

Dairy Farm Competitiveness: Lessons from the Top Dairies Project¹

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The "Top Dairies Project" has two main purposes: To help dairy farmers assess the competitiveness of their farms compared to other farms across the country and to help them identify the strong and weak aspects of their farm performance. Eight North Carolina dairy farmers participated for the first time in 1999, as part of a pilot project to develop performance measures specifically for North Carolina. The "Top Dairies Project" was developed at Cornell University, with help from individuals across the country. The first farm data were collected in 1997.

Thanks to the North Carolina cooperators, I was able to generate benchmarks that all NC dairy farmers can use to see how they stack up. A copy of this report is included with these remarks. I urge you to evaluate your farm by inserting your own farm data in the blank spaces provided. I will be happy to assist if you need help. Also, any dairy farmer would like to be part of this project by contributing farm information for 2000 should contact me right away. I promise to keep all the individual farm information strictly confidential and no one else will see your information.

Given the trends in dairy farming, dairy farmers and other people involved in the industry are very interested in the competitiveness of North Carolina dairy farms. I used the information in the "Top Dairies" database to see how competitive our North Carolina farms were and to see if I could identify the factors that seem to make farms more competitive. The data I generated are shown in tables 1 – 4 but I will summarize it here. All the comparisons are for confinement Holstein herds because there were 484 of them, compared to only 12 Jersey herds and no grazing herds.

The North Carolina farms were more profitable than the average for all the 484 herds in the database. I use return on assets (sometimes called return on investment) as my profit measure because long term survival depends on being able to generate a high enough rate of return to justify borrowing money at market interest rates. The NC farms generated a ROA of 8.6% compared to national average of 6.0%. This was better than the average for farms in the Northeast, was similar to the Midwest and was lower than the farms in the Southwest, which includes California. The NC farms had the highest gross income per cow and the highest cost per cow, Table 1. Net income per cow (NFI), at \$610, was similar to the national average. This is the return to the family for the unpaid labor, management and investments they contribute to the farming operation. The NC figure was considerably lower than for the Midwest farms but beat the Southwest farms by almost \$200 per cow.

Comparable data on a per 100 lb. of milk sold basis show similar results, Table 2. As expected, NC has the higher price per 100 lb. but also has the highest cost.

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The effect of herd size on farm performance is shown in Table 3. Profitability increases with herd size, from a ROA of 3.5% for herds of less than 100 cows to 11.2% for herds over 600 cows. The smallest herds had the lowest milk price but this does not explain much of the difference. The larger herds had higher milk production per cow and a lower investment per cow. Net farm income per cow was similar for all size groups and NFI per 100 lb. of milk declined as herd size increased. This suggests there are few economies of scale, although there may be regional effects that confound this result.

I grouped the farms based on return on assets and on milk production per cow above or below the group average, Table 4. Looking at ROA, the above average group had a ROA of 11.2% compared to only 0.8% for the below average group. The higher profit group was considerably larger, on average, had higher milk per cow and lower investment per cow. They had higher income per cow, higher cost per cow, and higher NFI per cow and per 100 lb. The results were similar when the herds were grouped by production, but the profit differences were not quite as pronounced.

I also prepared some graphs (not shown here) that looked at the relationships between ROA and milk sold per cow, milk price, herd size, and cost per 100 lb. Cost of production had the biggest impact on profitability. More milk per cow, higher milk price and a larger herd size all had a positive effect on ROA but the relationship was weaker and there was a huge variation among the farms.

The main conclusions I draw from this analysis are as follows:

- The North Carolina dairies were nationally competitive from a profitability standpoint. However, there are more differences among farms than between regions.
- Larger farms are more profitable, on the average, but a dairy farmer should assess his or her current financial status and past performance, and push a pencil before expanding. Less investment per cow is an important contributor to higher profitability and there is little evidence of large economies of scale.
- The more profitable farms produced more milk per cow and had higher costs per cow. Clearly, herd productivity continues to be important but make sure high levels of milk production are achieved in a cost-effective manner.

Finally, a word or two of caution is in order. First, the data come from many sources and, although Cornell faculty screen the data for obvious errors, some of the farm data may contain errors. Second, because all the herds contribute their data voluntarily, we cannot say for sure that their information is typical of a particular region or herd size. Third, the information I presented is for a single year and farm performance can and does change markedly from year-to-year. Lastly, 1999 was a year of record high milk prices and this affected profit levels. It is not yet clear how federal order reform might affect regional competitiveness over the longer term, but I do not believe it will change the competitive position of North Carolina significantly.

Table 1. Regional competitiveness, confinement Holstein herds, per cow basis, 1999

Item	NC	US	Northeast	Midwest	Southwest
Profit:					
Return on Assets	8.6%	6.0%	5.1%	8.8%	11.4%
Farm characteristics					
No. of Farms	8	484	183	61	7
No. of Cows	262	248	191	191	1,579
No. of People	6.2	5.8	5.1	4.6	17.0
Investment	\$1,733,818	\$1,599,246	\$1,243,219	\$1,340,801	\$7,402,579
Milk/cow	21,183	19,860	18,912	20,772	20,650
Investment/cow	\$7,077	\$7,181	\$6,842	\$8,017	4,355
Income	\$/cow	\$/cow	\$/cow	\$/cow	\$/cow
Milk	3,587	2,950	2,801	3,021	2,939
Other	336	470	424	771	234
Total	3,923	3,420	3,225	3,792	3,173
Expense					
Feed	1,148	774	744	581	1,303
Labor	440	303	263	304	276
Crop inputs	148	173	158	265	23
Other	1,321	1,328	1,276	1,548	992
Total Oper. Exp.	3,057	2,578	2,441	2,698	2,594
Depreciation	296	232	215	248	149
Total Expense	3,352	2,856	2,656	2,946	2,743
Net Farm Income	610	607	568	844	430

Source: Calculated by the author from data in the Cornell University Top Dairies database

Table 2. Regional competitiveness, confinement Holstein herds, per 100 lb of milk sold, 1999

Item	NC	US	Northeast	Midwest	Southwest
Profit:					
Return on Assets	8.6%	6.0%	5.1%	8.8%	11.4%
Farm characteristics					
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Investment/cow	\$7,077	\$7,181	\$6,842	\$8,017	\$4,355
Income	\$/100 lb	\$/100 lb	\$/100 lb	\$/100 lb	\$/100 lb
Milk	16.88	14.85	14.78	14.61	14.32
Other	1.58	2.41	2.34	3.76	1.08
Total	18.46	17.26	17.12	18.37	15.40
Expense					
Feed	5.40	3.92	3.96	2.77	6.28
Labor	2.07	1.44	1.28	1.40	1.34
Crop inputs	0.69	0.87	0.83	1.27	0.11
Other	5.83	6.82	6.97	7.49	4.85
Total Oper. Exp.	13.99	13.05	13.04	12.93	12.58
Depreciation	1.39	1.19	1.18	1.19	0.72
Total Expense	15.78	14.24	14.22	14.12	13.30
Net Farm Income	2.87	3.00	2.88	4.22	2.10

Source: Calculated by the author from data in the Cornell University Top Dairies database

Table 3. Herd size and farm performance, confinement Holstein herds, 1999

Item	Under 100	100 to 199	200 to 399	400 to 599	600 and up
Profit:					
Return on Assets	3.5%	5.3%	8.8%	9.0%	11.2%
Net Farm Income/100lb	\$3.23	\$2.84	\$2.89	\$2.70	\$2.64
Farm characteristics					
No. of Farms	203	108	90	38	42
No. of Cows	64	141	286	491	1,127
No. of People	2.3	4.0	7.0	11.1	20.1
Investment	\$494,700	\$1,024,253	\$1,752,404	\$3,279,256	\$6,622,378
Milk/cow	18,243	19,736	21,075	22,549	22,795
Milk Price/100 lb	\$14.75	\$14.86	\$15.00	\$15.05	\$14.88
Investment/cow	\$7,866	\$7,328	\$6,157	\$6,706	\$6,023
Income	\$/cow	\$/cow	\$/cow	\$/cow	\$/cow
Milk	2,688	2,934	3,160	3,390	3,390
Other	462	498	470	462	443
Total	3,150	3,432	3,630	3,852	3,833
Expense					
Feed	686	749	838	926	991
Labor	153	313	427	526	539
Crop inputs	165	201	176	166	144
Other	1,287	1,372	1,350	1,362	1,337
Total Cash Exp.	2,291	2,635	2,791	2,980	3,011
Depreciation	240	231	216	156	214
Total Expense	2,531	2,866	2,574	3,136	3,225
Net Farm Income	617	563	621	604	607

Source: Calculated by the author from data in the Cornell University Top Dairies database

Table 4. Characteristics of higher and lower profit, and higher and lower producing confinement Holstein herds, 1999

Item	Return on Assets		Milk Sold per Cow	
	Below Avg.	Above Avg.	Below Avg.	Above Avg.
Profit:				
Return on Assets	0.8%	11.2%	3.5%	8.2%
Net Farm Income/100lb	\$2.05	\$3.94	\$2.84	\$3.14
Farm characteristics				
No. of Farms	242	242	228	256
No. of Cows	149	348	141	344
No. of People	4.0	7.6	3.7	7.7
Investment	\$1,061,052	\$2,137,440	\$875,287	\$2,244,023
Milk/cow	18,491	21,230	16,703	22,672
Milk Price/100 lb	14.71	\$14.99	\$14.86	\$14.85
Investment/cow	\$7,830	\$6,531	\$6,926	\$7,407
Income	\$/Cow	\$/Cow	\$/Cow	\$/Cow
Milk	2,722	3,178	2,483	3,366
Other	425	514	440	496
Total	3,147	3,692	2,923	3,862
Expense				
Feed	747	803	672	866
Labor	243	362	191	402
Crop inputs	178	168	151	193
Other	1,330	1,325	1,208	1,433
Total Cash Exp.	2,498	2,658	2,222	2,894
Depreciation	256	209	208	254
Total Expense	2,754	2,867	2,430	3,148
Net Farm Income	393	823	491	712

Source: Calculated by the author from data in the Cornell University Top Dairies database

North Carolina Dairy Farm Financial Performance Pilot Project

Averages based on 1999 information for 8 Farms

Table 1. Selected Measures of Farm Resources

ITEM	Your Farm	Average per Farm
Cows		261.8
Milk, Cwt.		55,630.3
Milk Price, \$/Cwt.		16.82
Milk/Cow, lb.		21,183
Unpaid Labor, mo.		18.1
Paid Labor, mo.		55.9
Livestock Returns over Feed, \$		673,262
Investment/Worker, \$		282,374
Investment/Cow, \$		7,077
Milk Income/Gross Revenue		0.91

Table 2. Revenue

REVENUE	Your Farm \$	Average \$/Farm	Your Farm \$/cow	Average \$/cow	Your Farm \$/cwt.	Average \$/cwt.
Milk		939,181		3,587		16.88
Livestock		34,536		132		0.62
Other		53,319		204		0.96
Total Operating Income		1,027,035		3,923		18.46
Accrual Adjustments		0		0		0.00
Gross Revenue		1,027,035		3,923		18.46

Table 3. Expenses

EXPENSES	Your Farm \$	Avg \$/Farm	Your Farm \$/cow	Avg \$/cow	Your Farm \$/cwt	Avg \$/cwt
Hired Labor		115,277		440		2.07
-Feed - Grain & Byprods		260,912		997		4.69
-Feed - Bought Forage		39,544		151		0.71
-Feed - Nondairy		0		0		0.00
<i>Feed subtotal</i>		<i>300,455</i>		<i>1,148</i>		<i>5.40</i>
-Fertilizer		18,902		72		0.34
-Chemicals		10,949		42		0.20
-Seed		8,803		34		0.16
<i>Crop Subtotal</i>		<i>38,654</i>		<i>148</i>		<i>0.69</i>
<i>Feed & Crop subtotal</i>		<i>339,109</i>		<i>1,295</i>		<i>6.10</i>
Milk Hauling & marketing		45,651		174		0.82
Milking supplies		25,250		96		0.45
Vet & Med		20,356		78		0.37
BST		11,995		46		0.22
Breeding		8,222		31		0.15
Bedding		5,094		19		0.09
Custom Boarding/Raising		15,944		61		0.29
Bought Replacement Livestock		18,882		72		0.34
Leased cows		0		0		0.00
Other Livestock Expense		12,289		47		0.22
<i>Livestock Expense subtotal</i>		<i>163,682</i>		<i>625</i>		<i>2.94</i>
-Utilities		17,683		68		0.32
-Machinery Repair		26,432		101		0.48
-Mach Hire, Rent, Lease		19,612		75		0.35
-Fuel		9,387		36		0.17
-Auto		0		0		0.00
<i>Power Subtotal</i>		<i>73,114</i>		<i>279</i>		<i>1.31</i>
Land Rent & Lease		19,524		75		0.35
Building, Fence, Land Repair		13,032		50		0.23
Insurance		16,702		64		0.30
Property Taxes		8,969		34		0.16
Miscellaneous		28,673		110		0.52
<i>General Farm Expense subtotal</i>		<i>86,900</i>		<i>332</i>		<i>1.56</i>
Total Production Expenses		778,082		2,972		13.99
Interest		22,149		85		0.40
Total Operating Expenses		800,230		3,057		14.38
Income Before Depreciation		226,805		905		4.26
Depreciation		77,433		296		1.39
Total Expenses		877,663		3,352		15.78
Net Farm Income from Operations		149,372		610		2.87

Table 4. Selected Measures of Farm Resources and Financial Performance

PERFORMANCE MEASURES	Your Farm	Average
Purchased Expansion Livestock, \$		7,064
Total Investment, \$		1,733,818
Total Liabilities, \$		263,050
Net Worth (Equity), \$		1,470,768
Interest on Equity Capital, \$		147,077
Unpaid Labor Charge, \$		21,690
Management Returns, \$		-19,395
Net Farm Income/Cow, \$		571
Net Farm Income/Cwt., \$		2.69
Management Returns/Cow, \$		-35
Management Returns/Cwt., \$		-0.17
Return on Assets, \$		149,831
Rate of Return on Assets		8.64%
Rate of Return on Equity		8.68%
Debt:Asset Ratio		0.15
Asset Turnover Ratio		0.60
Operating Profit Margin Ratio		0.15
Operating Expense Ratio		0.78
Operating Surplus for Debt Service, Family Living, etc., \$		248,954
Operating Surplus for Debt Service, Family Living, etc. per Cow, \$		951
Operating Surplus for Debt Service, Family Living, etc. per Unpaid Worker, \$		89,975

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