feed ration increased by about 2% between 2004 and 2005, and roughly 15% between 2005 and 2006, depending on the percentage of protein included in the ration (Green Mountain Feeds personal communication). These increases in feed prices closely parallel the annual increase in the per cwt cost of purchased feed. Second, many items in this budget are similar to the ARMS budget for an organic dairy. Similar factors include purchased feed (about 15% lower in the ARMS budget), hired labor (which is approximately 11% lower in the ARMS budget), veterinary and medicine charge (nearly identical), whereas marketing costs and repairs are only about half as much in the ARMS budget.

The second set of costs includes accrued expense deductions, largely composed of the depreciation of capital fixed assets. These costs increased dramatically between 2005 and 2006 (Table 4). Depreciation for this study was drawn from study participants' Schedule F U.S. income tax form. This method of accounting for the cost of fixed capital differs from the approach the USDA and other studies follow since they are concerned with capturing use values based upon capital-recovery approaches. It is not possible to compare these costs because the methods used to capture these costs differ. However, since this study spans three years, single-year depreciation impacts will tend to be less dramatic. Nonetheless, we are able to report that depreciation increased about 14% from 2005 to 2006.

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[5]More discussion of the difference between conventional and organic budgets will take place later in this bulletin.

Table 3. Operating costs and expenses for organic dairy farms 2004–2006 ($/cwt nominal).

Expenses	2004	2005	2006
Purchased feed[1]	7.24	7.41	8.56
Labor	2.10	2.44	2.74
Repairs	1.31	1.90	1.86
Supplies	1.36	1.58	1.65
Interest	1.04	1.10	1.41
Custom hire	0.37	0.58	0.98
Utilities	0.90	1.13	0.96
Fuel and oil	0.68	0.86	0.90
Insurance	0.64	0.63	0.69
Miscellaneous	0.57	0.55	0.58
Bedding	0.43	0.51	0.48
Real estate taxes	0.54	0.54	0.48
Milk Marketing	0.43	0.42	0.46
Breeding	0.36	0.36	0.38
Auto and truck	0.40	0.37	0.34
Veterinary	0.30	0.32	0.29
Rent	0.10	0.43	0.28
Fertilizers and lime	0.07	0.15	0.27
Seed and plants	0.04	0.10	0.17
DHIA	0.09	0.10	0.13
Medicine	0.04	0.05	0.08
Chemicals	0.02	0.01	0.00
Total Cash Expenses	$19.05	$21.55	$23.70

[1]Purchased feed includes forage and grains.

Table 4. Accrued expenses for organic dairy production 2004–2006 ($/cwt nominal).

Accrual Expense Adjustments	2004	2005	2006
Depreciation	2.86	2.91	3.33
Accounts payable	0.05	0.20	(0.10)
Pre-paid expenses	(0.01)	(0.04)	(0.07)
Supplies	0.01	(0.07)	(0.01)
Total Accrual Expenses	$2.90	$3.01	$3.15

RETURNS AND FIRM PERFORMANCE

The three years of data allow a comparison of how costs and returns have evolved over time. Both categories of earnings and returns have increased over time and at different rates and for different reasons. Table 5 summarizes overall farm performance for the three-year period and several points merit discussion.

First, farm income and expenses have increased, but it is not until 2006 that we note strong overall performance of the organic farm operation (Table 5). Accrual income from milk[6] decreased from 2004 to 2005 before rebounding dramatically in 2006. Adjustments to the pay price formula for most farmers did not occur until the last quarter of 2005. Net farm revenue from all operations was positive each year and increased dramatically in 2006. However, after deducting family withdrawals[7], net farm earnings were negative in both 2004 and 2005.[8]

At the farm level, the amount of off-farm income decreased from year to year. Withdrawals for unpaid labor and management appear to decrease, but this amount is held constant across years at $35,000 and just spread across greater milk output. When all factors are taken into consideration, an improved financial performance across the years is apparent. We note that the return to farm assets and farm equity improved from year to year also. These results, alongside average farm asset and equity levels, are captured in the final rows of Table 5. Overall, farm assets, equity and returns have increased each year.

COMPARISON OF ORGANIC DAIRY FARMS WITH CONVENTIONAL FARMS

In the following comparison, we draw upon Northeast Farm Credit and their annual report titled "Northeast Dairy Farm Summary." The NEDFS is an annual publication of production and financial information from more than 500 farms located in the Northeast. We compare the organic dairy financial data with the

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[6]Accrual income from milk equals milk sales plus change in accounts receivables minus total farm expenses.

[7]Family withdrawals represent the charge for unpaid family labor and management.

[8]To ease comparisons, family withdrawals were set at $35,000 each year.

Table 5. Returns to organic dairy farming 2004–2006 (average $/cwt nominal).

Income	2004	2005	2006
Milk sales	22.97	24.94	28.84
All other sales	3.82	3.27	4.46
Cash Receipts	25.79	28.21	33.50
Total accrual revenue	0.36	0.53	1.11
Total Farm Revenue	26.15	28.75	34.41
Expenses			
Total cash expenses	19.05	21.55	23.70
Total accrual expenses	2.89	3.02	3.15
Total Farm Expenses	22.13	24.58	26.85
Performance			
Accrual income from milk	1.19	0.59	2.29
Net cash farm income	6.74	6.66	9.60
Net farm revenue	4.22	4.19	7.56
Owner withdrawal	6.29	6.64	5.39
Net farm earnings	(2.07)	(2.45)	2.17
Off farm income	3.32	2.90	1.57
Net earnings	1.25	0.45	3.74
Average assets ($/farm)	526,392	630,740	762,015
Average equity ($/farm)	401,601	485,220	555,446
Return on assets (%)	-1.0%	-0.3%	5.1%
Return on equity (%)	-6.7%	-3.5%	4.5%

smallest farm size category in the NEDFS of 89 cows or fewer.[9] These comparisons provide a useful overview of the differences and similarities between organic and non-organic dairy production.

Before starting the comparison, several important factors affecting performance are worth noting. While the average herd size for the organic dairy farms has grown from year to year, herd sizes of the organic dataset and NEDFS are directly comparable only in 2006. The second important factor is the level of milk output per cow. Non-organic farms produced 25%, 35%, and 31% more milk per cow in 2004, 2005, and 2006, respectively, than did organic farms. When combined with the difference in herd size, this amounts to a 45%, 42%, and 35% more milk sold per farm in the conventional

[9]Unless otherwise noted the data used in the comparison are drawn from Tables B-1 and B-2 in Sobson et al. (2005, 2006, 2007).

Table 6. Comparative summary between organic and non-organic dairy farms 2004–2006.

	2004		2005		2006	
	Organic	NEDFS[1]	Organic	NEDFS	Organic	NEDFS
Number of farms	30	163	44	146	41	145
Average herd size	49	67	56	66	63	67
Annual milk sold (cwt per farm)	6,890	12,609	7,401	12,866	8,528	13,036
Average milk sold per cow (lbs)	14,060	18,819	12,619	19,494	13,455	19,457
Average milk price	22.97	16.84	24.94	15.91	28.84	13.61

[1]NEDFS = Northeast Dairy Farm Summary.

sector than in the organic sector. Third, while everyone wants to know how organic compares to conventional dairy farms, remember that these farms differ with respect to experience, methods of operation, and in many cases, philosophical goals.

In 2004, the price of non-organic milk averaged around $16.95/cwt, the highest average non-organic milk price for 2004–2006 (Sobson et al. 2005). In 2005, the average price received declined to $16.13/cwt, and just one year later, milk prices dropped precipitously and averaged around $13.81/cwt (Sobson et al. 2006, 2007). In the organic sector, the contract milk prices began to rise in the later part of 2005 and continued to rise through 2006. Across the three years, the average price received increased 9% between 2004 and 2005 and 16% between 2005 and 2006.

The feed markets in the two sectors have also behaved differently. The price of conventional dairy feed concentrate peaked in the first quarter of 2004 and then declined by nearly 50% into the first quarter of 2005 after which the price stabilized around the midpoint between the high and low. Prices began their upward spiral in September 2006. In the organic sector, concentrate feed prices were relatively unchanged between 2004 and 2005 and then increased by 15% between 2005 and 2006. Both sectors were affected by rising energy costs on the supply side, but the organic sector felt less of an impact due to limited use of petrochemical-based crop inputs. The primary price mover was demand coming from the growing sector of organic animal production (dairy, poultry, and beef), which was growing faster than the limited availability of organic livestock feed grains (Green Mountain Feeds personal communication).

Table 7. Revenue and expenses by farm type in 2004, 2005, and 2006 ($/cow nominal).

	2004		2005		2006	
	Organic	NEDFS[1]	Organic	NEDFS	Organic	NEDFS
Revenue						
Milk	3,183	3,169	3,144	3,102	3,874	2,649
Dairy Cattle	146	207	163	271	237	233
Crops	16	124	22	99	21	123
Other	202	178	202	213	337	291
Total Sales	3,546	3,678	3,530	3,685	4,469	3,296
Accrual Adjustments						
Livestock Inventory	61	(3)	94	(18)	150	(8)
Breed. livestock purchases[2]	(36)		(11)		(55)	
Accounts receivable[2]	21		18		38	
Hay[2]	(16)		(20)		16	
Grain[2]	11		(10)		(1)	
Total Accrued Revenue	41	(3)	70	(18)	149	(8)
Total Farm Revenue	3,587	3,675	3,600	3,667	4,618	3,288
Expenses						
Auto & truck[2]	51		43		46	
Bedding[2]	57		64		63	
Chemicals	4	34	1	41	0	33
Custom hire	53	66	73	62	127	49
DHIA[2]	14		13		18	
Fertilizers	11	83	19	107	36	95
Purchased feed[3]	993	870	936	789	1,172	778
Fuel and oil	92	114	104	155	122	160
Insurance	83	71	72	81	88	71
Interest	131	114	124	150	179	177
Hired labor	316	244	332	248	371	264
Milk marketing	60	159	51	174	61	187
Taxes	70	91	62	94	61	99
Rent	13	40	47	46	37	42
Repairs	183	239	216	263	243	227
Seeds	6	45	14	58	22	52
Supplies	177	196	184	202	214	195
Utilities	113	110	126	119	126	129
Vet, medicine, breeding	95	123	92	133	100	128
Miscellaneous	77	90	61	84	79	88
Total Cash Expenses	2,600	2,706	2,636	2,831	3,164	2752

Table 7. Continued.

	2004		2005		2006	
	Organic	NEDFS[1]	Organic	NEDFS	Organic	NEDFS
Accrual Expense Adjustments						
Depreciation	395	346	356	399	443	366
Other adjustments[4]	2	0	22	0	(34)	0
Total Accrual Expenses	397	46	379	399	409	366
Total Expenses	2,997	3,052	3,015	3,230	3,573	3,148

[1]NEDFS = Northeast Dairy Farm Summary.
[2]Category of revenue or expense not presented in the NEDFS.
[3]Includes grain and forage. In 2005, 90% of purchased feed for organic farmers was grain. In 2006, 88% was grain.
[4]The NEDFS shows that "other" cost adjustments are made to specific costs and reflected in operating expenses.

When turning to revenue and costs several differences are apparent (Table 7). Cash milk sales per cow from milk production are largely identical in 2004 and 2005 for both organic and conventional, differing by only around 1%. In 2006, when conventional milk prices declined, organic farms earned 46% more per cow than did non-organic farms. This insulation from the cyclical nature of the conventional market is an often-cited advantage to organic production, as organic farmers have contracts guaranteeing a set price. Milk revenue accounts for the greatest share of income earned in both sectors, but conventional farms earn a much greater amount from crop sales than do organic farms. When this revenue is combined with all other sources, non-organic farms earned about 4% more per cow in 2004 and 2005, but 36% less than their organic counterparts in 2006. When accrued adjustments to income are combined with cash sources, this common trend is maintained.[10]

We now turn to differences in cost structure in Table 7. Regardless of the production system, purchased feed, hired labor, repairs and supplies are the four largest cost shares of cash operating expenses, and the rank ordering of these expenses is also identical between the two systems. These four cost components total approximately 63.5% of the total costs of organic production and about 53% to 57% of non-organic costs, depending upon the year. While the relative ranking of the importance of these cost centers is identical, the ab-

[10]The Northeast Dairy Farm Survey does not contain data on several categories of accrued revenue adjustments and so the relative difference between the two may be exaggerated by this factor.

solute values of the expenditures do differ. Feed costs per cow are 14%, 19%, and 51% higher for organic farms than for conventional and hired labor is 30% to 41% greater also. Dalton et al. (2005) found that organic farms hired in more labor and paid their workers a higher hourly wage rate than non-organic counterparts.

Repair costs are higher for conventional farms, but this difference largely disappears in 2006 when herd sizes are comparable. We also note a similar trend with the cost of supplies. The higher repair costs are likely related to the high conventional milk prices in 2004 that allowed farmers to make deferred repairs after several lean years. Following these costs, interest expense and fuel and oil expense are the next largest cost shares in the budgets. It is interesting to note that fuel and oil expense is approximately 25% higher for non-organic farms. This higher expense may be attributed to greater cropping activity as suggested by higher crop income in the revenue stream. Few of the organic dairy farms in Vermont and Maine raise grain crops, but they do conduct haying activities on extensive acreages.

Other cost centers are distinctly different. Marketing costs are three times more expensive for conventional farms than for organic. Few organic dairy farms pay for hauling, and only some, depending on the processor, pay for a stop charge. However, organic farmers do pay for advertising and cooperative dues. These costs account for only 2% of cash expenditures for organic farms, but 6% of conventional operations. Chemicals, seeds, and fertilizer costs are higher for conventional operations. Combined, these costs were eight times greater on conventional farms in 2004, six times in 2005, and three times higher in 2006. Veterinary, medicine and breeding costs were similar in cost share ranking between the two farm types, but approximately 22% to 31% higher per cow in absolute values for conventional producers.

When all cash operating expenses are combined, organic dairy production was per cow 4% less expensive than non-organic production in 2004, 7% less expensive in 2005, but 14% more expensive on a per cow basis in 2006. Again, since some cost categories are not purely variable and decrease as herd size increases, it is worth emphasizing that the herd sizes were 28%, 15%, and 6% smaller for organic farms in 2004, 2005, and 2006, respectively. When depreciation and other accrued adjustments are added in to arrive at the total expenses, conventional farms are 1% and 6% more costly than organic farms in 2004 and 2005, respectively, but 13% less costly in 2006.

Finally, we examine the relative returns to dairy farming in these two sectors. These results are presented in Table 8. The first lines present the net cash revenue from dairy production and all farm activities. In all years, organic dairy farms earned more per cow from milk production than their non-organic counterparts and generated more net cash income from all farm activities except in 2004, on the average. This trend largely parallels the trend in milk prices. The third line of Table 8 calculates net farm revenue, which includes accrual adjusted income and expenses. Non-organic producers earned higher returns in 2004, but the average net revenue for 2005 and 2006 was higher for organic producers, especially in 2006. The fifth line presents farm earnings after subtracting family living withdrawals.[11] Data to calculate family living withdrawals were not collected for organic producers so a flat rate of $35,000 per year was

Table 8. Net revenue and earnings performance of organic and non-organic farms 2004–2006 ($/cow nominal or percentage).

	2004		2005		2006	
	Organic	NEDFS[1]	Organic	NEDFS	Organic	NEDFS
Cash income from milk	583	463	507	271	710	(133)
Net cash farm income	946	972	893	854	1,306	514
Net farm revenue	590	623	585	437	1,045	140
Owner withdrawal	794	484	742	500	689	447
Net farm earnings	(204)	139	(157)	$63)	356	(307)
Off-farm income	372	193	298	184	173	179
Net earnings	168	332	140	121	529	(128)
Average assets	10,996	11,450	12,274	12,715	13,792	12,806
Average equity	8,378	9,013	9,660	10,065	10,443	10,140
Return on assets (%)	-1.0%	3.9%	-0.3%	2.3%	5.1%	0.2%
Return on equity (%)	-6.7%	3.7%	-3.5%	1.5%	4.5%	-1.5%

[1]NEDFS = Northeast Dairy Farm Summary.

[11]Please note that when comparing financial results on a per cow basis, the difference in herd size can have a significant impact on fixed costs and family withdrawals.

assigned. By contrast, non-organic producers withdrew $32,428, $33,000, and $29,949 for 2004, 2005, and 2006, respectively.[12]

Despite this difference, we still observe a consistent trend of improved performance over time for organic producers and a decrease of profitability for non-organic during the time of this study. We then add off-farm earnings to the calculation to derive a measure of net family earnings. Off-farm income declined modestly for conventional producers, but quite dramatically for organic producers. This is attributed to the increased sample size of the organic database. With this in mind, we note that organic producers' family earnings were 49% less than conventional producers in 2004, similar but slightly better performance of organic producers in 2005, and dramatically higher earnings for organic farmers in 2006.

Organic farm assets were within 4% of conventional farms in 2004 and 2005.[13] Organic farms, however, possessed 10% more assets in 2006 primarily due to the surge in the value of organic dairy cows.[14] Non-organic producers possessed 12% and 7% greater equity in 2004 and 2005, but 6% less equity in 2006. The change in assets and equity likely reflects the composition of the farms in the study, and the gain in equity may reflect a reinvestment of net earnings. For example, several organic dairy farms paid off significant levels of debt in 2006. In any case, these differences are reflected in both the return on assets and the return on equity. Between the two operations we found that both the return on assets and equity are higher for non-organic producers in 2004 and 2005, but higher for organic producers in 2006. We also found that the highest returns

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[12]Family cost of living was kept at $35,000 for consistent comparison between years. The authors conceded this provides a dilemma for comparison to the NEDFS. Evidence shows that family living costs rise when farm income rises, which is true for the organic farms, but income for the NEDFS farms declined from 2004 to 2006.

[13]We calculate the returns to assets and returns to equity for the non-organic farm based upon the average numbers for the NEDFS. We do so because the ROA and ROE calculation in the NEDFS include off-farm income, which is inconsistent with recommended farm financial standards recommendations.

[14]The study saw the value of organic dairy cows more than double from 2004 to 2006. For this study, dairy cows were kept at a conservative, consistent value. For each year, the value of the cows was kept constant from beginning to the end of the year so the income statement reflects only the growth/decline of the herd numbers.

occurred in 2004 for the non-organic producers while the highest for organic producers in 2006. Although one must be cautious when comparing between years and between systems, it is interesting to note that the returns to assets and equity in the "best" year in organic production exceeded the "best" year in non-organic production by approximately 20%. However, in the "worst" years, losses were far greater for organic dairy farms.

IMPACT OF HIGHER FEED AND FUEL PRICES

The growth of organic dairy has been quite phenomenal in New England, especially in Vermont. But the future is definitely clouded by recent increases in feed prices (Table 9). The price of organic grains increased in 2005 and 2006, and conventional grains also started to climb to historical highs in October 2006. Demand for the existing supply of organic grain is competitive with the demand found in other organic livestock sectors. In addition, farms also face soaring fuel prices and other inputs as transportation costs filter through the economy.

To see how these changes would affect organic dairy farms, we simulated a scenario, based on 2006 data, where feed prices increased 40%, fuel prices by 25%, and other farm expenses by 4%. In this scenario, we assumed milk production per cow and cow numbers would remain the same. These are conservative estimates of the change in expenses given that the New England dairy farmers would likely economize where possible.

These price increases would inflate the purchased grain feed expenses by $25,544, fuel expenses by $2,044, and other expenses by $5,276. Combined, the cost of production would increase by

Table 9. Illustrative prices of New England organic dairy feed 2005–2008 (FOB Green Mountain Feeds, VT).

Year	12% Protein Grain	16% Protein Grain	18% Protein Grain
2005	$310	$330	$349
2006	$350	$380	$395
2007	$360	$393	$412
2008	$490	$565	$598
Change from 2005 to 2008	58.1%	71.2%	71.3%

Source: Green Mountain Feeds, Bethel, Vermont.

$3.85 per cwt. Net farm earnings would be reduced from $28,946 to a loss of -$3,918. For the average New England organic dairy farm to achieve a 5% return on equity, the milk price would have to increase nearly 15% to $32.65 per cwt. This is $3.81 more than the $28.84 that New England organic dairy farms received for their milk in 2006. There is no indication that organic milk prices will continue to keep pace with increased costs.

FUTURE OF ORGANIC DAIRY FARMING IN NEW ENGLAND

Predicting the future of organic dairy farming is difficult due to the recent volatility of feed and fuel prices.

Vermont saw a surge of nearly 100 farms that switched to organic in 2006–2007. This led to a moratorium by organic processors on additional new organic farms until the new supply is absorbed into the economy. The pace of the transition has slowed tremendously, but there are still those contemplating switching to organic production.

Organic milk prices also seemed to have leveled off while conventional milk prices have hit record levels in the past year. There have been reports of a few organic dairy farmers switching back to conventional. Prior to 2007, the researchers could not document one case of a farmer moving from organic to conventional. So for the current time period, some farmers may perceive conventional as being more profitable.

While conventional prices are at record highs, production expenses have also surged. In early 2008, we have seen oil prices hit $140/barrel. As a result, the cost of diesel fuel has doubled in two years, fertilizer prices have increased from 50% to 150%, corn prices have hit unheard of levels due to demand for ethanol, and soybean protein prices have surged due to biofuel demand and food shortages worldwide. What this means is that even with record high milk prices, conventional milk production may not be profitable under current practices. This situation could cause more farmers to switch to organic or organic production systems due to their lower input costs.

Organic dairy farming has also come to be seen as an outlet for smaller farms that cannot, or have decided they will not, continue to get bigger to maintain profitability. There is serious concern about how New England dairy farms can compete with the large dairy farms in the West. Going organic may be the only way these smaller farms can survive. On the other hand, with higher fuel

prices, New England dairy farms may have an economic advantage in their proximity to large metropolitan markets.

Although there is likely potential for additional growth in the demand for organic milk, farmers face an uncertain future. Organic dairy is proving to be a profitable venture, but this array of new conditions will presents a maze of new opportunities and challenges for both organic and conventional dairy producers.

CONCLUSIONS

This bulletin documents the costs and return of a small sample of organic dairy farms in Maine and Vermont over a relatively short three-year period. Although the sample size is small, it is statistically defensible and this study represents the first multi-year analysis of organic dairy farms.

We found several key trends in the organic sector. The average farm size increased across years as did total milk produced and when combined with stable to increasing milk prices, resulted in improved financial performance of organic dairy farms, especially in 2006. When compared with a similar sample of small conventional farms, cash revenues per cow were quite similar in 2004 and 2005, but revenue on organic farms was 36% higher than on their non-organic counterparts in 2006. Income is more concentrated in milk receipts on organic farms while revenues on non-organic farms show a greater contribution from crop income.

On the cost side, organic farms experienced an increase in expenditures for the most important cost centers of feed, hired labor, supplies, and repairs across the three years. In contrast, only the hired labor cost center increased for non-organic producers and the other three centers decreased over time. These four areas represent the largest share of expense for both organic and non-organic farms. While these cost shares were similar for the two types of farms, others were markedly different although far less important in terms of their contribution to total cost. Overall, it is difficult to cite one production system as more expensive than another; rather it is more appropriate to indicate that they are remarkably similar. This may be due in part to differences in the revenue-generating strategy the farms employed. Non-organic farms earned higher revenue for crop sales, but also incurred higher fuel and biochemical input costs.

Organic farms expended less on veterinary, breeding, and medicine costs because of the difference in herd health-maintenance practices. In addition, marketing costs were three times more expensive for non-organic producers due to the contract structure.

Overall, however, average total cash expenses were 4% and 7% higher for conventional producers in 2004 and 2005, but 14% lower in 2006. Total expenses (including depreciation and other accrual adjustments) were also quite similar in 2004 and 2005, just 1% and 6% higher, respectively, for non-organic producers. This dominance reversed in 2006 when the total expense for an organic cow was 13% higher. This is also shown in the higher level of average assets and equity on organic farms in 2006. Between 2005 and 2006, the average asset and equity levels increased only slightly on conventional farms, while assets and equity increased 15% for organic producers driven by higher values for organic dairy cows. Again, this result must be taken with caution as it may be influenced by the composition of farms in the organic study.

It is the relationship between revenues, costs, and the resources used in production that determine the overall performance of a firm. In our three years of data, organic farm performance has improved each year. At the same time, several factors inhibit identification of which factors have affected performance the most. The average number of cows in the sample increased from 48 to 63 over the three years, indicating increasing returns to size of the operation. The milk price received by organic producers increased from year to year but costs have also. An additional hypothesis that merits investigation is determining the role of experience. It is possible that as organic producers gain more experience and knowledge, their performance and the performance of their farm may improve. Nonetheless, we also found that organic farmers produce 30% less milk per cow than their non-organic counterparts, but earn a similar or higher amount of revenue from each cow due to higher milk prices. Cost structures are remarkably similar and differ only in areas that contribute 7% or less to the total cost of production. Overall, managerial emphasis on containing feed, labor, and capital costs will lead to improved performance and longevity in the organic sector as it does in the non-organic dairy sector.

From a social perspective, the organic dairy sector has become a haven for smaller family-operated farms that could not, or would not, continue getting bigger to remain economically viable in conventional dairy production. However, organic dairy farmers are faced with the same familiar scenario as non-organic dairy, where rising feed, fuel, and other expenses continue to chip away at their profitability. Increases in organic commodity grain prices in 2007 and 2008 have risen at a rate exceeding the rise in conventional grains. This input cost drives decisions on organic dairy farms, despite a typically lower level of supplementation. The response of processors to dairy farmers' increasing demands for higher milk prices may determine the future growth of this industry in the Northeast.

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APPENDIX: ANNUAL BUDGETS WITH DESCRIPTIVE STATISTICS 2004–2006

Table A1. Annual income statement for 2004 ($/cwt or percent).

2004 Income Statement	Mean	Median	Std Deviation	Min-imum	Max-imum
Average # of cows	48.8	45.5	15.4	20.0	80.0
Lbs shipped total	6,890	6,870	2,783	2,100	13,000
Lbs shipped/cow	14,060	14,022	3,416	6,940	21,316
Milk price	22.97	22.90	1.70	19.88	27.04
Receipts					
Milk sales (a)	22.97	22.90	1.70	19.88	27.04
Dairy cattle sales	0.44	0.00	0.73	0.00	2.25
Cull cow sales	0.49	0.39	0.51	0.00	1.90
Bob/Veal calf sales	0.15	0.09	0.22	0.00	1.21
Crop sales	0.11	0.00	0.28	0.00	0.97
Government payments	1.00	0.30	2.03	0.00	10.53
Patronage dividends	0.13	0.03	0.16	0.00	0.45
Other	0.50	0.15	0.80	0.00	2.80
Total Cash Receipts (b)	25.79	25.33	2.94	21.62	35.92
Accrual Revenue Adjustments					
Livestock inventory	0.46	0.07	1.72	(3.30)	4.71
Breeding livestock purchases	(0.24)	0.00	0.61	(2.34)	0.00
Accounts receivable (c)	0.16	0.00	0.35	(0.31)	1.09
Hay	(0.08)	(0.02)	0.85	(1.96)	1.65
Grain	0.07	0.02	0.76	(1.83)	3.68
Total Accrual Revenue (d)	0.38	0.32	2.21	(3.85)	4.28
Total Farm Revenue (e)	26.16	25.79	3.80	19.67	39.77
Expenses					
Auto and truck expenses	0.40	0.37	0.39	0.00	1.72
Bedding	0.43	0.36	0.41	0.00	2.14
Breeding	0.36	0.31	0.29	0.00	1.22
Chemicals/pesticides	0.02	0.00	0.08	0.00	0.36
Custom hire	0.37	0.08	0.54	0.00	1.69
DHIA	0.09	0.00	0.11	0.00	0.30
Fertilizers & lime	0.07	0.00	0.14	0.00	0.63
Feed—purchased grain & other	7.24	7.12	2.11	3.25	12.62
Fuel and oil	0.68	0.68	0.39	0.06	1.45
Insurance	0.64	0.64	0.37	0.00	1.78
Interest	1.04	1.19	0.89	0.00	2.98
Labor	2.10	1.36	2.27	0.00	9.23
Milk marketing	0.43	0.35	0.32	0.15	1.43

2004 Income Statement	Mean	Median	Std Deviation	Min-imum	Max-imum
Real estate taxes (farm portion)	0.54	0.51	0.40	0.00	1.85
Rent	0.10	0.02	0.14	0.00	0.49
Repairs	1.31	1.17	0.70	0.28	2.80
Seed and plants	0.04	0.00	0.09	0.00	0.43
Supplies	1.36	1.25	0.69	0.37	3.63
Utilities	0.90	0.70	0.64	0.26	3.51
Vet	0.30	0.25	0.23	0.00	1.06
Medicine	0.04	0.00	0.06	0.00	0.21
Miscellaneous	0.57	0.39	0.52	0.00	1.99
Total Cash Expenses (f)	19.05	18.15	4.20	12.69	29.33
Accrual Expense Adjustments					
Depreciation	2.86	2.37	2.19	0.39	10.26
Accounts payable	0.05	0.00	0.47	(1.01)	1.85
Pre-paid expenses	(0.01)	0.00	0.07	(0.39)	0.00
Supplies	0.01	0.00	0.09	(0.26)	0.36
Total Accrual Expenses (g)	2.90	2.50	2.25	0.40	10.26
Total Farm Expenses (h)	**21.95**	**21.21**	**4.56**	**14.70**	**33.51**
Cash income from milk (a-f)	3.92	3.53	4.31	(7.31)	12.71
Accrual income from milk (a+c-h)	1.19	0.66	4.47	(11.48)	11.46
Net cash farm income (b-f)	6.74	6.16	3.87	(1.60)	15.69
Net farm revenue (e-h)	4.22	4.07	3.70	(3.33)	12.66
Family living (i)	6.29	5.10	3.52	2.69	16.67
Net cash farm earnings (b-f-i)	0.45	0.34	5.23	(10.38)	10.31
Net farm earnings (e-h-i)	(2.07)	(1.67)	5.30	(19.87)	7.72
Off farm income (j)	3.32	0.00	6.81	0.00	23.04
Net family cash earnings (b-f-i+j)	3.77	3.03	5.74	(7.82)	15.35
Net earnings (e-h-i+j)	1.25	0.78	5.81	(8.15)	15.82
Average assets	86.54	76.42	46.80	37.84	242.14
Average equity	65.00	59.09	44.42	9.65	242.14
Return on assets	-1.0%	-1.2%	5.7%	-18.5%	10.7%
Return on equity	-6.7%	-2.6%	16.4%	-78.7%	10.7%

Table A2. Annual income statement for 2005 ($/cwt).

2005 Income Statement	Mean	Median	Std Deviation	Min-imum	Max-imum
Average # of cows	56.4	49.3	30.2	21.5	184.0
Cwt of milk sold	7,401	6,278	4,957	1,970	23,576
Lbs shipped/cow	12,619	12,904	3,324	6,115	19,508
Milk price	24.94	24.73	1.57	22.38	30.95
Receipts					
Milk sales (a)	24.94	24.73	1.57	22.38	30.95
Dairy cattle sales	0.50	0.00	1.00	0.00	4.63
Cull cow sales	0.63	0.59	0.46	0.00	1.83
Bob/Veal calf sales	0.16	0.12	0.14	0.00	0.70
Crop sales	0.19	0.00	0.36	0.00	1.60
Government payments	0.81	0.46	1.12	0.00	5.55
Patronage dividends	0.16	0.07	0.17	0.00	0.51
Other	0.82	0.14	1.57	0.00	7.46
Total Cash Receipts (b)	28.21	27.61	3.14	23.15	38.24
Accrual Revenue Adjustments					
Livestock inventory	0.59	0.44	2.98	(10.22)	6.40
Breeding livestock purchases	(0.10)	0.00	0.38	(2.21)	0.00
Accounts receivable (c)	0.21	0.12	1.15	(2.15)	5.85
Hay	(0.08)	(0.13)	1.49	(4.29)	3.00
Grain	(0.09)	0.00	0.37	(1.63)	0.62
Total Accrual Revenue (d)	0.53	0.61	3.77	(14.31)	9.09
Total Farm Revenue (e)	28.75	29.24	4.38	17.18	39.29
Expenses					
Auto and truck expenses	0.37	0.24	0.38	0.00	1.48
Bedding	0.51	0.41	0.39	0.00	1.93
Breeding	0.36	0.34	0.29	0.00	1.28
Chemicals/pesticides	0.01	0.00	0.04	0.00	0.28
Custom hire	0.58	0.14	0.74	0.00	3.09
DHIA	0.10	0.00	0.14	0.00	0.61
Fertilizers & lime	0.15	0.00	0.32	0.00	1.56
Feed—purchased grain & other	7.41	7.51	2.39	1.52	13.08
Fuel and oil	0.86	0.82	0.44	0.10	2.14
Insurance	0.63	0.50	0.41	0.14	2.31
Interest	1.10	0.68	1.16	0.00	4.95
Labor	2.44	2.45	1.98	0.00	6.19
Milk marketing	0.42	0.39	0.28	0.11	1.49

2005 Income Statement	Mean	Median	Std Deviation	Min-imum	Max-imum
Real estate taxes (farm portion)	0.54	0.41	0.47	0.00	2.11
Rent	0.43	0.12	0.73	0.00	3.95
Repairs	1.90	1.55	1.48	0.23	7.97
Seed and plants	0.10	0.00	0.21	0.00	0.83
Supplies	1.58	1.36	0.94	0.27	5.14
Utilities	1.13	0.95	0.66	0.40	3.23
Vet	0.32	0.31	0.21	0.07	0.90
Medicine	0.05	0.00	0.09	0.00	0.41
Miscellaneous	0.55	0.35	0.64	0.02	3.33
Total Cash Expenses (f)	21.55	21.52	4.47	14.09	33.09
Accrual Expense Adjustments					
Depreciation	2.91	2.46	2.05	0.23	9.69
Accounts payable	0.20	0.00	0.87	(2.50)	2.69
Pre-paid expenses	(0.04)	0.00	0.13	(0.68)	0.00
Supplies	(0.07)	0.00	0.40	(2.46)	0.79
Total Accrual Expenses (g)	3.01	2.45	2.08	0.16	8.45
Total farm expenses (h)	24.56	24.54	5.03	14.28	35.34
Cash income from milk (a-f)	3.39	3.62	4.32	(8.17)	12.61
Accrual income from milk (a+c-h)	0.59	0.49	4.54	(10.09)	12.20
Net cash farm income (b-f)	6.66	6.69	4.19	(1.60)	16.27
Net farm revenue (e-h)	4.19	4.81	5.79	(18.16)	16.10
Family living (i)	6.64	5.58	3.95	1.48	17.76
Net cash farm earnings (b-f-i)	0.02	1.29	6.11	(16.64)	8.60
Net farm earnings (e-h-i)	(2.45)	(0.98)	7.76	(32.47)	8.44
Off farm income (j)	2.90	0.04	6.28	0.00	25.53
Net family cash earnings (b-f-i+j)	2.93	3.40	5.80	(15.91)	15.35
Net earnings (e-h-i+j)	0.45	0.87	7.65	(32.47)	13.49
Average assets	104.59	89.43	58.46	32.90	272.33
Average equity	80.63	72.45	56.40	17.44	240.81
Return on assets	-0.3%	0.4%	8.0%	-29.7%	16.0%
Return on equity	-3.5%	-2.0%	12.1%	-45.5%	17.5%

Table A3. Annual income statement for 2006 ($/cwt).

2006 Income Statement	Mean	Median	Std Deviation	Min-imum	Max-imum
Average # of cows	62.7	54.5	34.2	20.5	188.5
Cwt of milk sold	8,528	7,512	5,080	2,250	24,111
Lbs shipped/cow	13,455	13,370	2,567	7,659	18,691
Milk price	28.84	28.42	1.56	26.47	33.13
Receipts					
Milk sales (a)	28.84	28.42	1.56	26.47	33.13
Dairy cattle sales	1.05	0.00	2.29	0.00	11.26
Cull cow sales	0.54	0.45	0.39	0.00	2.11
Bob/veal calf sales	0.18	0.15	0.18	0.00	0.81
Crop sales	0.17	0.00	0.43	0.00	2.06
Government payments	1.67	1.07	1.26	0.00	4.68
Patronage dividends	0.11	0.06	0.12	0.00	0.41
Other	0.74	0.39	1.24	0.00	7.14
Total Cash Receipts (b)	33.30	32.48	3.83	28.56	49.78
Accrual Revenue Adjustments					
Livestock inventory	1.00	0.47	3.00	(4.11)	11.95
Breeding livestock purchases	(0.37)	0.00	1.32	(6.57)	0.00
Accounts receivable (c)	0.29	0.28	0.56	(1.14)	1.28
Hay	0.19	0.11	1.23	(3.06)	3.82
Grain	(0.01)	0.01	0.63	(2.93)	1.93
Total Accrual Revenue (d)	1.11	1.33	3.04	(5.80)	6.08
Total Farm Revenue (e)	34.41	33.31	4.05	27.94	43.98
Expenses					
Auto and truck expenses	0.34	0.22	0.41	0.00	1.77
Bedding	0.48	0.41	0.43	0.00	2.19
Breeding	0.38	0.34	0.25	0.00	1.26
Chemicals/pesticides	0.00	0.00	0.01	0.00	0.05
Custom hire	0.98	0.88	0.76	0.00	2.68
DHIA	0.13	0.12	0.16	0.00	0.76
Fertilizers & lime	0.27	0.06	0.41	0.00	1.91
Feed—purchased grain & other	8.56	8.88	2.74	0.04	13.13
Fuel and oil	0.90	0.88	0.43	0.15	2.02
Insurance	0.69	0.61	0.40	0.00	1.88
Interest	1.41	1.25	1.12	0.00	3.88
Labor	2.74	2.54	2.26	0.00	8.23
Milk marketing	0.46	0.47	0.26	0.02	1.15

2006 Income Statement	Mean	Median	Std Deviation	Min-imum	Max-imum
Real estate taxes (farm portion)	0.48	0.42	0.44	0.00	2.57
Rent	0.28	0.11	0.39	0.00	1.32
Repairs	1.86	1.71	0.98	0.17	4.33
Seed and plants	0.17	0.00	0.33	0.00	1.24
Supplies	1.65	1.62	0.79	0.46	4.29
Utilities	0.96	0.94	0.35	0.30	2.07
Vet	0.29	0.23	0.24	0.00	1.17
Medicine	0.08	0.04	0.10	0.00	0.34
Miscellaneous	0.58	0.43	0.48	0.04	1.91
Total Cash Expenses (f)	23.70	23.35	4.02	15.21	32.74
Accrual Expense Adjustments					
Depreciation	3.33	3.15	1.96	0.80	9.77
Accounts payable	(0.10)	0.00	1.10	(3.94)	4.20
Pre-paid expenses	(0.07)	0.00	0.25	(1.29)	0.34
Supplies	(0.01)	0.00	0.16	(0.58)	0.45
Total accrual expenses (g)	3.15	2.95	2.37	(0.41)	10.96
Total farm expenses (h)	26.85	26.13	4.99	14.80	41.68
Cash income from milk (a-f)	5.14	4.66	4.18	(4.93)	15.02
Accrual income from milk (a+c-h)	2.29	2.06	4.98	(12.15)	14.91
Net cash farm income (b-f)	9.60	8.74	4.09	1.93	19.91
Net farm revenue (e-h)	7.56	7.92	4.82	(3.14)	16.67
Family living (i)	5.39	4.66	2.94	1.45	15.56
Net cash farm earnings (b-f-i)	4.21	4.26	4.55	(4.22)	15.95
Net farm earnings (e-h-i)	2.17	2.79	5.86	(18.70)	12.23
Off farm income (j)	1.57	0.00	4.96	0.00	31.46
Net family cash earnings (b-f-i+j)	5.78	4.97	5.84	(4.22)	30.48
Net earnings (e-h-i+j)	3.74	4.75	6.91	(18.70)	28.19
Average assets	106.76	98.12	52.80	33.68	271.69
Average equity	80.15	67.20	55.42	15.93	249.16
Return on assets	5.1%	4.8%	6.2%	-6.3%	22.0%
Return on equity	4.5%	4.7%	9.1%	-20.6%	22.0%

Maine Agricultural and Forest Experiment Station
5782 Winslow Hall
Orono ME 04469-5782

5-5-38900

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