

1997 MILK PRODUCTION COSTS from 871 Wisconsin Dairy Farms

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Introduction

When compared to 1996, the overall cost of producing a hundredweight equivalent of milk decreased in 1997, but it is still higher than costs in 1995. In addition, farms with 51 to 75 cows had the lowest “Basic Cost” of any of the six farm size groups studied for this paper. Basic Costs are all cash and non-cash costs except labor and capital.

In this study of 1997 records, 871 Wisconsin dairy farms averaged a basic cost of \$7.86 per hundredweight equivalent (CWT EQ) on income of \$13.36 per CWT EQ (the U.S. average per hundredweight milk price in 1997). In 1995, the basic cost was \$7.41 per CWT EQ on income of \$12.86 (1995 U.S. average milk price) or basic costs were 57.6 percent of income. In 1996 basic costs were 58.0 percent of income.

Total allocated expenses per CWT EQ of milk sold in 1997 averaged \$11.81. Total allocated expenses do not include a charge for unpaid labor and management or a return to equity capital. When calculating opportunity costs using \$8.25 per hour for unpaid labor, \$10.00 per hour for unpaid management, plus a five percent return on the fair market value of equity capital, the total cost of production is \$14.14 per CWT EQ.

Data Source

Lakeshore Farm Management Association and Fox Valley Management Association² originally collected this data. Personnel affiliated with these associations helped individual farm managers reconcile their financial data. Individual farm managers used a number of different manual and computerized record keeping systems to enter the initial financial records, including the Agricultural Accounting and Information Management System (AAIMS©).

In 1997, 940 financial data sets were received from Lakeshore Farm Management and Fox Valley Associations. Some of these records had milk income that was less than 60 percent of their total income. Those farms are not included in this analysis. However, the farms left in the study had a total of 80,529 dairy cows and 1,534,610,992 pounds of milk sold (1.46% of state total).

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Comparing the Studied Dairy Farms to Other Wisconsin Dairy Farms

The average number of cows per farm increased 8.5 cows to 92.5 cows in 1997, with 19,057 pounds of milk sold per cow. The study farms in 1993 averaged 71 cows and 17,801 pounds of milk sold per cow. Wisconsin's 1997 herd size averaged 60 cows, with an average of 16,057 pounds of milk sold per cow. AgSource DHI (1997) herds averaged 67.4 cows, with production per cow estimated at 18,728 pounds.

Table 1 shows range and distribution of milk sold per cow on the farms studied and on AgSource DHI farms.

Table 1
Milk Sold per Cow

Pounds per Cow	Study Farms		AgSource DHI
	Number of Farms	Percent of Farms*	Percent of Herds*
Less than 13,000	68	8	2
13,001 - 15,000	78	9	6
15,001 - 17,000	132	15	15
17,001 - 19,000	189	22	23
19,001 - 21,000	204	23	24
21,001 - 23,000	137	16	18
greater than 23,000	63	7	13

- Percent columns may not add to 100 due to rounding.

Table 2 shows the Cost per Farm averages in six herd size categories. To assist in understanding the table the “Range in Herd Size - 51 to 75” will be used as an example.

In this data set there were 316 herds that had more than 50 cows and less than 76 cows. These herds averaged 62 cows and sold, on average, 18,549 pounds of milk per cow. They farmed 242 crop acres.

The average amount of purchased feed was \$34,462 per farm. In addition, these farms paid \$3,291 for crop chemicals, \$6,325 for fertilizer, \$8,203 for repairs, and \$4,587 for vet & medicine. They also had some non-cash “Basic Costs”; a decrease in the amount of prepaid expenses of \$491 and an increase in their accounts payable of \$943. Total Basic Costs were \$107,994 per farm.

In addition to Basic Costs, these farms had \$15,588 of paid labor (10,301 to dependents and 5,287 to non-dependents). Some of this was paid as Social Security taxes and benefits (\$5,181) and the remainder (\$10,407) as wages. There was also \$12,678 (4,713 plus 7,965) of interest expense, and \$25,881 of depreciation. Some of the depreciation (3,406) was on taken on purchased livestock.

The Total Allocated Costs are \$162,141 per farm. Total Income, \$190,438. This results in a Net Farm Income from Operations (NFIFO) of \$28,297. This is not the return to the owner-operator-manager’s (and family’s) labor, management and equity capital. To obtain that number you need to add the amount paid to dependents to the NFIFO ($28,297 + 10,301 = 38,598$).

(NOTE: Comparison among groups of farms should not be made using this table.)

Table 2
Milk Production Costs per Farm in 1997

Range in Herd Size	<=50 cows	51 to 75	76 to 100	101 to 150	151 to 250	>250 cows
Number of Farms	239	316	138	91	45	42
Pounds Milk Sold per Cow	17,143	18,549	19,495	19,885	18,230	20,377
Average Number of Cows	41	62	87	120	202	457
Total Crop Acres Farmed	169	242	339	429	639	895
Milk Price Received	13.19	13.34	13.35	13.38	13.96	13.97
Cost of Resale Livestock Sold	123	84	84	778	406	9,666
Auto & Truck Expense	1,188	1,345	1,415	1,302	1,173	2,227
Crop Chemicals	1,835	3,291	5,099	7,186	7,907	17,148
Custom Heifer Raising	46	136	1,172	3,874	3,127	35,921
Custom Hire (Other)	2,036	3,308	5,345	7,492	12,140	24,590
Feed Purchased	21,562	34,462	53,673	75,909	131,511	395,977
Fertilizer & Lime	3,977	6,325	9,420	13,854	23,028	27,390
Freight & Trucking	311	474	905	1,009	1,764	6,992
Milk Hauling	690	813	874	1,097	1,535	5,689
Fuels & oil	2,893	3,875	5,876	7,950	11,380	25,983
Insurance	1,912	2,630	3,566	4,621	6,079	15,050
Milk Marketing & CCC	1,269	2,007	2,935	4,042	6,444	16,523
Rent/Lease Equipment	259	880	1,675	2,803	6,201	15,767
Rent-Farm & Pasture	3,532	6,478	11,526	16,509	27,889	39,660
Build & Fence Repair	1,629	2,769	5,220	5,597	7,655	16,716
Mach Repair & Maintenance.	5,163	8,203	12,591	18,143	23,893	51,451
Seed & Plants Purchased	2,724	4,513	6,562	7,878	13,515	23,603
Supplies	4,540	6,629	8,970	12,069	18,748	34,702
Taxes	2,569	3,612	4,400	6,140	7,975	11,810
Utilities	2,718	3,816	5,589	7,516	9,559	21,677
Vet & Medicine	2,957	4,587	7,601	10,740	17,283	40,944
Breeding Fees	1,461	2,394	3,242	4,284	5,427	10,064
Other Farm Expenses	901	1,457	2,145	3,051	4,695	12,589
Other Crop Expenses	838	1,291	1,934	1,946	3,388	5,650
Other Livestock Expenses	393	1,153	3,284	7,301	11,855	45,090
Accounts Payable Adjustment	128	491	1,370	972	5,056	4,801
Prepaid Expense Adjustment	298	943	2,598	1,818	2,425	5,301
Basic Costs	67,952	107,994	169,072	235,609	372,057	922,981
Livestock Depreciation	2,219	3,406	5,519	7,581	19,763	49,126
<i>Basic Cost + Lvst Depr</i>	<i>70,171</i>	<i>111,400</i>	<i>174,591</i>	<i>243,190</i>	<i>391,820</i>	<i>972,108</i>
Mortgage Interest	3,441	4,713	6,122	8,269	14,259	44,154
Other Interest	4,341	7,965	11,006	17,265	34,599	68,960
SST & Employee Benefits (Dep)	2,799	4,174	4,045	4,573	1,744	6,095
SST & Employee Ben (Non-Dep)	398	1,007	2,082	5,378	8,172	32,733
Labor Hired (Dependents)	3,390	6,127	6,304	8,226	10,596	21,821
Labor Hired (Non-Dependents)	1,419	4,280	12,513	25,495	44,979	148,298
Other Depreciation	12,112	22,475	30,472	40,659	60,181	135,083
Total Allocated Costs	98,071	162,141	247,135	353,055	566,351	1,429,252
Total Income	113,570	190,438	282,908	398,608	642,932	1,539,083
Net Farm Income from Operations	15,499	28,297	35,773	45,554	76,581	109,831

Table 3
Milk Production Costs per Cow in 1997

Range in Herd Size	<=50 cows	51 to 75	76 to 100	101 to 150	151 to 250	>250 cows
Number of Farms	239	316	138	91	45	42
Pounds Milk Sold per Cow	17,143	18,549	19,495	19,885	18,230	20,377
Average Number of Cows	41	62	87	120	202	457
Total Crop Acres per Cow	4.15	3.90	3.90	3.58	3.16	1.96
Total Number of Cows	9,754	19,576	12,016	10,909	9,098	19,176
Cost of Resale Livestock Sold	\$ 3	\$ 1	\$ 1	\$ 6	\$ 2	\$ 21
Auto & Truck Expense	\$ 29	\$ 22	\$ 16	\$ 11	\$ 6	\$ 5
Crop Chemicals	\$ 45	\$ 53	\$ 59	\$ 60	\$ 39	\$ 38
Custom Heifer Raising	\$ 1	\$ 2	\$ 13	\$ 32	\$ 15	\$ 79
Custom Hire (Other)	\$ 50	\$ 53	\$ 61	\$ 62	\$ 60	\$ 54
Feed Purchased	\$ 528	\$ 556	\$ 616	\$ 633	\$ 651	\$ 867
Fertilizer & Lime	\$ 97	\$ 102	\$ 108	\$ 116	\$ 114	\$ 60
Freight & Trucking	\$ 8	\$ 8	\$ 10	\$ 8	\$ 9	\$ 15
Milk Hauling	\$ 17	\$ 13	\$ 10	\$ 9	\$ 8	\$ 12
Fuels & oil	\$ 71	\$ 63	\$ 67	\$ 66	\$ 56	\$ 57
Insurance	\$ 47	\$ 42	\$ 41	\$ 39	\$ 30	\$ 33
Milk Marketing & CCC	\$ 31	\$ 32	\$ 34	\$ 34	\$ 32	\$ 36
Rent/Lease Equipment	\$ 6	\$ 14	\$ 19	\$ 23	\$ 31	\$ 35
Rent-Farm & Pasture	\$ 87	\$ 105	\$ 132	\$ 138	\$ 138	\$ 87
Build & Fence Repair	\$ 40	\$ 45	\$ 60	\$ 47	\$ 38	\$ 37
Mach Repair & Maintenance.	\$ 126	\$ 132	\$ 145	\$ 151	\$ 118	\$ 113
Seed & Plants Purchased	\$ 67	\$ 73	\$ 75	\$ 66	\$ 67	\$ 52
Supplies	\$ 111	\$ 107	\$ 103	\$ 101	\$ 93	\$ 76
Taxes	\$ 63	\$ 58	\$ 51	\$ 51	\$ 39	\$ 26
Utilities	\$ 67	\$ 62	\$ 64	\$ 63	\$ 47	\$ 47
Vet & Medicine	\$ 72	\$ 74	\$ 87	\$ 90	\$ 85	\$ 90
Breeding Fees	\$ 36	\$ 39	\$ 37	\$ 36	\$ 27	\$ 22
Other Farm Expenses	\$ 22	\$ 24	\$ 25	\$ 25	\$ 23	\$ 28
Other Crop Expenses	\$ 21	\$ 21	\$ 22	\$ 16	\$ 17	\$ 12
Other Livestock Expenses	\$ 10	\$ 19	\$ 38	\$ 61	\$ 59	\$ 99
Accounts Payable Adjustment	\$ 3	\$ 8	\$ 16	\$ 8	\$ 25	\$ 11
Prepaid Expense Adjustment	\$ 7	\$ 15	\$ 30	\$ 15	\$ 12	\$ 12
Basic Costs	\$ 1,665	\$ 1,743	\$ 1,942	\$ 1,965	\$ 1,840	\$ 2,022
Livestock Depreciation	\$ 54	\$ 55	\$ 63	\$ 63	\$ 98	\$ 108
<i>Basic Cost + Lvst Depr</i>	<i>\$ 1,719</i>	<i>\$ 1,798</i>	<i>\$ 2,005</i>	<i>\$ 2,029</i>	<i>\$ 1,938</i>	<i>\$ 2,129</i>
Mortgage Interest	\$ 84	\$ 76	\$ 70	\$ 69	\$ 71	\$ 97
Other Interest	\$ 106	\$ 129	\$ 126	\$ 144	\$ 171	\$ 151
SST & Employee Benefits (Dep)	\$ 69	\$ 67	\$ 46	\$ 38	\$ 9	\$ 13
SST & Employee Ben (Non-Dep)	\$ 10	\$ 16	\$ 24	\$ 45	\$ 40	\$ 72
Labor Hired (Dependents)	\$ 83	\$ 99	\$ 72	\$ 69	\$ 52	\$ 48
Labor Hired (Non-Dependents)	\$ 35	\$ 69	\$ 144	\$ 213	\$ 222	\$ 325
Other Depreciation	\$ 297	\$ 363	\$ 350	\$ 339	\$ 298	\$ 296
Total Allocated Costs	\$ 2,403	\$ 2,617	\$ 2,838	\$ 2,945	\$ 2,801	\$ 3,130
Total Income	\$ 2,783	\$ 3,074	\$ 3,249	\$ 3,325	\$ 3,180	\$ 3,371
Net Farm Income from Operations	\$ 380	\$ 457	\$ 411	\$ 380	\$ 379	\$ 241

Table 3 shows the Cost per Cow averages in six herd size categories. The 42 farms in the “>250 cows” category have almost as many “Total Number of Cows” as the 316 farms in the “51 to 75” category. Also, the 42 farms in the “>250 cows” category have approximately twice as many total cows as the 239 farms in the “≤50 cows” category.

Table 3 shows that the larger farms (based on cow numbers) have fewer crop acres per cow and lower property taxes per cow. However, larger farms have higher purchased feed costs per cow (\$867 versus \$528 for the smallest size category). Also the larger farms have much higher “Other Livestock Expenses”, \$99 versus \$10. The reason for this may be related to use of BST. Farm managers are instructed to place BST costs in the “Other Livestock Expense” category on the Schedule F form. Also, other data suggests larger farms use BST on a higher percentage of their herd.

The Basic Costs per cow in the largest herd size category exceeds that in the “51 to 75” category by \$279 (2,022 versus 1,743). This is largely due to the difference in purchased feed costs. The amount of livestock depreciation taken doubles from the two smallest herd size categories to the largest. Interest paid per cow increases from approximately \$190 per cow for herds of 100 cows or less to nearly \$250 for the largest herd size category. The amount paid per cow for labor increases from \$251 in the “51 to 75” category to \$458 in the “>250 cows” category. This increase in paid labor is due to more “non-dependent” labor and more wages paid to one’s self and family. This means that on the larger farms NFIFO is approaching a redefinition as the return to the equity capital.

Total Allocated Costs per cow are \$513 (3,130 minus 2,617) higher in the largest cow size category than in the “51 to 75” size category. However, the larger farms generate approximately \$300 more income per cow and they have lower unpaid labor (family living) draws.

The “51 to 75 cow” herd size category has the highest return per cow to the owner-operator-manager’s (and family’s) labor and equity capital at \$623 (457 plus 99 plus 67). In largest herd size category it equals \$302. When the number of cows is multiplied by those values, the owner-operator-manager of the larger herds average \$138,014 for family living and a return to equity capital versus \$38,626 for the farms in the “51 to 75 cow” category.

(NOTE: Table 3 can be used to compare costs among farms in the different size categories.)

Tables 4 & 6 show the average per cow and per cwt for all the farms in this study respectively. Table 4 compares the averages on a per cow basis with 1996 numbers. Table 6 compares 1997 and 1995 Average Costs per Cwt. The comparison year of 1995 was chosen for this table because 1996 was a very “high expense” year and a comparison to a more typical year was felt to provide better information.

Table 4 shows that the purchased feed per cow did not decline; as much as was expected (feed costs per cow were \$472 in 1995.) The price of individual feed items, such as SBOM, declined in 1997 but not until later in the year. There was also, an industry trend to buying more of total feed requirements. Other items declined marginally from 1996 to 1997.

Cash Basic Costs were down \$80 per cow, but accrual Basic Costs were only down \$53 per cow. In 1996 the “Non-cash Adjustment” to Basic Costs was negative. This meant that farm managers were prepaying for Basic Cost items. In 1997, they drew on those “savings” accounts and added to their accounts payable in the amount of \$27 per cow.

Interest costs per cow continue to rise (\$205 in 1995, \$212 in 1996, and \$218 in 1997). Also, the amount of paid labor costs per cow continues to rise. It totaled \$237 in 1995 versus \$323 and \$300 in 1997 and 1996 respectively.

Table 4
Study Farms' Average Cost per Cow - Selected Expense Categories
1997 & 1996

Item	Average Cost Per COW			Item	Average Cost per COW		
	1997	1996	Difference		1997	1996	Difference
Car & Truck Expense	\$ 15	\$ 18	\$ -3	Utilities	\$ 58	\$ 64	\$ -6
Chemicals	\$ 49	\$ 48	\$ 1	Vet Fees & Medicine	\$ 83	\$ 87	\$ -4
Custom Hire	\$ 56	\$ 53	\$ 3	Breeding Fees	\$ 32	\$ 29	\$ 3
Feed Purchase	\$657	\$662	\$ -5	Other Expenses	\$ 96	\$123	\$ -27
Fertilizer and Lime	\$ 96	\$111	\$ -15	Custom Heifer Raising	\$ 28	\$ -	\$ 28
Freight and Trucking	\$ 22	\$ 18	\$ 4	Non-cash Adjustments	\$ 27	\$ -15	\$ 42
Fuel and Oil	\$ 63	\$ 66	\$ -3	Basic Costs / Cow*	\$1871	\$1924	\$ -53
Farm Insurance	\$ 39	\$ 41	\$ -2	Mortgage Interest & Other Interest	\$218	\$212	\$ 6
Marketing Fees	\$ 33	\$ 44	\$ -11	Emp Benefit Program	\$ 77	\$ 70	\$ 7
Rent/Lease Equipment	\$ 22	\$ 24	\$ -2	Labor Hired	\$246	\$230	\$ 16
Rent/Lease Other	\$111	\$115	\$ -4	Depreciation	\$401	\$433	\$ -32
Repairs & Maintenance	\$174	\$193	\$ -19	Other Costs / Cow*	\$ 942	\$945	\$ -3
Seeds & Plants Purch	\$ 66	\$ 76	\$ -10				
Supplies Purchased	\$ 97	\$ 102	\$ -5				
Taxes	\$ 47	\$ 66	\$ -19				

* Columns may not add due to rounding.

Cost of Production Calculation Method Used

There are three commonly used methods to calculate the cost of production. They are "Cost per Unit of Primary Product", "Cost per Unit of Equivalent Production", and "Residual Cost per Unit of Primary Product." All three of these methods yield the same answer if the production process has just a single product. However, if the production process has joint products the results can be quite different. Dairy farms producing milk have numerous joint products: cull cows, calves, CCC milk assessment refund, cooperative dividends, property tax credit on income taxes, crop-related government payments, etc. Therefore, knowing the cost of production calculation method used in a study is essential.

Each method has its own advantages and disadvantages.³ This study uses the "Equivalent Production" method to calculate the cost of producing milk. This method was chosen because it is easier for the reader to be in the correct frame of reference toward income when comparing it to production costs.

Basic Cost of Production per Hundredweight Equivalent

"Basic costs" are "total allocated expenses" minus interest paid, wages and benefits paid, and depreciation expenses. Basic cost is a useful measure when comparing one farm to another because it is not influenced by the farm's debt structure, the amount of paid versus unpaid labor, or the capital consumption claimed (depreciation).

³ Frank, Gary G. "Cost of Production versus Cost of Production", Published on the Center for Dairy Profitability website at: www.wisc.edu/dairy-profit, July 1998.

In this study, the average Basic Cost of \$7.86 was calculated by summing total basic costs on all farms and dividing by the total number of CWT EQ produced. Fifty-eight percent of the farms had a basic cost of \$8.00 per CWT EQ or less, an increase from the 35 percent who had Basic Costs of \$8.00 or less in 1996. In Table 5 selected ranges of basic costs are presented. It shows the number and percent of farms in each range.

The \$7.86 average basic cost means that the average farmer in the study had \$5.50 of income available per CWT EQ to use for other costs (US average milk price in 1996 = \$13.36 minus basic expenses of \$7.86 per CWT EQ). Other costs are items such as hired labor, scheduled principal and interest payments, a down payment when purchasing assets, and/or a family living draw.

Table 5
Number of Herds in Basic Cost Production Ranges
(871 Farms)

Expenses per CWT EQ	Number of Farms	Percent of Farms*
Less than \$ 5.00	14	2
5.01 - 6.00	57	6
6.01 - 7.00	167	19
7.01 - 8.00	267	31
8.01 - 9.00	200	23
9.01 - 10.00	96	11
greater than 10.00	70	8

* Percent column may not add to 100 due to rounding.

Table 6 shows the average costs per CWT EQ for selected expense categories that match the expense categories on Schedule F (Federal tax form) for 1997 and 1995. It also shows opportunity costs unpaid labor, unpaid management, and interest on equity calculations.

The basic cost of production increased by \$0.45 from 1995 to 1997. Feed costs contributed \$0.64 to this increase. The \$0.14 decrease in marketing fees is due to the complete termination of milk tax over the two years. Other expenses increased by \$0.23. The reason for this may be the increase in the amount of custom heifer raising that occurred. It accounted for \$0.24 of "Other Expenses" (custom heifer raising was not collected in 1996 and earlier years). All remaining items, except property taxes change by less than \$0.10 per CWT EQ.

The current goal for Basic Costs per CWT EQ is \$8.00 or less. The average column on Table 6 will help you identify categories of expense that are above average. For instance, suppose your insurance costs are \$0.25 per CWT EQ and the average is \$0.16, you should find out why this difference exists and what you can do about getting the cost down.

Table 6
Study Farms' Average Cost per CWT EQ - Selected Expense Categories
1997 & 1995

Item	Average Cost Per CWT EQ			Item	Average Cost per CWT EQ		
	1997	1995	Difference		1997	1995	Difference
Car & Truck Expense	\$0.06	\$0.05	0.01	Utilities	\$0.24	\$0.28	-0.04
Chemicals	0.20	0.18	0.02	Vet Fees & Medicine	0.35	0.37	-0.02
Custom Hire	0.24	0.21	0.03	Breeding Fees	0.14	0.15	-0.01
Feed Purchase	2.76	2.12	0.64	Other Expenses	0.55	0.32	0.23
Fertilizer and Lime	0.40	0.47	-0.07	Non-cash Adjustments	<u>0.11</u>	<u>-0.02</u>	<u>0.13</u>
Freight and Trucking	0.09	0.11	-0.02	Basic Costs / CWT EQ*	\$ 7.86	\$7.41	\$0.45
Fuel and Oil	0.26	0.26	0.00	Mortgage Interest & Other Interest	0.91	0.92	-0.01
Farm Insurance	0.16	0.18	-0.02	Emp Benefit Program	0.32	0.24	0.08
Marketing Fees	0.14	0.28	-0.14	Labor Hired	1.03	0.83	0.20
Rent/Lease Equipment	0.09	0.07	0.02	Depreciation	<u>1.68</u>	<u>1.57</u>	<u>0.11</u>
Rent/Lease Other	0.46	0.54	-0.08	Other Costs / CWT EQ*	\$3.94	\$3.55	0.39
Repairs & Maintenance	0.72	0.77	-0.05	Unpaid Labor ¹	1.08	1.03	0.05
Seeds & Plants Purch	0.28	0.34	-0.06	Unpaid Management ²	0.42	0.42	0.00
Supplies Purchased	0.41	0.44	-0.03	Interest on Equity ³	<u>0.84</u>	<u>1.06</u>	<u>-0.22</u>
Taxes	0.20	0.30	-0.10	Opportunity Costs	2.34	2.51	-0.17
					=====	=====	=====
				Total Cost / CWT EQ*	\$14.14	\$13.47	\$0.67

• Columns may not add due to rounding.

1. Total labor required was estimated at 60 hours per cow per year and a wage of \$8.25 per hour. The unpaid labor is the difference between the estimated total labor cost (60 x \$8.25 = \$495) and the recorded paid labor.
2. The total management cost was assumed to be unpaid and was estimated at 10 hours per cow per year and at \$10.00 per hour.
3. The interest on the fair market value equity, with no reduction in the fair market value of the farm assets for transaction costs, was estimated at 5 percent. Transaction costs can substantially reduce the owner's equity in the event the assets are sold and the net proceeds invested in non-farm assets.

“Other Costs” increased by \$0.39 and “Opportunity Costs” decreased by \$0.17 per CWT EQ, which causes a \$0.67 increase in the total cost of producing milk from 1995 to 1997. This higher total cost includes an increase in the opportunity wage per hour from \$7.75 to \$8.25. The average milk price increased during this period by \$0.50 (from \$12.86 to \$13.36).

Table 7 shows the cost of milk per CWT EQ. Notice that Custom Heifer Raising is not really a cost item for smaller farms, but for the largest farm group it amounts to \$0.31 per CWT EQ. Vet. & Medicine costs per CWT EQ are nearly identical across all herd size categories. Other Livestock Expenses increase by \$0.34 per CWT EQ from the smallest to the largest herd size group. It is presumed this is the BST cost.

Table 7
Milk Production Costs per CWT EQ in 1997

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Number of Farms	239	316	138	91	45	42
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Total Crop Acres Farmed	169	242	339	429	639	895
Cost of Resale Livestock Sold	\$ 0.01	\$ 0.01	\$ 0.00	\$ 0.03	\$ 0.01	\$ 0.08
Auto & Truck Expense	\$ 0.14	\$ 0.09	\$ 0.07	\$ 0.04	\$ 0.02	\$ 0.02
Crop Chemicals	\$ 0.22	\$ 0.23	\$ 0.24	\$ 0.24	\$ 0.16	\$ 0.15
Custom Heifer Raising	\$ 0.01	\$ 0.01	\$ 0.06	\$ 0.13	\$ 0.06	\$ 0.31
Custom Hire (Other)	\$ 0.24	\$ 0.23	\$ 0.25	\$ 0.25	\$ 0.25	\$ 0.21
Feed Purchased	\$ 2.54	\$ 2.42	\$ 2.53	\$ 2.54	\$ 2.73	\$ 3.44
Fertilizer & Lime	\$ 0.47	\$ 0.44	\$ 0.44	\$ 0.46	\$ 0.48	\$ 0.24
Freight & Trucking	\$ 0.04	\$ 0.03	\$ 0.04	\$ 0.03	\$ 0.04	\$ 0.06
Milk Hauling	\$ 0.08	\$ 0.06	\$ 0.04	\$ 0.04	\$ 0.03	\$ 0.05
Fuels & oil	\$ 0.34	\$ 0.27	\$ 0.28	\$ 0.27	\$ 0.24	\$ 0.23
Insurance	\$ 0.22	\$ 0.18	\$ 0.17	\$ 0.15	\$ 0.13	\$ 0.13
Milk Marketing & CCC	\$ 0.14	\$ 0.14	\$ 0.14	\$ 0.14	\$ 0.14	\$ 0.14
Rent/Lease Equipment	\$ 0.03	\$ 0.06	\$ 0.08	\$ 0.09	\$ 0.13	\$ 0.14
Rent-Farm & Pasture	\$ 0.42	\$ 0.45	\$ 0.54	\$ 0.55	\$ 0.58	\$ 0.34
Build & Fence Repair	\$ 0.19	\$ 0.19	\$ 0.25	\$ 0.19	\$ 0.16	\$ 0.15
Mach Repair & Maintenance.	\$ 0.61	\$ 0.58	\$ 0.59	\$ 0.61	\$ 0.50	\$ 0.45
Seed & Plants Purchased	\$ 0.32	\$ 0.32	\$ 0.31	\$ 0.26	\$ 0.28	\$ 0.20
Supplies	\$ 0.53	\$ 0.47	\$ 0.42	\$ 0.40	\$ 0.39	\$ 0.30
Taxes	\$ 0.30	\$ 0.25	\$ 0.21	\$ 0.21	\$ 0.17	\$ 0.10
Utilities	\$ 0.32	\$ 0.27	\$ 0.26	\$ 0.25	\$ 0.20	\$ 0.19
Vet & Medicine	\$ 0.35	\$ 0.32	\$ 0.36	\$ 0.36	\$ 0.36	\$ 0.36
Breeding Fees	\$ 0.17	\$ 0.17	\$ 0.15	\$ 0.14	\$ 0.11	\$ 0.09
Other Farm Expenses	\$ 0.11	\$ 0.10	\$ 0.10	\$ 0.10	\$ 0.10	\$ 0.11
Other Crop Expenses	\$ 0.10	\$ 0.09	\$ 0.09	\$ 0.07	\$ 0.07	\$ 0.05
Other Livestock Expenses	\$ 0.05	\$ 0.08	\$ 0.16	\$ 0.24	\$ 0.25	\$ 0.39
Accounts Payable Adjustment	\$ 0.02	\$ 0.03	\$ 0.06	\$ 0.03	\$ 0.11	\$ 0.04
Prepaid Expense Adjustment	\$ 0.04	\$ 0.07	\$ 0.12	\$ 0.06	\$ 0.05	\$ 0.05
Basic Costs	\$ 8.00	\$ 7.58	\$ 7.98	\$ 7.90	\$ 7.73	\$ 8.01
Livestock Depreciation	\$ 0.26	\$ 0.24	\$ 0.26	\$ 0.25	\$ 0.41	\$ 0.43
<i>Basic Cost + Lvst Depr</i>	<i>\$ 8.26</i>	<i>\$ 7.82</i>	<i>\$ 8.24</i>	<i>\$ 8.15</i>	<i>\$ 8.14</i>	<i>\$ 8.44</i>
Mortgage Interest	\$ 0.40	\$ 0.33	\$ 0.29	\$ 0.28	\$ 0.30	\$ 0.38
Other Interest	\$ 0.51	\$ 0.56	\$ 0.52	\$ 0.58	\$ 0.72	\$ 0.60
SST & Employee Benefits (Dep)	\$ 0.33	\$ 0.29	\$ 0.19	\$ 0.15	\$ 0.04	\$ 0.05
SST & Employee Ben (Non-Dep)	\$ 0.05	\$ 0.07	\$ 0.10	\$ 0.18	\$ 0.17	\$ 0.28
Labor Hired (Dependents)	\$ 0.40	\$ 0.43	\$ 0.30	\$ 0.28	\$ 0.22	\$ 0.19
Labor Hired (Non-Dependents)	\$ 0.17	\$ 0.30	\$ 0.59	\$ 0.85	\$ 0.93	\$ 1.29
Other Depreciation	\$ 1.43	\$ 1.58	\$ 1.44	\$ 1.36	\$ 1.25	\$ 1.17
Total Allocated Costs	\$ 11.54	\$ 11.37	\$ 11.67	\$ 11.83	\$ 11.77	\$ 12.41
Total Income	\$ 13.36	\$ 13.36	\$ 13.36	\$ 13.36	\$ 13.36	\$ 13.36
Net Farm Income from Operations	\$ 1.82	\$ 1.99	\$ 1.69	\$ 1.53	\$ 1.59	\$ 0.95

The “51 to 75 cow” farms have the lowest Basic Costs per CWT EQ (\$7.58). The range in per CWT EQ costs among the farm size groups is \$0.43. Livestock Depreciation costs are relatively constant until herd sizes exceed 150 cows.

The “51 to 75 cow” farms have the highest NFIFO per CWT EQ (\$1.99). They have a return to the owner-operator-manager (and their family’s) labor & management and equity capital of \$2.71 per CWT EQ.

Additional Information

Tables 8-10 show results using different farm characteristics to sort the farms and the overall average for selected items. The tables also show averages for selected items for the lowest quintile (20 percent) of farms (174) on that item sort, the middle 60 percent (523 farms), and the highest quintile. Margin per farm is the dollars available to pay the total labor and management costs (including family living) and total capital costs include interest paid and opportunity interest on equity. ROROA is calculated by using the following formula: (NFIFO plus interest paid minus unpaid labor and management charges) divided by the average total farm assets.

Table 8
Study Farms Sorted by **Basic Cost of Production per Hundredweight Equivalent** (CWT EQ)

	Basic Cost of Production / CWT EQ	Total Allocated Costs / CWT EQ	Average No. of Cows	Crop and Pasture Acres Per Cow	Pounds Milk Sold per Cow	Margin per Farm	ROROA
Average	\$7.86	\$11.81	92.5	3.34	19,100	\$121,184	5.42%
Low 20%	\$6.04	\$10.11	75.5	3.60	18,605	\$133,505	9.04%
Mid 60%	\$7.78	\$11.74	98.9	3.37	19,440	\$135,022	6.24%
High 20%	\$9.88	\$13.67	89.9	3.02	18,391	\$67,268	-1.66%

Table 8 shows that the quintile of farms with the lowest basic cost (low cost farms) had an average basic cost of \$6.04. The quintile of farms with the highest basic cost (high cost farms) had a basic cost of \$9.88, a difference of \$3.84 per CWT EQ. The difference in the ROROA on the low and the high cost farms is 10.70% (9.04 – (-1.66%)).

The average margin of low cost farms was \$66,237 (98%) greater than the high cost farms’ average margin. On average, farm managers of low cost farms had available twice as many dollars to pay wages, benefits, family living, principal, interest, and make down payments on new capital purchases than the high cost farms. Also, the low cost farms accomplished this with fewer cows per farm. The mid-cost farms had more margin per farm but required an additional 23.4 cows to produce that margin.

Table 9
Study Farms Sorted by Milk Sold per Cow

	Basic Cost of Production / CWT EQ	Total Allocated Costs / CWT EQ	Average No. of Cows	Crop and Pasture Acres Per Cow	Pounds Milk Sold per Cow	Margin Per Farm	ROROA
Low 20%	\$7.81	\$11.84	64.5	3.95	13,287	\$62,735	1.30%
Mid 60%	\$7.94	\$11.88	93.5	3.33	18,805	\$118,998	5.09%
High 20%	\$7.70	\$11.65	117.3	3.03	23,004	\$186,205	8.35%

Table 9 shows that the quintile of farms with the lowest milk sold per cow (low milk/cow) had an average basic cost of \$7.81 per CWT EQ. The quintile of farms with the highest milk sold per cow (high milk/cow) had a basic cost of \$7.70, a difference of \$0.11 per CWT EQ. The high milk/cow farms averaged 52.8 more cows per farm and 9717 pounds more milk sold per cow.

The average margin of the “high milk/cow” farms was \$123,470 (197%) greater than the “low milk/cow” farms’. Of this extra margin, only about \$3,000 is due to a lower basic cost of production per CWT EQ, the remainder is due to volume. The milk sold per farm on the “high milk/cow” farms was 2,698,770 pounds. This compares to an average of 857,197 pounds on the “low milk/cow” farms. Therefore, on average, the “high milk/cow” farms sold about 3 times as much milk per farm as the “low milk/cow” farms.

Statistical tests (correlation and regression analysis) showed no meaningful relationship between production per cow and basic costs per CWT EQ on the 871 farms studied. In addition, milk sold per cow was not a significant variable, at the 95% confidence level, in determining ROROA.

Table 10
Study Farms Sorted by Average Number of Cows per Farm

	Basic Cost of Production / CWT EQ	Total Allocated Costs / CWT EQ	Average No. of Cows	Crop and Pasture Acres Per Cow	Pounds Milk Sold per Cow	Margin Per Farm	RORO A
Low 20%	\$8.12	\$11.66	38.0	4.20	16,659	\$39,629	2.20%
Mid 60%	\$7.74	\$11.48	67.2	3.91	18,833	\$88,456	4.39%
High 20%	\$7.92	\$12.11	222.9	2.68	19,758	\$301,112	7.51%

Table 10 sorts the farms by the number of cows in the herd. In 1996 when the study farms were sorted by the “Number of Cows per Farm” the lowest quintile had 38 cows per farm. The “Mid” and “High” categories had 64 and 186 cows, respectively. It appears that small farms are remaining the same and the larger farms are increasing in size.

This table shows that the quintile of farms with the lowest cow numbers had an average basic cost of \$8.12 per CWT EQ. The quintile of farms with the highest cow numbers had a basic cost of \$7.92, a difference of \$0.20 per CWT EQ. The “high cow number” farms averaged 184.9 more cows per farm and 3099 additional pounds of milk sold per cow.

The average margin of the “high cow number” farms was \$261,483 (660%) greater than the “low cow number” farms’. Of this extra margin, approximately \$9,000 is due to a lower basic cost of production per CWT EQ; the remainder is due to volume. The milk sold per farm on the “higher cow number” farms was 4,403,158 pounds, compared to an average of 632,390 pounds on the “lower cow number” farms.

Summary

The average herd size in our study group of farms is increasing rapidly. This appears to be due to expansion by the larger farms. These farms are also increasing production per cow more rapidly than the farms with smaller herds.

Purchased feed costs remain the largest cost item. Both the purchased feed costs per cow and per CWT EQ declined from 1996, but less than was expected given the decline in protein and energy prices. The changing size of dairies is causing the acres farmed per cow to decline and the amount of feed purchased per cow to increase. This causes the overall purchased feed costs to remain nearly constant even as prices of individual feeds have declined.

The farms in this study were larger and had higher average production per cow than the Wisconsin average. Total income per cow averaged \$3,181, of which \$2,711 was milk income. In addition, 91 percent of total income was from the sale of products directly related to the dairy enterprise (milk, cull cows, and calves). Total allocated expenses per cow averaged \$2,811, which left \$370 per cow as a return to the farmer's (and family's) unpaid labor, management, and equity capital (NFIFO).

The corresponding 1996 values were total income per cow, \$3,318; total allocated expenses per cow, \$2,870; and NFIFO per cow, \$448. This drop in NFIFO per cow may cause concerns. However, NFIFO (on both a per cow and ratio basis) is slowly being eroded by a change in how the industry operates. As a larger percent of the labor & management required to operate a dairy is paid, NFIFO becomes more of a return to the farm manager's equity.

The total allocated expenses per CWT EQ averaged \$11.81 and basic costs averaged \$7.86 per CWT EQ. The business term equivalent to "basic costs" is the "cost of goods." Business managers want to know their "cost of goods" per dollar of income. The basic costs or cost of goods per dollar of income averaged 59 cents (the \$7.86 basic cost divided by the \$13.36 average milk price in 1997). The other 41 cents, per dollar of income, is available for hiring labor, principal and interest payments, down payments or payment for asset purchases, and/or family living draw.

The ROROA has remained relatively steady (approximately 5.5 percent) over the last 3 years. However, farms with a negative ROROA are in a very risky position. Those farms produced 15 percent of the milk in this sample.

More details on the financial status of these 871 Wisconsin farms may be found in the paper “Financial Benchmarks using 1997 Data from 871 Wisconsin Dairy Farms.” This paper uses benchmarks from the Farm Financial Standard Task Force (FFSTF) measures and others.