

# **MILK PRODUCTION COSTS in 1999 on Selected WISCONSIN DAIRY FARMS**

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## **Introduction**

For the second year, the U.S. Average Milk Price exceeded the study farms' total economic cost of milk production. The 1999 total cost of production per hundredweight equivalent of milk (\$14.27) was less than the U.S. average milk price (\$14.37). The total economic costs in 1998 were \$14.90 and the milk price was \$15.43. 1998 was the first year in our analysis where the milk price exceeded total economic costs. In 1998, the milk price exceeded economic cost by \$0.53 per hundredweight equivalent and this year the milk price exceeded economic cost by \$0.10 per hundredweight equivalent.

In this study of 1999 records, 620 dairy farms averaged a basic cost of \$7.72 per hundredweight equivalent (CWT EQ) on income of \$14.37 per CWT EQ (U.S. average per hundredweight milk price in 1999). In 1998, the basic cost was \$8.23 per CWT EQ on income of \$15.43 (The U.S. average milk price in 1998.).

In 1999, the total allocated expenses per CWT EQ of milk sold averaged \$11.79. Total allocated expenses do not include a charge for unpaid labor and management or a return to equity capital. When these opportunity costs are calculated at \$8.75 per hour for unpaid labor, \$10.00 per hour for unpaid management, plus five percent return on the fair market value of equity capital, the total economic cost of production is \$14.27 CWT EQ.

## **Data Source**

Lakeshore Farm Management Association, Fox Valley Management Association and Wisconsin County Agents<sup>2</sup> 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 1999, 1000 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 dairy farms left in the study still had a total of more than 59,997 cows and produced more than 1,212,000,000 pounds of milk.

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**Table 1**  
Statement of Cash Flows in 1999  
**(per cow)**

***Operating Activities***

Cash Received from Operations	\$ 3,514
+ Total Non-Farm Income	\$ 131
<b>minus</b> Cash Paid for Purchased Resale Livestock	\$ 1
- Cash Paid for Purchased Feed	\$ 581
- Cash Interest Paid	\$ 197
- Wages and Benefits Paid	\$ 366
- Cash Paid for Other Operating Expenses	\$ 1,388
<b>Net Cash Income</b>	<b>\$ 1,111</b>
<b>minus</b> Cash Family Living Expenditures	\$ 369
- Income & Social Security Taxes Paid	\$ 72
<b>Net Cash Provided by Operating Activities</b>	<b>\$ 670</b>

***Investing Activities***

Cash Received from Sale of Farm Assets	\$ 21
+ Cash Received from Sale of Personal Assets	\$ 12
<b>minus</b> Amount Paid for Breeding Livestock	\$ 184
- Boot Price Paid for Machinery & Equipment	\$ 270
- Amount Paid for Real Estate	\$ 342
- Amount Paid for Coop Stock, Etc.	\$ 29
- Amount Paid for Personal Assets	\$ 52
<b>Net Cash Provided by Investing Activities</b>	<b>\$ -844</b>

***Financing Activities***

Net Proceeds from Operating & CCC Loans	\$ 20
+ Proceeds from Added Term Debt	\$ 469
+ Net Capital Contribution, Gifts, Etc.	\$ 0
+ Net Proceeds for Personal Debt	\$ 5
<b>minus</b> Scheduled Repayment of Term Debt	\$ 289
- Unscheduled Repayment of Term Debt	\$ 24
- Principal Payments on Capital Lease Obligations	\$ -
<b>Net Cash Provided by Financing Activities</b>	<b>\$ 180</b>

Cash at End of Year	\$ 95
Cash at Beginning of Year	\$ 114
<b>Net Increase (Decrease) in Cash</b>	<b>\$ -19</b>

**Cash Flow Accuracy\* \$ 26**

\* This value is the amount of cash paid out in excess of the amount recorded and/or reported for use in this "Statement of Cash Flows."  
Or, if negative, the amount cash inflow was in excess of the amount recorded.

The "Statement of Cash Flows" provides a break down of cash inflows and outflows into three activities. They are operating, investing and financing activities.

The operating activity includes non-farm income and cash family living expenditures plus income and social security taxes paid. The investing activity includes the purchase and sale of assets, both farm and personal. The financing activity includes both new borrowing and debt repayment on farm and personal loans.

The net cash provided by the three activities are summed and compared to the change in the cash on hand. This leads to a single number -- "Cash Flow Accuracy." The cash flow accuracy should be within a half cent per dollar of all cash incomes (between \$-18 and \$18, in this case).

The cash flow accuracy for this data set is \$26 per cow. It is felt that this discrepancy is due to the fact that several farms in the study did not report Family Living and Savings.

## Comparing the Studied Dairy Farms to Other Wisconsin Dairy Farms

The average number of cows per farm decreased 2.7 cows to 96.8 as compared to 99.5 cows in 1998. Total pounds of milk sold per cow for 1999 was 20,210 pounds, an increase of 12 pounds. In 1993, the farms in this study averaged 71 cows and 17,801 pounds of milk sold per cow. In comparison, Wisconsin's 1999-herd size averaged 62 cows, with an average of 16,702 pounds of milk sold per cow. AgSource DHI (1999) herds averaged 74.4 cows, with production per cow estimated at 20,839 pounds.

Table 2 shows the range and distribution of milk sold per cow on the farms studied and on AgSource DHI farms.

**Table 2**  
**Milk Sold per Cow**

Pounds per Cow	Study Farms		AgSource DHI
	Number of Farms	Percent of Farms *	Percent of Herds *
Less than 13,000	28	5	1
13,000 – 15,000	39	6	5
15,001 – 17,000	70	11	11
17,001 – 19,000	109	18	19
19,001 – 21,000	164	26	24
21,0001 – 23,000	127	20	21
Greater than 23,000	83	13	19

\* Percent columns may not add to 100 due to rounding.

Table 3 shows the per farm averages in six herd size categories. This table contains six columns of numbers. To assist in your understanding of the entire table, the “Range in Herd Size – 76 to 100” is used as an example.

There were 95 herds in the data set that had more than 75 cows and less than 101 cows. Those herds averaged 87 cows and sold on average of 20,039 pounds of milk per cow. They had an average of 3.73 crop acres per cow. The average amount of purchased feed was \$44,386 per farm. In addition, they paid \$5,126 for crop chemicals, \$9,284 for fertilizer, \$21,708 for repairs, and \$8,407 for vet & medicine. All, with the exception of vet & medicine, were lower than in 1998. There was a decrease in prepaid expenses of \$1030 and an increase in accounts payable of \$268. In 1998 there was a negative accrual adjustment to expense and a decrease in accounts payable of \$1,561. Total Basic Costs were \$170,236 per farm in 1999 versus \$167,205 in 1998.

In addition to Basic Costs, this group of study farms had \$21,960 in paid labor costs (\$8,569 to dependents and 13,391 to non-dependents). Social Security Taxes plus Benefits equaled \$7,688 (\$5,351 to dependents and 2,337 to non-dependents). There was also \$17,144 (8,682 plus 8,462) of interest expense, and \$40,208 of depreciation. Some of that depreciation (6,244) was on taken on purchased livestock.

The Total Allocated Costs are \$257,238 per farm in 1999 versus \$249,080 in 1998. The Total Income is \$313,176 versus \$324,164 in 1998. The Net Farm Income from Operations (NFIFO) in 1999 was \$55,938 (19,000 less than 1998). Note: 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. The return is then \$69,859 and this compares very favorably with the return to the owner-operator-manager’s (and family’s) labor, management and equity capital in 1997, which was \$46,122, but is less than the 86,572 received in 1998.

**Table 3**  
**Milk Production Costs per Farm in 1999**

<b>Range in Herd Size</b>	<b>&lt;=50 cows</b>	<b>51 to 75</b>	<b>76 to 100</b>	<b>101 to 150</b>	<b>151 to 250</b>	<b>&gt;250 cows</b>
Number of Farms	158	216	95	85	32	34
Average Cows per Farm	41	63	87	122	194	443
Milk Sold per Cow (lbs)	18,089	19,590	20,039	20,479	19,979	21,693
Crop Acres per Cow	3.86	3.73	3.73	3.06	2.37	1.81
Total Crop Acres Farmed	160	234	325	372	461	802
Cost of Resale Lst Sold	5	166	29	385	-	38
Auto Expenses	1,579	1,839	1,787	1,929	2,021	3,627
Chemicals	1,757	3,599	5,126	7,453	10,269	21,959
Custom Heifer Raising	26	211	877	3,451	12,739	38,736
Custom Hire	2,784	4,861	10,811	11,503	22,397	49,963
Feed Purchased	18,592	30,203	44,386	69,141	117,272	338,887
Fert & Lime	4,000	6,569	9,284	13,336	13,776	25,629
Milk Hauling	1,090	1,580	2,603	2,670	5,096	13,474
Gas & oil	2,462	3,574	4,766	6,438	8,363	21,549
Insurance	2,022	2,881	3,965	4,863	5,890	12,242
Milk Marketing & Hedging	1,289	2,108	2,972	4,158	6,799	17,821
Equip Leased	401	637	1,518	3,450	7,614	20,405
Rent-Farm & Pasture	3,765	7,493	11,670	16,807	23,541	57,940
Repairs	9,934	15,108	21,708	31,201	33,557	81,449
Seed & Plants Purchased	2,835	4,448	6,544	8,101	13,709	20,650
Supplies	5,678	8,064	11,498	14,748	17,067	51,734
Taxes	2,774	4,020	5,559	5,617	7,624	12,911
Utilities	3,029	4,344	5,664	7,875	10,423	22,695
Vet & Medicine	3,623	5,176	8,407	10,927	18,094	53,614
Breeding Fees	1,632	2,614	3,785	5,165	6,427	15,746
Other Expenses	2,682	5,580	8,039	14,914	31,595	89,561
Accts Payable Adjustment	-356	62	268	(48)	-2,488)	2,527
Prepd Expenses Adjustment	-444	-1,334	-1,030	-1,667	-2,074	-11,090
<b>Basic Costs</b>	<b>71,157</b>	<b>113,802</b>	<b>170,236</b>	<b>242,415</b>	<b>369,711</b>	<b>962,069</b>
Depr on Purchased Livestock	2,325	4,061	6,244	8,743	20,227	65,661
<b>Basic Costs + Livestock Depr</b>	<b>73,482</b>	<b>117,863</b>	<b>176,481</b>	<b>251,158</b>	<b>389,938</b>	<b>1,027,729</b>
Mortgage Interest	3,720	4,624	8,682	9,460	13,034	38,804
Other Interest	4,033	6,821	8,462	12,509	28,717	57,862
Labor Hired (Dependents)	4,208	7,677	8,569	8,919	17,746	22,812
Labor Hired (Non-dep)	1,291	4,664	13,391	25,662	41,550	161,547
SST & Emp Bens (Dep)	3,560	4,546	5,351	4,306	4,889	8,177
SST & Emp Bens (Non-dep)	430	1,567	2,337	5,193	8,852	30,966
Depr - Mach,equip,build	16,282	27,532	33,964	45,995	69,147	128,067
<b>Total Allocated Costs</b>	<b>107,007</b>	<b>175,294</b>	<b>257,238</b>	<b>363,204</b>	<b>573,872</b>	<b>1,475,963</b>
Total Farm Incomes	132,344	220,992	313,176	449,931	695,313	1,737,614
<b>NFIFO*</b>	<b>25,337</b>	<b>45,698</b>	<b>55,938</b>	<b>86,727</b>	<b>121,440</b>	<b>261,651</b>

\*Net Farm Income from Operations

Table 3 should not be used to compare costs among farms; however, Tables 4 and 8 can be used to compare costs among farms in the different size categories.

**Table 4**  
**Milk Production Costs per Cow in 1999**

<b>Range in Herd Size</b>	<b>&lt;=50 cows</b>	<b>51 to 75</b>	<b>76 to 100</b>	<b>101 to 150</b>	<b>151 to 250</b>	<b>&gt;250 cows</b>
Number of Farms	158	216	95	85	32	34
Total Number of Cows	6,535	13,577	8,273	10,332	6,219	15,061
Average Cows per Farm	41	63	87	122	194	443
Milk Sold per Cow (lbs)	18,089	19,590	20,039	20,479	19,979	21,693
Price Received per 100 lbs	\$ 14.41	\$ 14.50	\$ 14.61	\$ 14.69	\$ 14.88	\$ 15.20
Crop Acres per Cow	3.86	3.73	3.73	3.06	2.37	1.81
Cost of Resale Lst Sold	0	3	0	3	-	0
Auto Expenses	38	29	21	16	10	8
Chemicals	42	57	59	61	53	50
Custom Heifer Raising	1	3	10	28	66	87
Custom Hire	67	77	124	95	115	113
Feed Purchased	450	481	510	569	603	765
Fert & Lime	97	105	107	110	71	58
Milk Hauling	26	25	30	22	26	30
Gas & oil	60	57	55	53	43	49
Insurance	49	46	46	40	30	28
Milk Marketing & Hedging	31	34	34	34	35	40
Equip Leased	10	10	17	28	39	46
Rent-Farm & Pasture	91	119	134	138	121	131
Repairs	240	240	249	257	173	184
Seed & Plants Purchased	69	71	75	67	71	47
Supplies	137	128	132	121	88	117
Taxes	67	64	64	46	39	29
Utilities	73	69	65	65	54	51
Vet & Medicine	88	82	97	90	93	121
Breeding Fees	39	42	43	42	33	36
Other Expenses	65	89	92	123	163	202
Accts Payable Adjustment	-9	1	3	0	-13	6
Prepd Expenses Adjustment	-11	-21	-12	-14	-11	-25
<b>Basic Costs</b>	<b>1,720</b>	<b>1,810</b>	<b>1,955</b>	<b>1,994</b>	<b>1,902</b>	<b>2,172</b>
Depr on Purchased Livestock	56	65	72	72	104	148
Basic Costs + Livestock Depr	1,777	1,875	2,027	2,066	2,006	2,320
Mortgage Interest	90	74	100	78	67	88
Other Interest	98	109	97	103	148	131
Labor Hired (Dependents)	102	122	98	73	91	51
Labor Hired (Non-dep)	31	74	154	211	214	365
SST & Emp Bens (Dep)	86	72	61	35	25	18
SST & Emp Bens (Non-dep)	10	25	27	43	46	70
Depr - Mach,equip,build	394	438	390	378	356	289
Total Allocated Costs	2,587	2,789	2,954	2,988	2,953	3,332
Total Farm Incomes	3,200	3,516	3,596	3,702	3,578	3,923
<b>NFIFO*</b>	<b>613</b>	<b>727</b>	<b>642</b>	<b>714</b>	<b>625</b>	<b>591</b>

\*Net Farm Income from Operations

Table 4 shows the per cow averages in six herd size categories for 1999. The 34 farms in the “>250 cows” category have more total cows than do the 216 farms in the “51 to 75” category. Also, the 34 farms in the “>250 cows” category have more than twice as many total cows as the 158 farms in the “≤50 cows” category.

Remember: Table 3 should not be used to compare costs among farms, however Tables 4 and 8 can be used to compare costs among farms in the different size categories.

Table 4 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 (\$765 versus \$450 for the smallest size category). Also, larger farms have much higher “Other Expenses”, \$202 versus \$65. This could be related to BST use as farm managers are instructed to place BST costs in the “Other Livestock Expense” category. Other data suggests that larger farms use BST on a higher percentage of their herd.

The Basic Costs per cow in the largest herd size category exceeded the Basic Costs in the smallest category by \$452 (2,172 versus 1,720). This is largely due to the difference in purchased feed cost. The amount of livestock depreciation almost triples from the two smallest herd-size categories to the largest. The interest paid per cow is approximately \$200 for all herd sizes. The amount paid per cow for labor increases from \$293 in the “51 to 75” category to \$505 in the “>250 cows” category. (In 1998, these numbers were \$251 and \$490.) On larger farms, FIFO is close to the return to the equity capital.

The Total Allocated Costs per cow are \$543 (3,332 minus 2,789) higher in largest farm size category than in the “51 to 75” size category. However, those larger farms generate approximately \$400 more income per cow and they have lower per cow 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 \$921 (727 plus 122 plus 72). In the largest herd size category it equals \$661. However, when the number of cows is multiplied by these values, the owner-operator-managers of the larger herds average \$292,639 for family living and a return to equity capital versus \$57,921 for the farms in the “51 to 75 cow” category.

Table 5 shows the average per cow costs for all farms in the study. The purchased feed per cow declined for the first time in several years. This is likely due to lower per unit feed costs (feed cost per cow were \$581, \$663, \$657 and \$662 in 1999, 1998, 1997 and 1996, respectively). Custom hire costs however have increased substantially from 1996 to 1999. In 1996, total custom hire costs per cow were only \$53, in 1998 they are \$124 per cow (\$87 for machine work and \$37 for custom heifer raising) and in 1999 they were \$133 per cow (\$97 for machine work and \$36 for custom heifer raising). Supplies went up \$18 per cow in 1999 compared to 1998 where they were \$104 per cow.

Cash Basic Costs were down \$48 per cow from 1998, but accrual Basic Costs were actually up \$5 per cow from 1998. In 1999, the “Non-Cash Adjustments” to Basic Costs was negative. This meant that farm managers were prepaying for Basic Cost items, in 1999, the increase in items prepaid was \$18 per cow. Total prepaid expenses at the end of 1999 stood at \$136 per cow.

Interest costs per cow in 1999 went down after 4 years of steady climbing. They were \$197, \$226, \$218, \$212 and \$205 in 1999, 1998, 1997, 1996, and 1995, respectively. Paid labor costs per cow continues to rise: \$366 (1999), \$353 (1998), \$323 (1997), \$300 (1996) and \$237 (1995).

**Table 5**  
Study Farms' Average Cost **per Cow** - Selected Expense Categories  
1999 & 1998

Item	Average Cost Per COW			Item	Average Cost per COW		
	1999	1998	Difference		1999	1998	Difference
Car & Truck Expense	\$ 19	\$ 17	\$ 2	Utilities	\$ 60	\$ 61	\$ -1
Chemicals	\$ 54	\$ 62	\$ -8	Vet Fees & Medicine	\$ 97	\$ 97	\$ 0
Custom Hire	\$ 97	\$ 87	\$ 12	Breeding Fees	\$ 39	\$ 34	\$ 5
Feed Purchase	\$581	\$663	\$ -82	Other Expenses	\$129	\$105	\$ 24
Custom Heifer Raising	\$ 36	\$ 37	\$ -1	Non-cash Adjustments	\$ -18	\$ -71	\$ 53
Fertilizer and Lime	\$ 90	\$107	\$ -17	<b>Basic Costs / Cow*</b>	<b>\$1948</b>	<b>\$1943</b>	<b>\$ 5</b>
Freight and Trucking	\$ 27	\$ 16	\$ 11	Mortgage Interest & Other Interest	\$197	\$226	\$ -29
Fuel and Oil	\$ 53	\$ 56	\$ -3	Emp Benefit Program	\$ 88	\$ 72	\$ 16
Farm Insurance	\$ 39	\$ 40	\$ -1	Labor Hired	\$278	\$276	\$ 2
Marketing & Hedging	\$ 35	\$ 38	\$ -3	Depreciation	\$466	\$430	\$ 36
Rent/Lease Equipment	\$ 26	\$ 25	\$ 1	<b>Other Costs / Cow*</b>	<b>\$1029</b>	<b>\$1003</b>	<b>\$ 26</b>
Rent/Lease Other	\$125	\$116	\$ 9				
Repairs & Maintenance	\$223	\$214	\$ 9				
Seeds & Plants Pur	\$ 64	\$ 83	\$ -19				
Supplies Purchased	\$122	\$104	\$ 18				
Taxes	\$ 50	\$ 53	\$ -3				

\* 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 will 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 of calculating the cost of production has some advantages and disadvantages.<sup>3</sup> This study uses the “Cost per Unit of Equivalent Production” method to calculate the cost of producing milk. It was chosen because in using this method, the cost of milk production can be compared directly to the price of milk. This method also permits the calculation of cost per hundredweight equivalent on individual expense items.

<sup>3</sup> Frank, Gary G. ‘Cost of Production versus Cost of Production’, Published on the Center for Dairy Profitability website at: [www.wisc.edu/dairy-profit](http://www.wisc.edu/dairy-profit), July 1998.

## Basic Cost of Production per Hundredweight Equivalent

"Basic costs" are total allocated expenses minus interest paid, wages and benefits paid, and depreciation expenses. "Total allocated expenses" are "total expenses" minus value of unpaid labor and management minus a return to equity. 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).

An average Basic Cost of \$7.72 per CWT EQ was calculated by summing the total basic costs on all farms and dividing by the total number of CWT EQ produced. Sixty-three percent of the farms had a basic cost of \$8.00 per CWT EQ or less, an increase from the 49 percent who had Basic Costs of \$8.00 or less in 1998, 58 percent in 1997 and 35 percent in 1996. In Table 6 selected ranges of basic costs are presented. It shows the number and percent of farms in each range.

The \$7.72 average basic cost means that the average farmer in this study had \$6.65 of income available per CWT EQ to use for other costs (US average milk price in 1999 = \$14.37 minus basic expenses of \$7.72 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 6**  
Number of Herds in Basic Cost Production Ranges  
(620 Farms)

Expenses per CWT EQ	Number of Farms	Percent of Farms *
Less than \$ 5.00	10	2
5.01 - 6.00	47	8
6.01 - 7.00	142	23
7.01 - 8.00	187	30
8.01 - 9.00	134	22
9.01 - 10.00	60	9
greater than 10.00	40	6

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

Table 7 shows the average costs per CWT EQ for selected expense categories that match the expense categories on Schedule F (Federal tax form) for 1999 and 1998. It also shows opportunity cost for unpaid labor, unpaid management, and interest on equity calculations.

The Basic Cost of Production decreased by \$0.51 from 1998 to 1999 (See Table 7). This occurred even though the Basic Costs per cow increased by \$5. Feed costs per CWT contributed \$0.47 to this decrease, as they did per cow at -\$82. Seeds and Plants purchased decreased by \$0.10 in 1999. In 1998, seeds and plants purchased per CWT were \$0.35; in 1999, they were \$0.25. Most of the other expense categories changed by very small amounts and percentages. The exceptions were Non-Cash Adjustments and Interest payments. Non-cash adjustments decreased by \$0.23 in 1999 and interest payments decreased from \$0.94 in 1998 to \$0.78 in 1999; this was probably due to lower interest rates.

The current goal for Basic Costs per CWT EQ is \$8.00 or less. The average column on Table 7 will help you identify categories of expense that are above average. The "Calculating Your Milk Production Costs and Using the Results to Manage Your Expenses" paper, available on the Center for Dairy Profitability's website at [www.wisc.edu/dairy-profit](http://www.wisc.edu/dairy-profit) under "Papers & Publications" will help you do the calculations. For instance, suppose your fuel and oil costs are \$0.55 per CWT EQ while the average is \$0.21, you should find out why this difference exists and what you can do about changing the level of that cost.

**Table 7**  
Study Farms' Average Cost per CWT EQ - Selected Expense Categories  
1999 & 1998

Item	Average Cost Per CWT EQ			Item	Average Cost per CWT EQ		
	1999	1998	Difference		1999	1998	Difference
Car & Truck Expense	\$0.08	\$0.07	0.01	Utilities	\$0.25	\$0.25	0
Chemicals	0.21	0.26	-0.05	Vet Fees & Medicine	0.38	0.40	-0.02
Custom Hire	0.39	0.36	0.03	Breeding Fees	0.16	0.14	-0.02
Custom Heifer Raising	0.14	0.15	-0.01	Other Expenses	0.51	0.55	-0.04
Feed Purchase	2.30	2.77	-0.47	Non-Cash Adjustments	<u>-0.07</u>	<u>-0.30</u>	<u>0.23</u>
Fertilizer and Lime	0.35	0.45	-0.10	<b>Basic Costs / CWT EQ*</b>	<b>\$7.72</b>	<b>\$8.23</b>	<b>-\$0.51</b>
Freight and Trucking	0.11	0.07	0.04	Mortgage Interest & Other Interest	0.78	0.94	-0.16
Fuel and Oil	0.21	0.23	-0.02	Emp Benefit Program	0.35	0.30	0.05
Farm Insurance	0.15	0.17	-0.02	Labor Hired	1.11	1.15	-0.04
Marketing Fees	0.14	0.16	-0.02	Depreciation	<u>1.83</u>	<u>1.80</u>	<u>0.03</u>
Rent/Lease Equipment	0.10	0.10	0	<b>Other Costs / CWT EQ*</b>	<b>\$4.07</b>	<b>\$4.19</b>	<b>-0.12</b>
Rent/Lease Other	0.49	0.49	0	Unpaid Labor <sup>1</sup>	1.05	1.14	-0.09
Repairs & Maintenance	0.88	0.90	-0.02	Unpaid Management <sup>2</sup>	0.40	0.41	-0.01
Seeds & Plants Pur	0.25	0.35	-0.10	Interest on Equity <sup>3</sup>	<u>1.03</u>	<u>0.93</u>	<u>0.10</u>
Supplies Purchased	0.48	0.43	0.05	<b>Opportunity Costs</b>	<b>\$2.48</b>	<b>\$2.48</b>	<b>0</b>
Taxes	0.20	0.22	-0.02	<b>Total Cost / CWT EQ*</b>	<b>\$14.27</b>	<b>\$14.90</b>	<b>-\$0.63</b>

\* Columns may not add due to rounding.

1. Total labor required was estimated at 50 hours per cow, plus 5 hours per heifer, plus 3 hours per acre per year and a wage of \$8.75 per hour. The unpaid labor is the difference between the estimated total labor cost and the recorded paid labor cost.
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 are invested in non-farm assets. See the discussion of "Contingent Liabilities" in the "1998 Financial Benchmarks on Selected Wisconsin Dairy Farms" paper available <http://www.wisc.edu/dairy-profit>.

The "Non-Cash Adjustments" to the cash expenses incurred in producing milk were a negative \$0.23, when comparing 1998 to 1999. This means that dairy farmers increased the level of prepaid expenses and reduced the level of accounts payable. As in 1998, this very likely occurred because dairy farmers were trying to move cash expenses to reduce their yearly income tax liability. Also, some farmers had major decreases in their accounts payable in both years.

In 1996, the first good price year in the 90's, dairy farmers made a small reduction in account payable and/or increases in prepaid expenses, \$0.06 per hundredweight equivalent. In 1998, farmers reduced accounts payable and/or increased prepaid expenses by \$0.30 per hundredweight equivalent.

The "Other Costs" (interest, wages, benefits and depreciation) decreased by \$0.12. "Opportunity Costs" remained the same per CWT EQ to cause a \$0.63 decrease in the total cost of producing milk from 1998 to 1999. This lower total cost includes an increase in the opportunity wage from \$8.50 to \$8.75. The average milk price decreased by \$1.06 (from \$15.43 to \$14.37) between these two years.

**Table 8**  
**Milk Production Cost per CWT EQ in 1999**

<b>Range in Herd Size</b>	<b>&lt;=50 cows</b>	<b>51 to 75</b>	<b>76 to 100</b>	<b>101 to 150</b>	<b>151 to 250</b>	<b>&gt;250 cows</b>
Number of Farms	158	216	95	85	32	34
Total Number of Cows	6,535	13,577	8,273	10,332	6,219	15,061
Average Cows per Farm	41	63	87	122	194	443
Milk Sold per Cow (lbs)	18,089	19,590	20,039	20,479	19,979	21,693
Crop Acres per Cow	3.86	3.73	3.73	3.06	2.37	1.81
Cost of Resale Lst Sold	0.00	0.01	0.00	0.01	0.00	0.00
Auto Expenses	0.17	0.12	0.08	0.06	0.04	0.03
Chemicals	0.19	0.23	0.24	0.24	0.21	0.18
Custom Heifer Raising	0.00	0.01	0.04	0.11	0.26	0.32
Custom Hire	0.30	0.32	0.50	0.37	0.46	0.41
Feed Purchased	2.02	1.96	2.04	2.21	2.42	2.80
Fert & Lime	0.43	0.43	0.43	0.43	0.28	0.21
Milk Hauling	0.12	0.10	0.12	0.09	0.11	0.11
Gas & oil	0.27	0.23	0.22	0.21	0.17	0.18
Insurance	0.22	0.19	0.18	0.16	0.12	0.10
Milk Marketing & Hedging	0.14	0.14	0.14	0.13	0.14	0.15
Equip Leased	0.04	0.04	0.07	0.11	0.16	0.17
Rent-Farm & Pasture	0.41	0.49	0.54	0.54	0.49	0.48
Repairs	1.08	0.98	1.00	1.00	0.69	0.67
Seed & Plants Purchased	0.31	0.29	0.30	0.26	0.28	0.17
Supplies	0.62	0.52	0.53	0.47	0.35	0.43
Taxes	0.30	0.26	0.26	0.18	0.16	0.11
Utilities	0.33	0.28	0.26	0.25	0.22	0.19
Vet & Medicine	0.39	0.34	0.39	0.35	0.37	0.44
Breeding Fees	0.18	0.17	0.17	0.16	0.13	0.13
Other Expenses	0.29	0.36	0.37	0.48	0.65	0.74
Accts Payable Adjustment	-0.04	0.00	0.01	0.00	-0.05	0.02
Prepd Expenses Adjustment	-0.05	-0.09	-0.05	-0.05	-0.04	-0.09
<b>Basic Costs</b>	<b>7.73</b>	<b>7.40</b>	<b>7.81</b>	<b>7.74</b>	<b>7.64</b>	<b>7.96</b>
Depr on Purchased Livestock	0.25	0.26	0.29	0.28	0.42	0.54
Basic Costs + Livestock Depr	7.98	7.66	8.10	8.02	8.06	8.50
Mortgage Interest	0.40	0.30	0.40	0.30	0.27	0.32
Other Interest	0.44	0.44	0.39	0.40	0.59	0.48
Labor Hired (Dependents)	0.46	0.50	0.39	0.28	0.37	0.19
Labor Hired (Non-dep)	0.14	0.30	0.61	0.82	0.86	1.34
SST & Emp Bens (Dep)	0.39	0.30	0.25	0.14	0.10	0.07
SST & Emp Bens (Non-dep)	0.05	0.10	0.11	0.17	0.18	0.26
Depr - Mach,equip,build	1.77	1.79	1.56	1.47	1.43	1.06
Total Allocated Costs	11.62	11.40	11.80	11.60	11.86	12.21
Total Farm Incomes	14.37	14.37	14.37	14.37	14.37	14.37
<b>NFIFO*</b>	<b>2.75</b>	<b>2.97</b>	<b>2.57</b>	<b>2.77</b>	<b>2.51</b>	<b>2.16</b>

\*Net Farm Income from Operations

Table 8 shows the cost of milk per CWT EQ for six herd size ranges. Custom Heifer Raising is not really a cost item for smaller farms, but for the largest farm group it amounts to \$0.32 per CWT EQ. Vet. & Medicine costs are approximately 30 percent higher per CWT EQ in herds over 250 cows versus herds of 51 to 100 cows. Other Expenses increase by \$0.45 or almost 200 percent per CWT EQ from the smallest to the largest herd size groups. It is presumed this is the cost of BST.

The “51 to 75 cow” farms have the lowest Basic Costs per CWT EQ (\$7.40). The range in per CWT EQ costs among farm size groups is \$0.56. Livestock depreciation is only \$0.25 per CWT EQ in the smallest herd size group but \$0.54 per CWT EQ in the herd over 250 cows.

The “51 to 75 cow” farms again have the highest NFIFO per CWT EQ (\$2.97). They have a return to the owner-operator-manager (and their family’s) labor & management and equity capital of \$3.77 per CWT EQ. In 1998, this group was second best with a NFIFO of \$3.51 per CWT EQ. In 1997, the “51 to 75 cow” farms had the highest NFIFO per CWT EQ.

### Additional Information

Tables 9-11 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 (124) on that item sort, the middle 60 percent (372 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, including 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 9**  
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	\$7.72	11.77	96.3	3.00	20,210	157,407	7.56%
Low 20%	\$5.84	9.85	77.0	3.29	20,170	170,724	11.29%
Mid 60%	\$7.65	11.70	103.9	2.96	20,482	180,996	8.38%
High 20%	\$9.72	13.83	95.2	2.92	19,350	99,997	.27%

Table 9 shows that the quintile of the farms with the lowest basic cost (low cost farms) had an average basic cost of \$5.84 versus \$6.23 in 1998. The quintile of the farms with the highest basic cost (high cost farms) had a basic cost of \$9.72, a difference of almost \$4.00 per CWT EQ. The difference in the ROROA on the low and the high cost farms is 11.02% (11.29 - .27) versus 8.75% (12.92 - 3.27) in 1998.

The average margin of the low cost farms was \$70,720 (71%) greater than the high cost farms’ average margin versus \$66,237 (55%) in 1998. On average, the low cost farms had \$1.71 available for each \$1.00 the high cost farms had available to pay for non-basic cost items. Non-basic cost items are wages, benefits, family living, principal, interest, and make down payments on new capital purchases. Also, the low cost farms accomplished this with fewer cows per farm. The mid-cost farms had approximately \$10,000 more margin per farm but required an additional 26.9 cows to produce that margin.

**Table 10**  
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%	7.96	12.06	71.5	3.64	14,299	85,445	2.68
Mid 60%	7.75	11.93	94.6	3.03	19,773	153,865	6.72
High 20%	7.59	11.39	128.7	2.61	24,456	266,667	11.79

Table 10 shows that the quintile of the farms with the lowest milk sold per cow sold more than 10,000 pounds less milk per cow than the high quintile.

It shows the low production farms had an average basic cost of \$7.96 per CWT EQ. The quintile of the farms with the highest milk sold per cow had a basic cost of \$7.59, a difference of \$0.37 per CWT EQ. The difference in 1998 was \$0.10 and in 1997 was \$0.11 per CWT EQ. It has been significantly low since this study began. The higher milk sold farms had averaged 57.2 more cows per farm and 10157 pounds more milk sold per cow.

The average margin of the “higher milk sold” farms was \$181,222 (212%) greater than the “lower milk sold” farms’ versus \$210,331 (286%) in 1998 and \$123,470 (197%) in 1997. Of this extra margin, only about \$11,650 is due to a lower basic cost of production per CWT EQ; the remainder was due to volume. The average amount of milk sold per farm on the “higher milk sold” farms was 3,147,487 pounds in 1999 versus 3,402,953 pounds in 1998. This compares to an average amount of milk sold of 1,022,379 pounds versus 937,427 pounds in 1998, on the “lower milk sold” farms. Therefore, on average, the “higher milk sold” farms sold about 3 times as much milk per farm as the “lower milk sold” farms.

Statistical tests (correlation and regression analysis) showed neither production per cow nor the number of cows per farm had any explanatory power versus basic costs per CWT EQ on the 620 farms studied. However, both were significant (t Statistic in excess of 2), at the 95% confidence level, in determining basic cost per CWT EQ. Moreover, both were significant in determining Rate of Return on Assets (ROROA). Also, they had marginal explanatory power versus ROROA. ( $R^2=0.21$ )

**Table 11**  
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	ROROA
Low 20%	7.84	11.72	39.1	3.81	17,906	56,123	3.70
Mid 60%	7.57	11.54	71.0	3.72	19,677	118,483	6.10
High 20%	7.83	11.98	231.9	2.21	21,089	402,136	10.28

In 1996, when the study farms were sorted by the “Number of Cows per Farm” (Table 11) the low quintile had 38 cows per farm. However, the “Mid” and the “High” categories had 64 and 186 cows, respectively. In 1997, the low quintile on this table had 38 cows per farm, the “Mid” 67, and the “High” 223. In 1998, the low quintile has 38.6 cows per farm, the “Mid” 69.3, and the “High” 250.9. Notice that in 1998 there was a 35 percent increase in the number of cows in the “High” cows per farm group with almost no increase in the “Low” group. During this year, it appeared the small farms were remaining the same size, however, the large farms increased in size. In 1999 however, the “High” group begins to decline by 19 cows. This is likely due to an increase in the number of large farms that are doing their financials on a fiscal year (so as of this date we have not received those records).

Table 11 sorts the farms by the number of cows in the herd. It shows that the quintile of the farms with the “low cow numbers” farms had an average basic cost of \$7.84 per CWT EQ versus \$8.25 in 1998. The quintile of the farms with the highest cow numbers had a basic cost of \$7.83, a difference of \$0.1 per CWT EQ in favor of the larger farms. Notwithstanding, the “high cow numbers” farms averaging 192.8 more cows per farm and 3183 additional pounds of milk sold per cow.

The average margin of the “high cow numbers” farms in 1999 was \$346,013 (617%) greater than the “lower cow numbers” farms versus \$261,483 (660%) in 1997. This margin could have been over \$500 less, had the large farms produced milk for the same basic cost as the small farms. The milk sold per farm on the “higher cow numbers” farms was 4,890,539 pounds in 1999 versus 4,403,158 in 1997. These compare to an average of 700,125 pounds of milk sold per farm on the “lower cow numbers” farms versus 632,390 pounds in 1997.

### Summary

The average herd size in our study group of farms was 96.8 cows. The milk sold per cow averaged 20,010 pounds. The rapid increase in cow numbers is due to expansion by the larger farms in the sample. These farms are also increasing production per cow more rapidly than the farms with smaller herds.

Total cost of production per hundredweight equivalent of milk was \$0.10 (\$14.37-14.27) less than the US average milk price in 1999. This is the second year (since our study of milk production costs began in 1992) that the milk price has exceeded total economic costs.

Purchased feed costs remain the largest cost item. They declined in 1999 after several years of being almost constant. Purchased feed costs per cow were \$581, \$663, \$657 and \$662 in 1999, 1998, 1997 and 1996, respectively. Purchased feed costs per CWT EQ were \$2.30, \$2.77, \$2.76 and \$2.94, in 1999, 1998, 1997 and 1996, respectively.

Total income per cow averaged \$3,633, of which \$2,984 was milk income, \$141 calves sold and \$166 cull cow sales. Therefore, 91 percent of total income was from the sale of products directly related to the dairy enterprise

(milk, cull cows, and calves). In 1998, 91 percent of the total income was from dairy. Total allocated expenses per cow in 1999 averaged \$3,688 versus \$3,129 in 1998. The return to the farmer's (and family's) unpaid labor, management, and equity capital (Net Farm Income from Operations - NFIFO) was \$657. This is less than the NFIFO per cow in 1998. The corresponding 1998 values were total income per cow, \$3,688; total allocated expenses per cow, \$3,129; and NFIFO per cow, \$716.

The wages paid to dependent family members was \$79, \$113 and \$118, \$125 per cow in 1996, 1997 and 1998, 1999 respectively. The collection system used by the Center for Dairy Profitability and the Farm Management Associations has been separating wages and benefits paid to dependent family members since 1996. As a larger percent of labor & management required to operate a dairy is paid, the definition of NFIFO is slowly changing from the money available for family living draw to a return to the farm equity.

In 1999, total allocated expenses per CWT EQ averaged \$11.79 and basic costs averaged \$7.72. In 1998, the total allocated costs per CWT EQ were \$12.51 and basic costs averaged \$8.23 and in 1997 these were \$11.81, and \$7.86 respectively. 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. Basic costs or cost of goods per dollar of income averaged \$0.54 cents (the \$7.72 basic cost divided by the \$14.37 average milk price in 1999). The other \$0.46 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 for the study farms was 7.56% which is a drop from 1998's ROROA of 9.20%, however it is still an increase from the 5.5% in the years 1995 through 1997. More details on the financial status of these 620 farms is published in the paper titled "1999 Financial Benchmarks on Selected Wisconsin Dairy Farms." This paper benchmarks the 16 Farm Financial Standard Task Force measures and others. Both papers will be available on the Center for Dairy Profitability's website at [www.wisc.edu/dairy-profit](http://www.wisc.edu/dairy-profit) under "Papers & Publications."