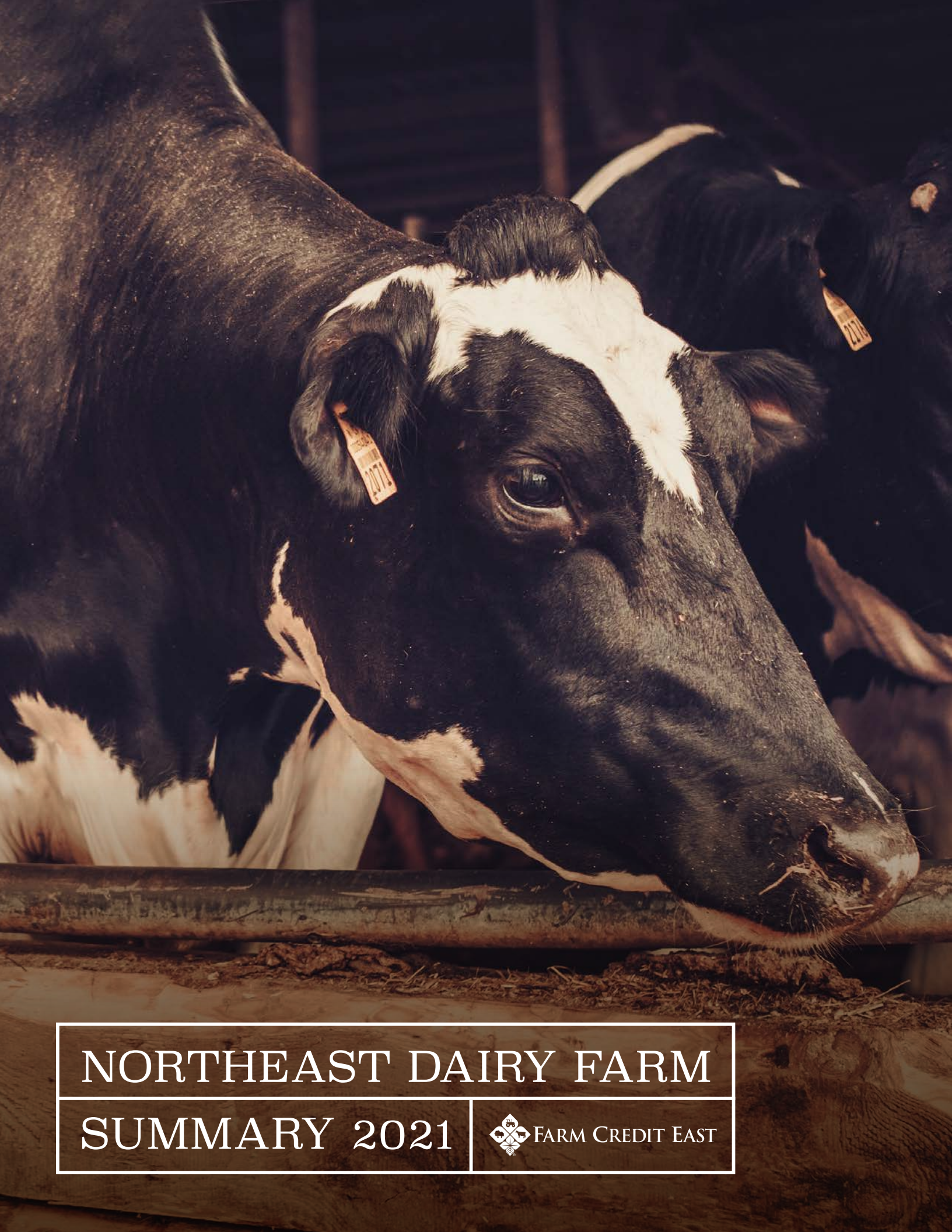

NORTHEAST DAIRY FARM SUMMARY 2021

FARM CREDIT EAST


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Prepared by:
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May 2022

ACKNOWLEDGMENTS

The *Northeast Dairy Farm Summary (DFS)* was first published in 1980 with data from 1979. No research project of this scope would be possible without the collaboration and hard work of many individuals. The current author would like to thank the authors who preceded him in writing the *DFS* over the past 42 years.

In addition, thanks are due to all Farm Credit East lending and financial services staff, who reconciled reams of financial data from a large number of farms and entered the information into our system. Every year, their hard work provides the raw material for creating the *DFS*. This report is truly a "team effort."

Most importantly, the entire Farm Credit East team extends our sincere thanks to the hardworking Northeast dairy producers who entrusted their farm data to this project. We hope the end product is helpful in your continual pursuit of improved farm management. You inspire us all with the valuable work that you do.

HIGHLIGHTS OF THE 2021 NORTHEAST DAIRY FARM SUMMARY

- 170 dairy farms participated in *2021 Northeast Dairy Farm Summary*.[1]
- Net earnings decreased to an average of $374 per cow in 2021,[2] from $663 per cow in 2020. A significant decline in government payments contributed to the decrease in earnings.
- Total costs increased by 3.4% from 2020 to 2021. Total expenses per cwt. increased by $0.71 per cwt. to $21.50 in 2021.[3]
- Net cost of production[4] (NCOP) increased to $18.60 per cwt., $0.24 greater than 2020.
- Some specific cost categories which changed in 2021 are:
  - Feed expense, a farm's largest cost, increased from $1,718 per cow in 2020 to $1,782 in 2021.
  - Labor, a dairy farm's second largest expense, increased from $866 per cow to $884 per cow.
  - Fuel expenses increased by 39% per cow as oil prices bounced back from the depressed levels during the height of the pandemic.
- Productivity decreased slightly. Per cow production in our sample herds was 0.2% below the prior year. Milk sold per worker decreased 3.5% due to fewer cows per worker, as well as lower per-cow production.
- Cash flow was sufficient, on average, to meet financial commitments (e.g., operating expenses, debt repayment, family living and income taxes), resulting in an average cash margin (excluding government payments) per cwt. of $0.66.[5] This was a greater cash margin than 2020's $0.35/cwt.
- Percent net worth in our sample declined slightly to 67% as total debt-per-cow increased from $3,981 to $4,672.

PROFILE OF THE AVERAGE NORTHEAST DAIRY FARM

	2020	2021
Number of Cows	685	568
Milk Sold per Cow	25,884 lbs.	25,823 lbs.
Milk Sold per Worker	1,391,525 lbs.	1,343,002 lbs.
Milk Price per Cwt.	$18.48	$19.21
NCOP per Cwt.	$18.11	$18.60
Net Worth	69%	67%
Net Earnings per Cow	$663	$374
Net Household Income per Cow	$682	$414
Return on Assets	6.4%	3.8%

[1]Six farms were excluded due to data irregularities, resulting in a benchmark of 164 farms. This year's *DFS* contains data from Connecticut, Massachusetts, Maine, New York and Vermont.
[2]On an accrual basis, after family living, not including nonfarm income.
[3]Including family living.
[4]Total farm expense, plus family living, less non-milk income. For more information, see page 12.
[5]See figure 7.

Note: with the merger between Farm Credit East and Yankee Farm Credit effective January 1, 2022, we are pleased to once again include data from 24 farms in Vermont and the areas in New York and New Hampshire that were part of the former Yankee Farm Credit territory.

We do not believe this significantly changes the analysis or the validity of the year-over-year comparisons. Although many farms participate in the *DFS* every year, collectively it is not the same group of farms each year. Nonetheless, we felt it was appropriate to acknowledge the addition of this particular set of farms in the composition of the *DFS* sample.

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INTRODUCTION

The purpose of Farm Credit East's annual *Dairy Farm Summary (DFS)* is to assess the financial health and progress of dairy farm businesses within the Northeast. It is intended to provide dairy producers, Farm Credit staff, Northeast public policymakers and dairy industry leaders with a better understanding of the current status of the Northeast's largest farm sector.

As a major regional summary of actual dairy farm business results, the *Dairy Farm Summary* is a unique annual project within the U.S. dairy industry. The *DFS* has been published for 42 consecutive years, beginning in 1980 with 1979 financial data. Past editions are available upon request.

This report is the result of cooperation and hard work by many people. We are grateful, first and foremost, to the 170 dairy producers who allowed their financial and production records to be used in this study.[6] Further, we appreciate the teamwork and effort of Farm Credit East staff who helped customers compile and provide that information. This report contains five years of financial data for Northeast dairy farms, with the majority of the farms from New York.

We believe this sample of 164 farm operations represents a solid cross section of better-than-average Northeast dairy farm businesses, most of which maintain loan relationships with Farm Credit. While the *DFS* summarizes the actual financial results of a wide range of Northeast dairy producers, it is important to note that our sample is skewed towards farms that are larger, and likely more profitable, than the true average of all dairy producers in the region. It does not include any organic dairy farms. All farms included in the study received the majority of their income from milk sales, but many farms have additional business income, such as custom work, maple sugaring or crop sales. We have purposely not excluded these farms from the sample (unless such income exceeds 50% of total farm income) as we believe it reflects one of the realities of Northeast dairying, where many producers have supplementary income streams.

If such ancillary business activity constitutes a separate enterprise from the main dairy farming activity, and both revenue and expenses can be broken out, the net return is included in *nonfarm income*, along with income from off-farm employment. If the expenses of this ancillary activity cannot be separated from the dairy farming expenses (labor costs are often co-mingled), such revenue is included in *other farm income*. Thus, the total farm income represented in this report often includes some return from these affiliated business ventures, increasing the income that would have been generated from the dairy enterprise alone. This is typically more significant for the farms with smaller herd sizes.

Partnerships and corporations have been adjusted to a sole proprietor basis for consistency. Farms with unusual events, such as a natural disaster, a major herd-health problem, a significant inheritance, large unexplained gains or losses (>10 percent of total assets), or other types of business anomalies were excluded from the sample. Each farm's data was carefully reviewed to ensure both cash flow and net worth reconciled within a limited margin of error. This approach ensures a high level of integrity for the financial results presented in the *2021 Northeast Dairy Farm Summary.*

The *DFS* tends to focus discussion on the "average farm." While there is no single farm which is exactly "average," focusing on the average farm within our sample allows us to highlight changes to Northeast dairy farms over time. While the use of averages may lead to an effective discussion with respect to change and overall industry trends, it tends to minimize the best and worst conditions experienced by farms within the sample.

[6] Of the 170 farms submitted, six were excluded as outliers, or due to data irregularity, resulting in a benchmark of 164 farms.

This continues to be true in a year such as 2021. While the "average farm" within our group of 164 had $374 per cow in net earnings, 15% of the farms in our sample had net losses. Results ranged from just over $3,000 in net earnings per cow, to a loss of more than $1,000 per cow. The standard deviation of net earnings was $609, indicating a great deal of variability within the sample. In addition to significant variations in profitability, we had a wide range of farm sizes in our sample as well. Herd size ranged from 30 cows to nearly 3,000.

Focusing on average results discounts the fact that while many producers are able to achieve positive earnings, others, of all sizes, struggle to make a profit in this challenging industry. For this reason, we also look at the data within individual herd-size groups and within the top and bottom profitability groups.

Figure 1

Dairy Farm Profitability

	Net Earnings per Cow[1]	Standard Deviation	Return on Assets[2]	Return on Equity[3]
2017	$ 291	$644	3.7%	3.5%
2018	$ -40	$535	1.2%	-0.5%
2019	$ 447	$518	5.2%	5.4%
2020	$ 663	$582	6.4%	7.6%
2021	$ 374	$609	3.8%	4.0%
3-Year Average	$ 495		5.1%	5.7%
5-Year Average	$ 347		4.1%	4.0%
10-Year Average	$ 365		4.0%	4.0%

[1]Net earnings does not include nonfarm income
[2]Return on assets = (net earnings + interest)/average total assets
[3]Return on equity = net earnings / average net worth

Figure 2A

Net Earnings Per Cow 1979-2021

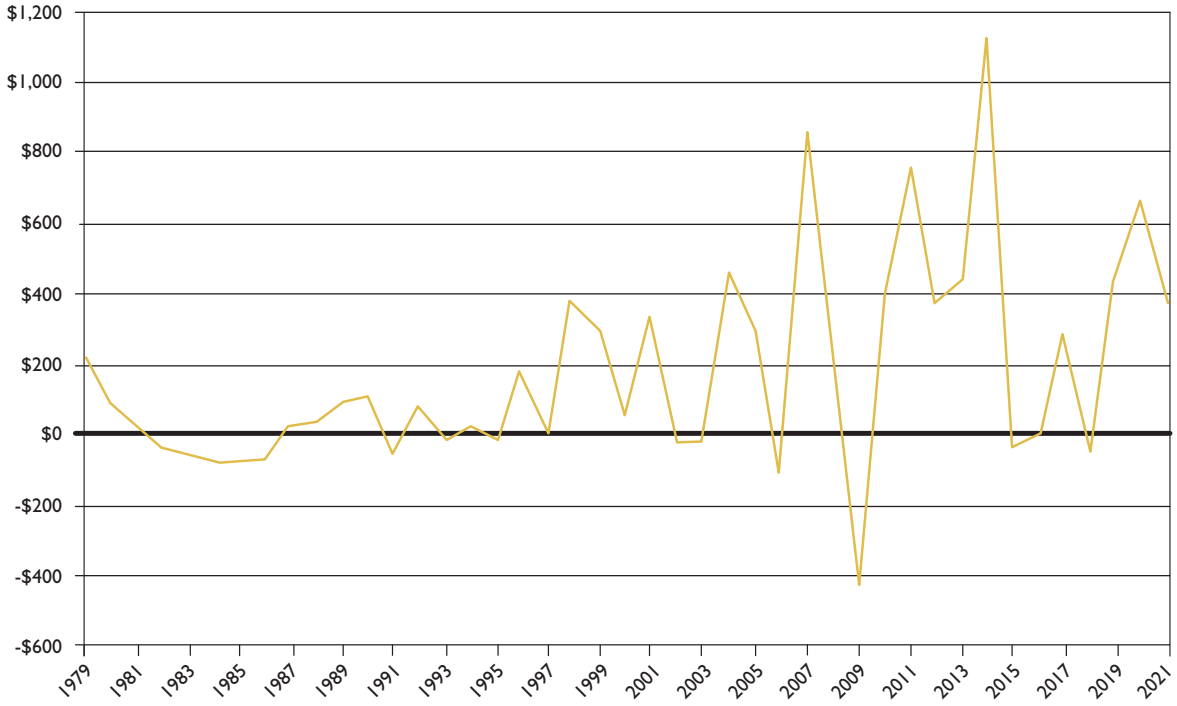
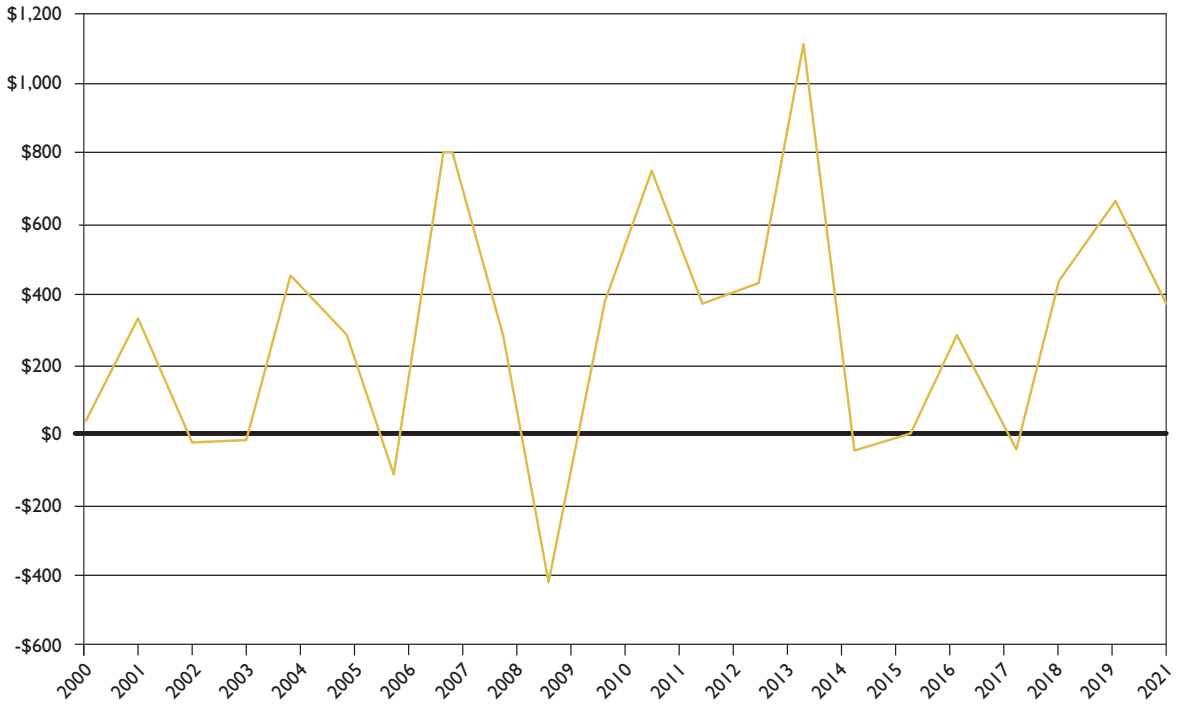


Figure 2B

Net Earnings Per Cow 2000-2021



ANALYSIS OF 2021

A Recovery Year

It's difficult to fully understand 2021 without a recap of the most unusual year that preceded it. If 2020 was the year when the world was completely disrupted by the COVID-19 pandemic, 2021 was the year when the world started to learn to live with it.

In late 2019/early 2020, reports of a new, highly contagious respiratory virus began to emerge from China. While measures to slow its spread were put in place by countries around the globe, the virus inevitably spread, and on March 11, 2020 the World Health Organization officially declared COVID-19 a pandemic. Shortly thereafter, in the United States, retail and service businesses began to shut down, schools closed, and millions of Americans shifted to working from home. By mid-April, most U.S. states had reported widespread cases, and the country in full "lockdown" mode.

While the pandemic had broad and far-reaching impacts, some of the biggest disruptions were felt in the food system. Prior to the pandemic, Americans had been spending just over half of their food dollars outside the home.[7] Foodservice, ranging from bars and restaurants, to schools, universities and other institutions accounted for nearly half of all products in the supply chain. This market channel shrank almost to zero as dining establishments and schools closed. Meanwhile, consumers shifted the majority of their food purchases to the grocery store channel which initially struggled to keep the shelves stocked due to both the shift to home food consumption as well as some degree of panic buying.

Producers, processors and distributors struggled to deal with the changes required both in terms of the food supply chain as well as the operational changes required to keep workers safe from COVID-19 in their businesses. Some fruit and vegetable growers had to dump or plow under crops, and some dairy producers had to dump milk. As a result some cooperatives and other milk buyers imposed production restrictions on dairy farms.

While the amount of milk dumped in April was unusually large, thankfully, processors were able to adjust their operations relatively quickly. By May 2020, the dumping had largely subsided, returning to a near-baseline level of 12.3 million pounds.

Although the dairy processing industry was able to adjust their operations over a few months, given the severe nature of the disruption, it took a toll on the industry. Supply greatly exceeded processing capacity and prices plummeted for several months, dropping from $19.28/cwt. (Order One Statistical Uniform Price) in December 2019 to a low of $13.47/cwt. in May 2020, a decline of nearly $6, before gradually recovering. Note that payments from the Coronovirus Food Assistance Program (CFAP) and other relief programs such as the Paycheck Protection Program (PPP) helped supplement income the last two years but particularly in 2020.

While the shutdown occurred rapidly, the reopening of the economy was more gradual. During the initial lockdown, restaurant sales plummeted, from $55.7 million in February, to $28.2 million in April. During May and June 2020, they recovered substantially, but it took until March of 2021, before they would match their previous sales volume. From March through December 2021, restaurant sales surged, exceeding their previous peak levels due to pent-up consumer demand.[8]

[7] USDA Economic Research Service
[8] U.S. Census Bureau

For the dairy industry, the impact of these market disruptions and subsequent recovery were substantial. After the initial shock to the system caused by the loss of food service markets, processors and distributors were able to successfully pivot their operations to focus on retail markets, and this was reflected in both the decline of milk dumped and the recovery of milk prices. By July 2020, the average wholesale milk price had recovered to $19.08, just below the pre-pandemic level of $19.28 from December 2019. From July 2020 until October 2021, milk prices fluctuated from roughly $16-18 per cwt. as milk markets, both domestically and internationally, gradually recovered in a somewhat uneven fashion.

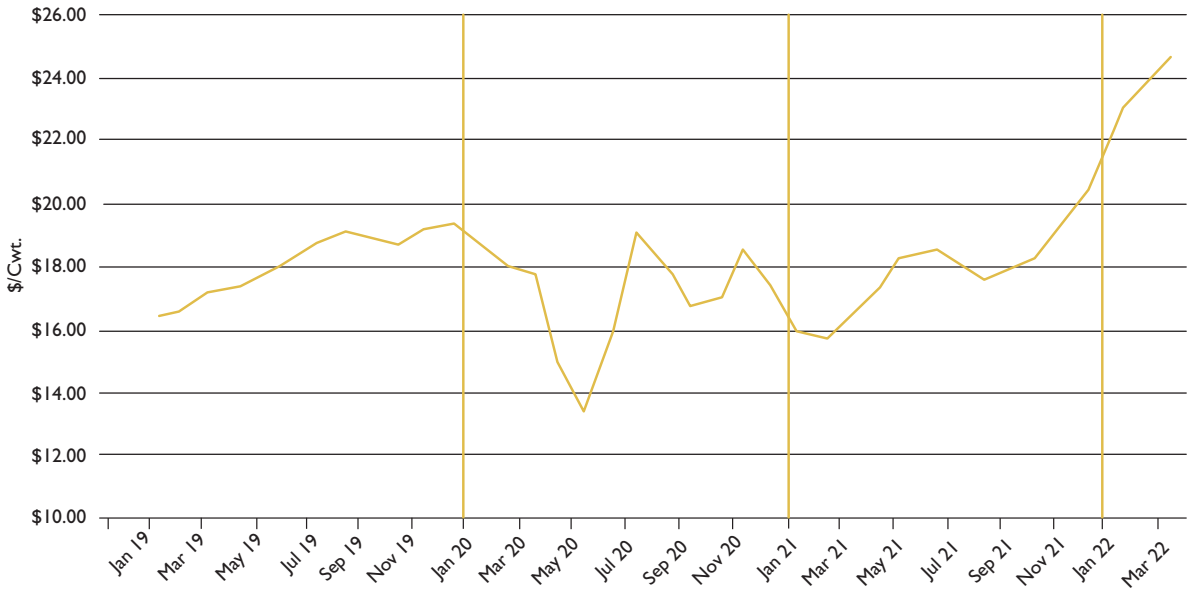
The pace of reopening accelerated in 2021 with the release of vaccines, although there were setbacks, and a new problem to confront: How to restore capacity fast enough to cope with resurgent demand? This became a problem across all sectors of the economy, particularly the manufacturing, distribution and sale of goods. U.S. manufacturers and retailers went from being shut down and losing their markets, to being open for business and unable to stock the shelves fast enough.

In the dairy sector, this presented significant challenges. While milk was being dumped in the second quarter of 2020 because of the shutdowns, in 2021, it was being dumped (albeit at a much lower level) because some processors weren't able to restore capacity fast enough to meet market demands, while others faced logistical challenges. Some processors cut back on manufacturing shifts because they couldn't find enough qualified workers to staff them, or because of increased absenteeism. Others couldn't get drivers to haul their products. Exporters struggled to get containers to load for overseas buyers. All of this created tremendous complications for cooperatives, processors, and exporters. Balancing milk supply with demand has rarely been more challenging than it was in 2021.

This bumpy road to recovery was reflected in milk prices, as can be seen in Figure 2C:

Figure 2C

Federal Order One – Statistical Uniform Price @ 3.5% Bufferfat – 2019-2022



Source: Federal Milk Marketing Order One

IMPACT ON FARM PROFITABILITY

Looking back over a five-year period, average net farm earnings ranged from $292 per cow in 2017, -$40 in 2018, $447 in 2019, $663 in 2020, and $374 in 2021 (not counting nonfarm income). This brings the five-year average earnings to $347 per cow.

In the 42-year history of the *DFS*, 2021 ranks 9th in terms of profitability in nominal terms, but only 16th when adjusted for inflation. While the cumulative return for *DFS* farms over the life of the study remains positive, the average farm has lost money in 15 out of the 41 years of the *DFS*. Farms that experience multiple years of net losses have tended to drop out of the study, often exiting the industry, leaving more profitable farms remaining.

This summary uses three primary measures of profitability, each of which provides a useful perspective on dairy farm financial performance:

- **Net earnings per cow** measures actual dollars of profit earned and includes all farm business sources of income on a per unit basis.
- **Return on assets (ROA)** measures profit earned relative to the present market value of total farm assets. This indicates the earning power of each dollar invested in the farming operation, regardless of whether it comes from the farm operator or was borrowed from a lender.
- **Return on equity (ROE)** measures profit earned relative to the farmer's equity investment in the operation. This measure is the best indicator of how the dairy producer's investment is paying off compared to the potential return if the funds were invested another way.

A single year does not provide an accurate picture of the dairy industry's long-term operating performance, especially given the volatility in recent years. To further illustrate, in the last 12 years we have seen two of the top three years for profitability in *DFS* history (2014 and 2011) as well as the greatest loss in *DFS* history (2009). Given these extremes, multi-year averages yield a more accurate picture of the industry. If we look at both shorter- and longer-term averages, we see similar results (Figure 2A). Continued year-to-year volatility confirms both the challenges faced by and opportunities available to Northeast dairy producers.

Figure 2D

Comparison of Multiyear Averages

	Three-Year Average	Five-Year Average	Ten-Year Average
Net Earnings per Cow	$495	$347	$365
Return on Assets	5.1%	4.1%	4.0%
Return on Equity	5.7%	4.0%	4.0%

It is important to differentiate net earnings (profit) from cash flow. Farm businesses rely on cash flow to pay ongoing expenses, but cash flow is not an accurate measure of profitability. Net earnings are an accrual measure of profit, which represent a farm business's ability to provide an economic return for the operator's investment and management. Net earnings offer the best measure of a farm's profitability by adjusting cash farm income and expenses to reflect changes in inventories, accounts receivable, accounts payable and prepaid expenses. Conversely, some farms may show positive net income on an accrual basis, yet struggle with cash flow.

It is important to note that principal payments on debt, while a significant cash obligation, are not a deductible expense and must be paid out of earnings. Thus both accrual net earnings and positive cash flow are essential for a dairy farm to prosper.

The average farm milk price at $19.21 per cwt. was $0.73, or 4.0% greater than 2020's $18.48. It was $1.21 greater than the previous five-year average of $18.00 per cwt. (Figure 3A). In terms of actual (nominal dollars, not adjusted for inflation) milk prices, 2021 ranked 7th in the 42 years of the *DFS*. However, to better understand the true story of how milk prices have changed over time, we must account for the impact of inflation (Figure 3B). In terms of "real," inflation-adjusted rankings, 2021 drops to 36th. The first year of the *DFS*, 1979, ranks first, with an inflation-adjusted milk price of $38.38/cwt. in 2021 dollars.

Figure 3A

Farm Milk Prices Per Cwt.

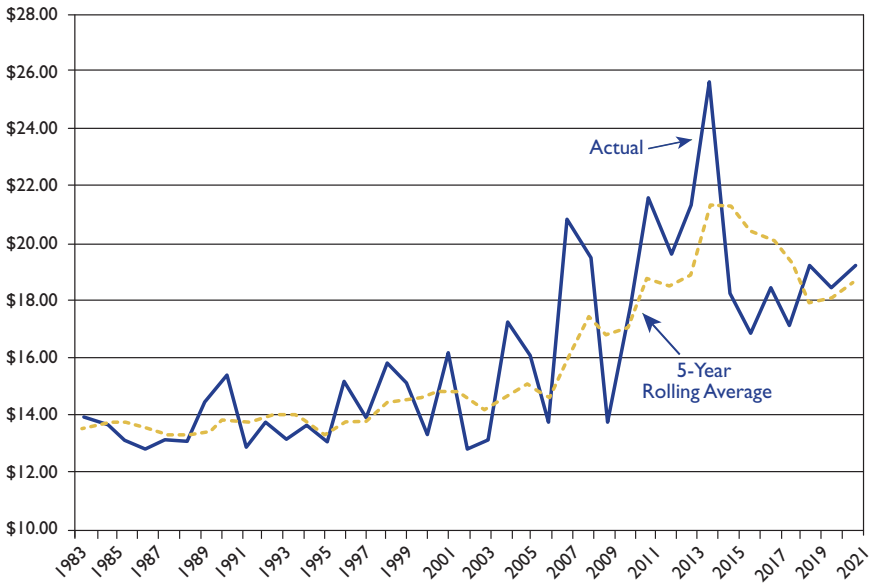
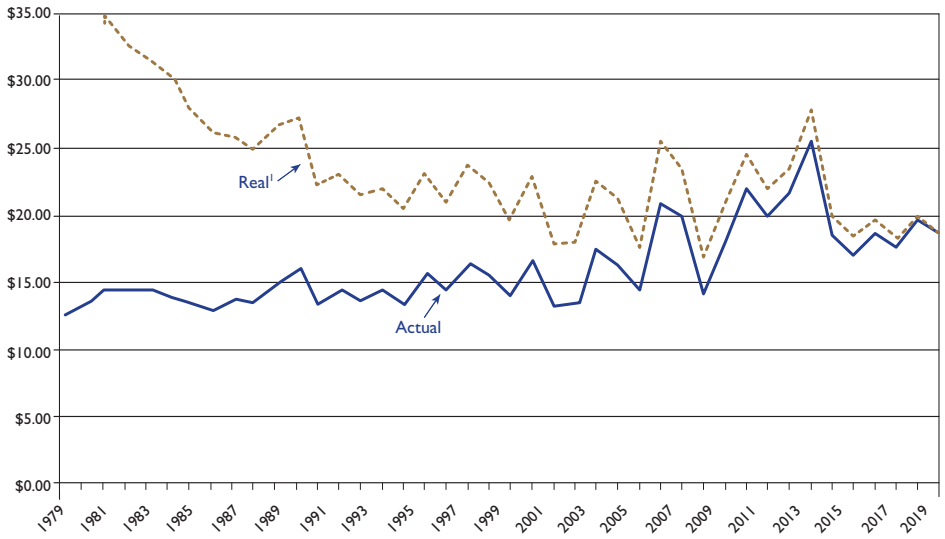


Figure 3B

Farm Milk Prices Per Cwt.



[1]Actual price adjusted for inflation - 2021 dollars.

COST OF PRODUCTION INCREASES

The net cost of producing milk in the Northeast has generally increased over the past five years.

Three key figures to review for 2021's cost of production analysis of the average dairy farm in the *DFS* include:

- Cash operating expenses were $19.79 per cwt., $0.50 greater than 2020.[9]
- Total costs, including depreciation and family living, were $21.50 per cwt., $0.71 per cwt. greater than 2020.
- Non-milk farm income for 2021 was greater than in 2020. After subtracting non-milk farm income, NCOP was $18.60 per cwt., $0.24 above the previous year.[10]

Figure 4A

Cost of Producing Milk – Accrual Basis

	2017	2018	2019	2020	2021
			Dollars per Cwt.		
Feed	$ 6.24	$ 6.45	$ 6.30	$ 6.64	$ 6.90
Labor	3.33	3.19	3.26	3.35	3.42
Interest	0.63	0.76	0.80	0.57	0.60
Freight & Trucking	1.05	1.14	1.14	1.22	1.29
Crop Inputs	1.20	1.14	1.06	1.22	1.33
Other Expenses	6.09	5.92	6.03	6.29	6.25
Adjusted Cash Operating Expenses	$18.54	$18.60	$18.59	$19.29	$19.79
+ Depreciation	1.30	1.28	1.20	1.16	1.31
+ Family Living	0.49	0.48	0.41	0.34	0.40
Total Costs	$20.33	$20.36	$20.20	$20.79	$21.50
- Non-Milk Income[1]	2.57	2.39	2.17	2.90	2.90
Net Cost of Production[2]	$17.76	$17.97	$18.03	$18.36	$18.60

[1] Non-milk income includes cattle, crop and other income adjusted for inventory changes. It does not include government payments.
[2] Before any return on equity. If we assume a return on equity to be an imputed cost, each 1% return on equity would be equivalent to another $0.36 added to the NCOP for 2021. For a 6% ROE, NCOP would be $20.76.

Despite increases in many expenses in recent years, Northeast dairy producers managed to limit cost-of-production increases. Categories where costs increased included feed, labor, fuel and crop inputs. Rent showed a marked decrease, which was likely due to a shift in the *DFS* sample to farms with less rented acreage rather than a significant decrease in average rent paid per acre (we saw an unusually high figure for rent paid in 2020).

[9] Not including family living expenses.
[10] Nonfarm income and government payments are not factored into NCOP.

Fuel was the category with the most notable increase, as energy prices rebounded to their pre-COVID levels. Fuel expense went from $125 per cow in 2020 to $174 per cow in 2021 (for reference, fuel expense averaged $163 per cow in 2019 and $174 in 2018).

Minimum wage increases in many Northeast states and an overall tightening of the labor market continue to put upward pressure on labor costs per hour, leading to a push for efficiency and lower staffing levels on many farms.

In New York state, 2020 saw the implementation of mandatory overtime pay for agricultural workers, with a 60-hour threshold for time-and-one-half pay. The Farm Laborers Wage Board, a three-person panel tasked with making recommendations regarding the overtime threshold, has recommended a gradual phase-down of that threshold to 40 hours over a 10-year period. Given that hired labor is typically the second-greatest expense on most dairy farms, managing labor efficiently will continue to be a significant contributor to the profit (or loss) of a farm.

Although milk prices increased in 2021, particularly later in the year, expenses increased as well, leaving farms forced to implement various strategies to control costs and gain efficiencies in order to remain profitable. One of these increasing costs is labor. While actual labor costs rose by only 2.3% per cwt in 2021, this increase was likely limited by the availability of workers, as many farms reported being shorthanded.

Farms responded to increased labor costs in different ways. Some smaller farms reduced either the hours worked by hired labor or the number of hired workers, and increased their usage of family labor. Some larger farms tried to become more efficient in their use of hired workers by increasing the number of cows per worker and by reducing hours to the 60-hour threshold or close to it. Some attempted to hire additional workers to manage the amount of overtime per worker, with varying degrees of success. The scarcity of both local resident and migrant workers, as well as housing limitations, made this tactic a challenge, and many farms had to operate in 2021 with fewer workers than desired.

The significant usage of family labor on Northeast farms somewhat masks the impact of increasing hired labor costs, most notably on smaller farms. Many farms using mostly family labor show zero, or a very small amount, for hired labor expense, relying on the family living draw for compensation. We make no adjustment for un- or under-paid family labor in the *DFS*, reporting only the actual funds spent without any imputed value for this work.

Repair expense, typically one of the top four expenses on a dairy farm, decreased by -5.7% per cow, to $367 per cow. Though below the 2020 figure, this is still greater than the five-year average of $325. This could indicate that dairy producers used their 2020 revenues to catch up on deferred maintenance that had been put off in prior years, and that in 2021, repair expenses fell closer to the average level of expenditure.

Figure 4B

Specific Cost Categories

	2020		2021		Percent Change	
	per Cow	per Cwt.	per Cow	per Cwt.	per Cow	per Cwt.
Feed	$1,718	$6.64	$1,782	$6.90	3.7%	4.0%
Labor	$ 866	$3.35	$ 884	$3.42	2.1%	2.3%
Fuel	$ 125	$0.48	$ 174	$0.67	39.2%	39.5%
Supplies	$ 240	$0.93	$ 243	$0.94	1.3%	1.5%
Rent	$ 139	$0.54	$ 102	$0.39	-26.6%	-26.4%
Repairs	$ 389	$1.50	$ 367	$1.42	-5.7%	-5.4%
Crop Inputs	$ 313	$1.21	$ 343	$1.33	9.6%	9.8%
Other Expenses	$1,500	$5.80	$1,552	$6.01	3.5%	3.7%

The formula used in the *DFS* for calculating NCOP is as follows:
[Cash Operating Expenses (with accrual adjustments made for pre-pays, accounts payable, etc.) + Calculated Depreciation[11] + Family Living Expense] - Non-Milk Farm Income[12] = Net Cost of Production.

It is important to note that the $18.56/cwt. average NCOP includes no return on the producer's equity investment. While it may be debatable what an appropriate return on equity (ROE) might be, earning some level of return should be a business objective, and is indeed necessary for the repayment of debt and for reinvestment in the business. For the average *DFS* producer in 2021, each 1% return on equity would be equivalent to an additional $0.36 per cwt. If we were to include a 6% ROE goal as part of NCOP, for example, this would be equivalent to a $20.72 NCOP, well above average milk prices.

Figure 4C compares NCOP between New York and New England in 2020 and 2021. New York producers typically have an advantage in lower costs and higher production per cow over New England producers. Additionally, New York farms generally have higher crop sales and are able to grow a greater percentage of their feed. A transportation expense differential of about 10-15% in New England compared to New York contributes to higher feed costs in that region.

Connecticut, Maine and Massachusetts have state support programs for dairy farmers, which help supplement farm income. Income from these support programs is included under "Government Payments" in the tables in the back of the report, but is not factored into their NCOP.[13] Areas of significant difference between the two regions included spending on purchased feed, labor and other expenses.[14]

[11] For the *DFS*, all farms have their submitted depreciation restated by applying a standard percentage of straight-line depreciation to various asset classes in order to compare consistent numbers from farm to farm and avoid variations driven by accounting and changes in tax laws.
[12] Non-milk income includes cattle, crop and other income adjusted for inventory changes, but does not include nonfarm income or government payments.
[13] Government payments are included on the income statement, and are part of net earnings calculations.
[14] It is worth noting that our sample of New England farms was only 13 in 2021, reducing the statistical significance of this data.

Figure 4C

NCOP By Region

Cost per CWT.	New York		New England	
	2020	2021	2020	2021
Feed	$ 6.55	$ 6.65	$ 7.87	$ 8.01
Labor	3.31	3.40	3.95	3.53
Interest	0.57	0.59	0.52	0.64
Freight & Trucking	1.22	1.32	1.18	1.18
Crop Inputs	1.22	1.33	1.06	1.30
Other Expenses	6.25	6.09	7.02	6.90
Adjusted Cash Operating Expenses	$19.12	$19.38	$21.60	$21.57
+ Depreciation	1.16	1.37	1.11	1.03
+ Family Living	0.36	0.39	0.40	0.42
Total Costs	$20.62	$21.14	$23.11	$23.01
- Non-milk Income	2.70	2.95	2.15	2.81
Net Cost of Production	$ 17.92	$ 18.19	$20.96	$20.21
Total NCOP Increase/cwt.		$0.27 +1.5%		-$0.75 -3.6%

Figure 4D shows NCOP by herd size. Generally, larger herds have an advantage in spreading fixed costs over more units, driving per-unit cost down through higher production per cow and greater capital efficiency. Smaller herds typically have lower labor costs and higher non-milk income per unit; however, family living and other costs are usually higher on a per-unit basis. Some of the herds with fewer than 100 cows were among the most profitable per unit in the study due to their high non-milk income and low labor costs, even when family living expenses are accounted for. This may significantly understate the true value of their family labor, but on paper, several of them showed strong net returns.

Figure 4D

NCOP By Herd Size

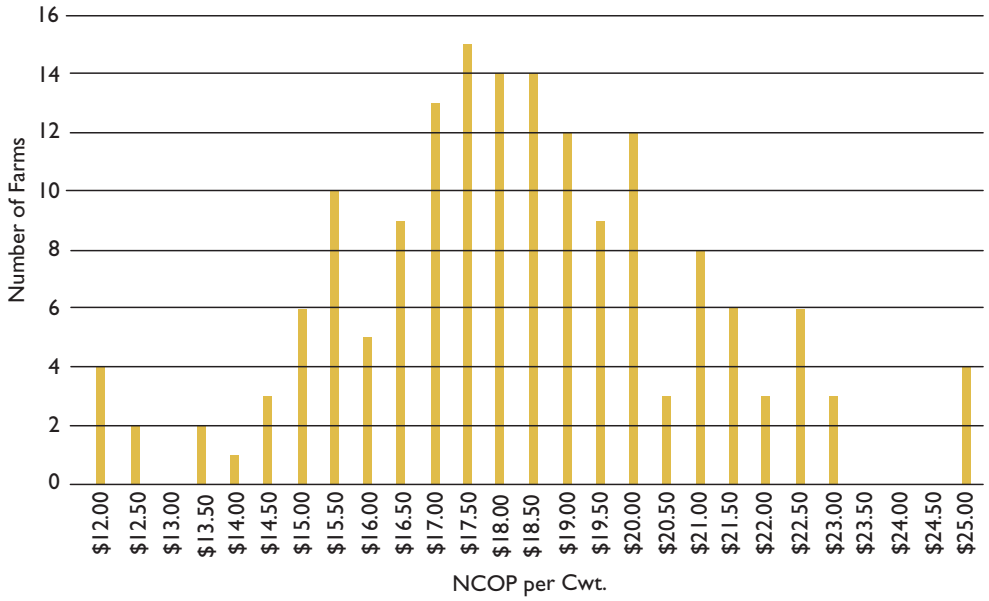
Cost per Cwt.	< 100 Cows	100-299 Cows	300-699 Cows	700+ Cows
Feed	$ 5.87	$ 6.85	$ 7.36	$ 6.82
Labor	1.20	2.62	3.44	3.57
Interest	0.90	0.56	0.57	0.60
Freight & Trucking	1.32	1.29	1.25	1.30
Crop Inputs	2.11	1.60	1.31	1.28
Other Expenses	7.69	6.82	6.98	5.97
Adjusted Cash Operating Expenses	$19.09	$19.73	$20.91	$19.55
+ Depreciation	2.78	2.07	1.39	1.16
+ Family Living	2.45	1.26	0.50	0.23
Total Costs	$24.32	$23.06	$22.80	$20.94
- Non-Milk Income*	5.65	3.45	3.16	2.73
Net Cost of Production	$18.66	$19.61	$19.65	$18.20

*Non-milk income includes cattle, crop and other income adjusted for inventory changes. It does not include government payments.

Given the uncertainty of milk prices from year to year, the ability to control expenditures, improve efficiency and adjust to changing input costs is critical to a dairy producer's financial performance.

Figure 4E

Net Cost of Production Distribution, 2021



We often speak of NCOP as if it is a single number. But as we can see in Figure 4E, each farm has its own unique cost of production. The distribution of NCOP roughly follows a bell-shaped curve, with a cluster around the *DFS* average per cwt. and outliers on either side. Some of the farms with unusually high or low NCOP values have significant non-milk business expenses or revenues that influence their NCOP. Farms with very high NCOP and without atypical sources of income will generally lose equity quickly if they can't change their operations to bring costs down.

HERD SIZE CHANGES

The farms that participate in the *Dairy Farm Summary* change somewhat from year to year.[15] From 2010 to 2016, the average number of cows per farm ranged between 300 and 400 milking head in the *DFS*, as average farm size has increased in the region. In more recent years, the average farm size in our sample has significantly increased. The *DFS* average increased from 600 head in 2019 to 685 in 2020. This was the highest average farm size in the history of the *DFS* report, and was a result of continued expansion on the part of some long-time *DFS* participants, as well as changes in the farm sample. This year's (2021) sample of farms had fewer large farms, and thus a smaller average herd size, coming in at 568 cows. The median farm size (the middle in terms of number of participants' cows) of the 2021 sample is 329 cows. (2020's median farm size was 333 cows.)

As shown in Figure 5A, the largest size group is responsible for the greatest percentage of milk production in the *DFS*. While farms with 700 or more cows were only 30% of the farms in the report, they were responsible for a majority of the milk produced.

Figure 5A

Farm Size and Milk Production

	99 Cows or Fewer	100-299 Cows	300-699 Cows	700 Cows or More
Number of Farms	35	43	36	50
Volume of Milk Produced[1]	2.0%	7.6%	17.7%	72.7%

[1] As a percent of all farms in the 2021 *DFS*

Figure 5B illustrates the relationship between labor productivity, cow productivity and overall dairy farm profitability. As more cows are handled per worker, milk sold per worker increases. Milk sold per worker and per cow are also closely correlated. More milk per cow is generally favorable in terms of greater productivity and total production, and contributes to higher gross revenue, a key factor in profitability.

While milk sold per cow correlates positively with adjusted net earnings per cow, low NCOP is a more important factor, which is improved by better labor efficiency. While there are variations in the data, Figure 5B shows generally increasing labor and family living expenses as milk sold per worker increases. Farms with higher labor efficiency tend to have a lower cost per cwt. for labor and family living.[16] For example, those farms selling less than 600,000 pounds of milk per worker have the lowest average combined labor and family living expense per person at $19,711, but on a per cwt. basis, their cost is $4.38 per cwt. In contrast, those in the top productivity category have a lower labor and family living cost per cwt. at $2.60, despite paying 2.5 times more per person. Thus the efficiency gained allows for greater flexibility with respect to employee compensation and family living draws.

Note that while adjusted net earnings per cow generally trends higher with increased labor productivity, it does not follow a continuous gradient from one group to the next, indicating that labor productivity is only one factor in determining overall profitability. Increased labor efficiency can also be achieved by varying business models, such as boarding out heifers, outsourcing more services or buying more forages. As a result, their revenues per worker may be greater than those farms that choose to do most things in-house. This of course may come with a cost, and could be part of the reason net earnings per cow varies substantially from one group to the next.

[15] This year's study includes 17 farms from Vermont, significantly increasing New England representation. Vermont farms were not included in last year's study.
[16] Family living costs are included as a proxy for the cost of unpaid family labor.

It is interesting to note that the second-to-lowest productivity group (600,000-799,000 pounds per worker) was also the most profitable. Notably, this group had relatively small herd sizes, few employees and was heavily reliant on family labor. Even when family living costs were factored in, their cost-per-person was quite low at $23,330, which contributed to their high profitability.

Figure 5B

Labor Productivity Influences Profits

Pounds of Milk Sold per Worker	Percent of Farms	Number of Cows	Cows per Worker	Milk Sold per Cow	Avg. Labor & Family Living per Person[1]	Adjusted Net Earnings per Cow
599,000 or less	10%	97	27	16,979	$ 19,711	$ 290
600,000-799,000	15%	102	34	21,576	$ 23,330	$ 867
800,000-999,000	10%	285	39	23,559	$ 50,020	$ 536
1 to 1.19 million	11%	432	45	24,781	$ 40,889	$ 491
1.2 to 1.39 million	21%	827	52	25,459	$ 50,102	$ 441
1.4 to 1.59 million	15%	942	58	26,291	$ 56,040	$ 354
1.6 to 1.79 million	10%	956	62	27,151	$ 59,386	$ 509
1.8 to 1.99 million	6%	774	75	26,539	$ 51,265	$ 665

[1] Includes operator and other family labor

CAPITAL EFFICIENCY

When viewed on a per cow or per cwt. basis, larger farms are generally able to spread costs and investments over more units. For example, the 99 cows or fewer group produced less than half the milk per worker than the average of all farms and had approximately double the investment per cwt. sold ($107 versus $54). Return on assets was positive for all groups, though the 700 or more cows group had the highest return on assets.

Figure 6

Capital Efficiency

Herd Size (No. of Cows)	Pounds Sold per Worker	Pounds Sold per Cow	Total Assets per Cwt. Sold[1]	Asset Turnover (per Year)[2]	Return on Assets[3]
99 or Fewer	567,245	21,044	$ 107	0.24	0.2%
100 to 299	1,036,675	23,884	77	0.32	3.0%
300 to 699	1,330,890	25,023	57	0.41	1.9%
700 or More	1,445,890	26,385	50	0.45	7.9%
All Farms	1,343,002	25,823	54	0.42	3.8%

[1] Total assets divided by cwt. of milk sold
[2] Total assets divided by cash receipts = turnover per year
[3] Return on assets = (net earnings + interest) / average farm assets

CASH FLOW FROM MILK INCOME INCREASES

Cash flow is another measure of financial health for a dairy operation or any business. Each business has a minimum cash requirement to meet its ongoing commitments, such as operating costs, overhead, debt service payments and family living. The remainder can be used for capital investment, such as to replace older equipment, build liquidity or invested elsewhere. Cash margin from milk income increased from the prior year in 2021, averaging $0.66/cwt. compared to $0.35 in 2020, $1.43 in 2019, -$0.49 in 2018, and -$0.01 in 2017 (Figure 7).[17] Prior to 2019, the average *DFS* farm had four straight years of negative cash flows. This means that although the average farm in our sample has had positive cash flow for the last three years, they may still carry increased debt loads from prior years of negative cash flows.

Figure 7

Cash Flow Analysis Per Cwt.

	2017	2018	2019	2020	2021
Actual Milk Price	$18.32	$17.19	$19.18	$18.48	$19.21
Cash Required	$21.64	$20.66	$20.62	$21.18	$21.80
- Other Income	3.31	2.98	2.87	3.05	3.25
Breakeven Milk Price	$18.33	$17.68	$17.75	$18.13	$18.55
Cash Margin	$-0.01	$-0.49	$ 1.43	$ 0.35	$ 0.66

Cash Margin Definitions

Total cash operating expenses + Family living expense and income tax + Scheduled principal payments	Cattle sales + Capital sales + Crop sales + Other farm income
= Cash required	= Other income

Figure 7 shows the range of cash margins from milk income for the average Northeast dairy farm since 2017. Due to cost inflation and increasing debt levels, the breakeven milk price has increased significantly from approximately $14 per cwt., which was common prior to 2007, to a peak of over $20 in 2014. Milk prices also increased for a time, setting new records in 2011 and 2014. Since that period, however, the average milk price has declined, while the breakeven milk price fell by a lesser amount, resulting in a cash deficit in several years. Note that this calculation looks at milk income only and does not account for government payments, which were more significant in 2020 than before or after that year.

Given the variation in average cash margins, making a financial decision based on a single year's performance would be difficult. Figure 7 further illustrates this point: While the average cash margin was positive in 2019, 2020 and 2021, it has been negative in some prior years.

This level of variability makes financial management more challenging, underscoring the importance of a long-range view of cash flow. Timing of major capital expenditures, managing debt load, building liquidity for the tight years, and adjusting family withdrawals are all means of managing volatility. Some producers have adopted risk management strategies involving both input costs and milk prices using a combination of crop insurance programs, such as Livestock Gross Margin (LGM-Dairy) and the Dairy Revenue Protection (DRP) coverage, other government programs such as the Dairy Margin Coverage (DMC), as well as hedging strategies.

[17] The cash flow analysis shown in Figure 7 does not include government payments.

DEBT CAPACITY

Debt capacity measures the maximum amount of capital debt a farmer could repay from cash generated from the farm business. Debt Capacity is primarily determined by net cash earnings and affected by interest rate and debt term. Reserve debt capacity is the difference between current debt capacity and the actual amount of capital debt (defined as intermediate- and long-term loans) owed by the business. It is a buffer against financial adversity which could occur within the business, such as herd health problems or crop failure, or from the marketplace, such as low milk prices or high feed costs. It represents the amount by which capital debt could theoretically increase above existing levels and still be repaid from that year's cash flow. In 2018, weak farm earnings provided inadequate cash flow to service existing financial obligations for many *DFS* farms, but other years showed excess reserve debt capacity (Figure 8).

Figure 8

Debt Capacity

	2017	2018	2019	2020	2021
Average Farm Credit Interest Rate[1]					
Commercial (Intermediate Term)	4.6%	5.3%	5.7%	3.2%	3.7%
Real Estate (Long Term)	4.7%	5.5%	5.8%	3.8%	3.8%
Debt Capacity (per Cow)	$4,817	$2,672	$5,881	$7,561	$6,326
- Capital Debt	3,108	3,521	3,405	3,361	3,752
RESERVE DEBT CAPACITY	$1,709	-$849	$2,476	$4,200	$2,574
3-Year Average Reserve Debt Capacity	$266	$96	$1,112	$1,942	$3,083
5-Year Average Reserve Debt Capacity	$2,416	$1,645	$485	$1,393	$2,022
Debt Payments as Percent of Milk Sales	13%	15%	11%	14%	15%

[1] Average interest rates for outstanding debt with Farm Credit, excluding benefit of patronage dividends.

Current debt capacity is impacted by interest rates, which despite recent increases, remain at low levels by historical standards. When the Federal Reserve increases short-term rates it impacts debt service requirements and capacity for those producers who have variable rate debt. And while in 2020 the Federal Reserve reduced short-term rates in response to the COVID-19 pandemic, they have already moved to increase rates in 2022. In planning for the future, it is important not to assume that today's interest rates will last indefinitely. If the average producer had to repay today's debt at 2007 interest rates (approximately 7.7%), it would reduce both debt capacity and reserve debt capacity by about $1,235 per cow.

Figure 8 shows the annual fluctuations and the average for reserve debt capacity over the last five years. In 2021, it was $2,574 per cow. Given that bank loans are generally for a period of several years, during which earnings will fluctuate, it is important to consider reserve debt capacity as a multi-year average, rather than from a single year. "Never borrow your last dollar during a good year" is time-tested financial wisdom in the farming community. The implication is that it is important to preserve significant liquidity in unused borrowing capacity to fall back on during years of low income or other adversity. The lack of reserve debt capacity for some farms puts them in a challenged position where their ability to borrow additional funds is limited.

In today's dairy business climate, liquidity is a critical factor to achieve long-term business viability and financial flexibility to deal with tough years. Whether it is cash in a savings account, prepaid expenses, inventories that can be quickly turned into cash or substantial unused capacity on a line of credit, strong liquidity is critical to dairy business success.

PRODUCERS REINVEST WITH CAPITAL PURCHASES

Capital purchases include replacement machinery and equipment, as well as buildings and land acquisition. Northeast dairy farmers' capital spending has historically remained remarkably steady given the significant volatility of earnings in the industry (Figure 9). This changed in 2020, probably due to the significant influx of COVID-19 relief funds. In 2021, capital purchases fell off significantly. Total capital purchases per farm were $431,778, just slightly above the previous five-year average of $420,792. While average capital purchases were $759 per cow, it should be noted that this reflects substantial expansion investments by some farms, and significantly lower spending by others. The median level, or midpoint, of capital purchases was lower, at $591 per cow, and the standard deviation was large, at $625.

Figure 9

Capital Purchases

	Per Farm	Per Cow	% of Total Assets[1]
2017	$362,840	$ 772	6.3%
2018	$383,386	$ 802	6.6%
2019	$379,200	$ 632	5.1%
2020	$706,236	$ 1,031	8.1%
2021	$431,778	$ 759	5.4%
3-Year Average	$505,738	$ 807	6.2%
5-Year Average	$452,688	$ 799	6.3%

[1] Capital purchases as a percent of total assets show an approximate rate of reinvestment in the farm enterprise.

Figure 10 shows a cash flow statement on a per-cow basis for the average Northeast dairy producer in the study. It includes sources and uses of cash for the business, including what was available to cover capital purchases.

Figure 10

Cash Sources and Use Statement

	2017	2018	2019	2020	2021
Sources			Dollars per Cow		
Net Cash Farm Income[1]	$ 671	$ 342	$ 811	$ 987	$ 812
Sale of Capital Assets	108	201	78	161	90
Paid-in Capital[2]	51	58	31	128	92
Money Borrowed	355	595	49	161	226
TOTAL SOURCES	$1,185	$1,196	$969	$1,437	$1,220
Uses					
Family Living	$ 125	$ 123	$ 105	$ 89	$ 103
Capital Purchases	772	802	632	1,031	759
Debt Principal Payments	288	271	232	317	358
TOTAL USES	$1,185	$1,196	$969	$1,437	$1,220
Percent Capital Purchases Financed[3]	46%	74%	8%	16%	30%

[1] Cash basis – No accrual adjustment to expenses
[2] Includes savings withdrawn, gifts, inheritances, grants, debt forgiven, insurance settlements and other extraordinary income. In 2020, this included forgivable loans such as those from the Paycheck Protection Program.
[3] Money borrowed / capital purchases

Total sources of cash decreased by $217 in 2021 to $1,220 per cow because of decreases in net cash farm income, sale of assets, and paid-in capital on a per cow basis. Net cash farm income decreased in 2021 to $812 per cow. A significant factor contributing to the decrease in net cash farm income was due to government payments received in 2020, such as those from the Coronavirus Food Assistance Program (CFAP).

NET WORTH INCREASES

Net worth, or owner's equity, measures how the farm business is capitalized. It is measured at the end of each year in the *DFS* in order to consider changes from year to year. Net worth is an indicator of the ability of the business to absorb financial losses and to collateralize additional borrowing. It is also a theoretical measure of the amount of money that could be redeployed toward other endeavors if the business was liquidated.

The average *DFS* farmer's net worth increased by $661 per cow in 2021 compared to the 2020 average, rising from $8,698 to $9,359 per cow. However, percent net worth declined to 67% (Figure 11), indicating greater leverage. Assets per cow increased as did liabilities per cow, resulting in a decrease in percent net worth. Solvency still remains solid for the average *DFS* farm, meaning the average participant has more than enough farm assets to satisfy all farm debts, selling costs and the resulting income tax liability.

Figure 11

Change In Financial Position

	Change in NW per Cow	Percent Net Worth[1]	Current Ratio[2]	Quick Ratio[3]	Asset Turnover[4]
2017	$ -561	69%	2.5	0.9	0.44
2018	$ -193	66%	2.5	0.9	0.41
2019	$ 133	67%	2.8	1.1	0.47
2020	$ 375	69%	3.4	1.5	0.48
2021	$ 661	67%	2.5	1.1	0.42

[1] Percent net worth = Owner's net worth / total assets
[2] Current ratio = Current assets / current liabilities
[3] Quick ratio = Current assets - inventory / current liabilities
[4] Asset turnover = Value of farm production / average total assets

There is an important distinction between growth in net worth resulting from earnings versus market revaluation. Net earnings are the result of profits from dairy farming. Market revaluation generally occurs in farm real estate and, sometimes, cattle, while machinery and equipment ordinarily depreciate.

Liquidity is the ability of the farm operator to convert short-term assets (current assets) to cash to meet short-term obligations (current liabilities) as they become due. Current and quick ratios are two important measures of liquidity. In 2021, the average dairy farm had a current ratio of 2.5, a decrease from the prior year (Figure 11). This means the average farm had 2.5 times the value of current assets compared to its current liabilities.

However, since inventory on a dairy farm is primarily feed for on-farm use and not intended to be directly converted into cash to pay bills, subtracting inventory from current assets provides a closer look at a dairy farm's true short-term liquidity situation. The quick ratio takes the result (current assets minus inventory) and divides by current liabilities. The quick ratio of 1.1 at the end of the year demonstrates that the average farm had sufficient near-cash assets, excluding inventory (such as cash and accounts receivable) to meet the current year's financial obligations. This indicates that producers had, on average, 110% of the value of short-term liabilities available in cash or assets that could be quickly converted to cash.

Finally, asset turnover is commonly used to measure the efficiency of total capital invested in the business by determining gross revenue dollars generated for every dollar invested. The higher the asset turnover ratio, the more efficiently the investment is working for the business. Thus greater asset turnover should translate into a higher return on assets (ROA). In 2021, the asset turnover ratio for the average Northeast dairy business was 0.42, slightly lower than 2020. This was a result of a decrease in cash receipts relative to the assets of the farms in the sample with $0.42 of gross revenue generated for every $1 invested in assets.

NET MARGIN DIFFERENCES REMAIN LARGE IN 2021

Northeast producers again showed a wide range of profits around the $374 per cow average net earnings in 2021. Some farms lost money, while a few posted more than $1,000 profit per cow. Figure 12 demonstrates the range of profitability between the top, bottom and all farms profit groups. Farms in the *DFS* are ranked by profit margin and divided into four quartiles.

Figure 12

Range of 2021 Profits

	Bottom 25%	All Farms	Top 25%
Number of Farms	41	164	41
Average Number of Cows	725	568	435
Milk Sold per Cow (lbs.)	24,710	25,823	27,329
Milk Sold per Worker (lbs.)	1,307,958	1,343,002	1,453,165
Net Earnings			
Per Farm	-$92,075	$212,432	$465,885
Per Cow	-$127	$374	$1,071
Per Cwt.	-$0.51	$1.45	$3.92
Return on Assets[1]	0.4%	3.8%	17.3%
Return on Equity[1]	-1.7%	4.0%	8.8%

[1] ROA and ROE calculations do not include asset appreciation.

There was a $1,198 difference in average net earnings per cow between the top and bottom quartile groups. This was close to 2020's difference, which stood at $1,325. Similarly, on a per cwt. basis, the top farms showed $4.43 more in net earnings than the least profitable farms. The top group had earnings of $3.92 per cwt., while the bottom group had a net loss of -$0.51 per cwt.

Also shown in Figure 12 are two productivity measures: Milk Sold per Worker and Milk Sold per Cow. The Top 25% group sold 10.6% more milk per cow and 11.1% more milk per worker than the Bottom 25%, which contributed to their differences in profitability.

Interestingly, some of the most profitable farms, at least on a per cow basis, were found at both the high end and at the low end of herd sizes. The large herd dairy farms were able to capitalize on economies of scale, while some of the small herd farms were able to keep a tight rein on expenses, had significant non-milk business income, and/or utilized a significant amount of family labor. There were farms from all four size categories represented in the top profit quartile.

Another area where the top profit group excels is in NCOP. Figure 13 shows the difference in the cost of producing milk between the most and least profitable groups. The difference between the two came to $3.29 per cwt. in 2021, significantly greater than the average difference of the preceding five years which was $2.57.

Figure 13

Cost of Producing Milk by Profit Groups

	2017	2018	2019	2020	2021
NCOP[1]	Dollars per Cwt.				
Bottom 25%	$18.92	$18.67	$18.77	$20.12	$19.75
Top 25%	16.23	16.57	16.81	16.46	16.46
Difference	2.69	2.10	1.96	3.66	3.29

[1]Before any return on equity

Certainly, high milk production per cow influences profitability. However, Figure 14A illustrates that by itself, high production per cow does not guarantee superior earnings. A significant number of high production farms are in the lower profit groups. However, fewer of the low production farms fall in the top profit group.

The importance of balancing production with total costs to achieve profitability is much more obvious (Figure 14B). As NCOP decreases, the probability of higher profits increases on nearly a straight line. Herd management, cost control, purchasing savvy and labor management are the main factors determining the cost of production.

Figure 14A

Profit vs. Milk Sold Per Cow

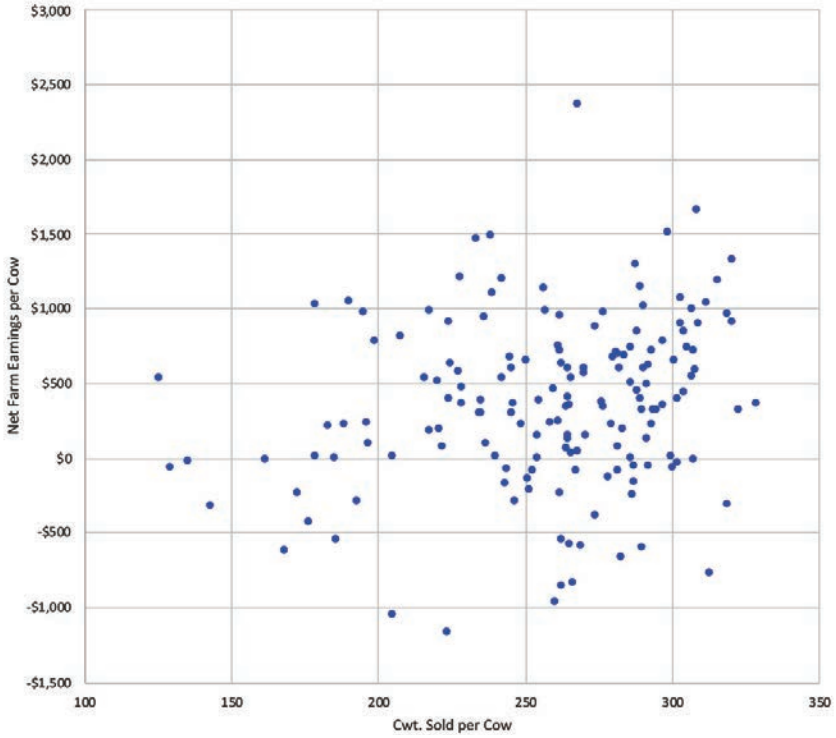
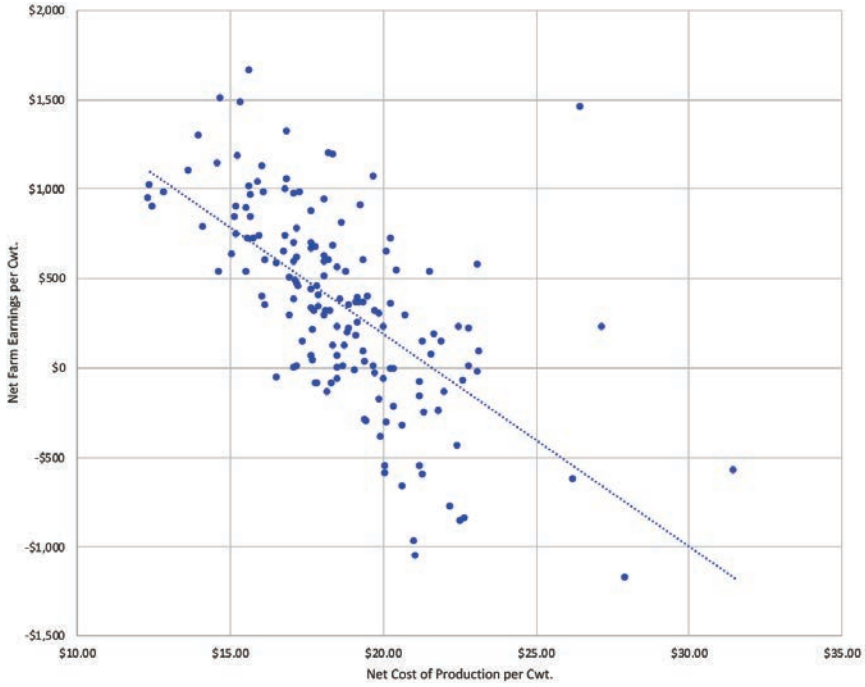


Figure 14B

Profit vs. NCOP



MANAGEMENT STYLE AND DAIRY PROFITS

Above average management is critical to profits, but "above average" can encompass a range of styles. Successful managers demonstrate different individual management strengths on which to build a profitable dairy business. In short, these managers have developed a management strategy that fits their personalities and resources.

Figure 15

Winning Management Styles of The Top 25%

	Great with Cows	Labor Efficient	Better Milk Price	Tight With a Buck
Number of Farms	8	9	9	15
Average Number of Cows	397	965	138	137
Milk Sold per Cow (lbs.)	31,553	29,513	24,048	23,869
Milk Sold per Worker (lbs.)	1,320,349	1,943,609	1,115,549	938,639
NCOP per Cwt.	$16.29	$16.19	$19.10	$14.13
Milk Price per Cwt.	$19.67	$20.08	$22.03	$18.20
Net Earnings per Cow	$1,151	$989	$1,050	$1,342
Net Earnings per Cwt.	$3.65	$3.35	$4.37	$5.62
Return on Assets (%)	6.8%	7.8%	6.3%	6.6%
Percent Net Worth (%)	72%	75%	76%	72%

The 41 farms included in the 2020 top profit quartile were broken down into four categories based on the primary driver of their profitability. Figure 15 breaks down these successful farm styles according to the corresponding management factor. For example, farms included in the **Great with Cows** group outperformed all others in producing the most milk per cow.

Great with Cows These farmers likely spend more time and money on cow productivity. The average pounds of milk sold per cow was 31,553, the highest among the five styles. High production allowed them to produce and sell 1,320,349 pounds of milk per worker, ranking second among the top profit farms.

Labor Efficient Effective labor management, highly productive cows and a large herd size enabled this group to be the most labor efficient, with milk sold per worker of nearly two million pounds. In addition to labor efficiency, this group reported the second highest milk sold per cow. This management style typically gains labor efficiencies from economies of scale and high output per cow.

Better Milk Price This group received $22.03 per cwt. for their milk, $2.26 more than average for the top profit group. Higher milk prices could be the result of high milk fat or protein content, negotiated premiums for quality, specialty markets, or direct-to-consumer sales. This category likely contains some non-Holstein herds within the top profit group. It is also worth noting that dairy revenue insurance indemnity payments are included in milk income, and could result in an apparent increase in milk price for some farms.

Tight With A Buck These operators excel at cost control, achieving the lowest cost of production at $14.13 per cwt. Although milk per cow and milk per worker are below the top profit group average, these farmers have implemented tight cost control to achieve superior results. With the smallest average herd size, this group likely utilizes a lot of family labor. Some of these farms also have significant non-milk business income, which influences NCOP. The rewards of managing costs are apparent in the highest earnings per cwt.

The common theme is that top-profit farms have reached a profitable balance between milk production per cow and costs through a variety of management styles.

FARM SIZE AND PROFITABILITY

Average farm sizes in the Northeast and across the country have continually increased for many decades. The *DFS* has illustrated that all size farms can be profitable, and that it's more important to be 'better' than it is to be 'bigger.' However, there are still strong correlations in the data regarding size of farm, efficiency, pounds of milk sold per cow, cost of production and, ultimately, profitability.

On average, the largest size group was by far the most profitable of the four size categories with $447 net earnings per cow in 2021 (Figure 16). In addition, compared to the rest of the sample, members of this group were:

- The most productive on a milk-sold-per-cow and per-worker measure.
- The lowest per-cow investor in productive assets. As a result, this group had the highest asset turnover ratio.
- The lowest cost producers per cwt., based on net cost of production.

It is noteworthy that all four size categories were represented in the top profit quartile, while only about one-third of the 700+ cow size group had that distinction. This is important because it shows there is opportunity to achieve superior profitability over a range of farm sizes. It also shows, however, that, as a group, the largest farms also have the highest average earnings per cow.

Figure 16

Farm Size and Profitability

	99 Cows or Fewer	100-299 Cows	300-699 Cows	700 Cows or more
Average Number of Cows	66	178	473	1,325
Milk Sold per Cow (lbs.)	21,044	23,884	25,023	26,385
Milk Sold per Worker (lbs.)	567,245	1,036,675	1,330,023	1,445,890
Net Cost of Production per Cwt.	$ 18.86	$ 19.58	$ 19.68	$ 18.15
Milk Price per Cwt.	$ 18.59	$ 19.43	$ 19.06	$ 19.25
Assets per Cow	$22,525	$18,377	$14,352	$ 13,131
Asset Turnover	0.24	0.32	0.41	0.45
Percentage Net Worth	74%	79%	71%	63%
Net Earnings per Cow	$ 258	$ 413	$ 131	$ 447
Return on Assets %	0.2%	3.0%	1.9%	7.9%

CONCLUSION

As discussed in the *Analysis of 2021* section earlier in the report, the COVID-19 pandemic continued to impact milk markets last year. 2021 marked the beginning of a return to normalcy, and while the significant government support available in 2020 declined, milk prices rose, and average profitability was moderate, slightly beating the average of the prior five years.

While 2019, 2020 and 2021 were reasonably good years for many Northeast dairy producers, it was preceded by several challenging years from 2015-2018, and producers face uncertainty as the world emerges from the COVID-19 pandemic. Therefore, readers should consider the results of multiple years if drawing long-term conclusions. Despite the positive cash flow from the last couple of years, many producers had seen significant balance sheet erosion due to the negative cash flows of 2015, 2016 and 2018.

Despite these significant challenges, Northeast dairy farmers have responded with a remarkable ability to economize, cut costs and gain further efficiencies in their already well-run operations. This resilience is how they have managed to continue operations in spite of persistent low prices, earnings volatility and market disruptions.

We noted in 2016 that total liabilities exceeded $4,000 per cow for the first time in *DFS* history. This was worth mentioning because while it took 29 years for average debt-per-cow to climb from $2,000 to $3,000, it subsequently took only eight years to exceed $4,000 per cow. Of course there is some impact from inflation during this period, but it still raises concerns about the increasing leverage of the average farm, and their ability to maintain debt service and cash flow during periods of low margins. While debt-per-cow subsequently declined below the $4,000 threshold in 2017, to $3,814, this was largely a function of larger herd sizes allowing debt to be spread out over more cows, and in 2018 debt-per-cow increased again to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$4,257. In 2019 and 2020, we saw similar increases. Due to continued increases in herd size, average debt-per-cow declined to $4,061, and then to $3,981, but remained near the $4,000 threshold. In 2021, we saw total debt per cow climb to $4,672. Total farm debt is now approximately $2.7 million for the average *DFS* farm.

During these periods of unpredictable markets and low prices, managing risk is more important than ever, given the high levels of debt carried by many farms, and the uncertainty they face in commodity prices on both the input and output sides.

The greatest risk management tool remains smart management and cost control. By continuing to invest in property, livestock and equipment, despite cash-flow challenges, Northeast producers are well-positioned for success as milk prices rise in 2022.

One of the key takeaways from the *Northeast Dairy Farm Summary* is that there are multiple paths to dairy farm profitability. Strategies are as different as the individual characteristics of farms within this study. This summary presented various management strategies that have consistently resulted in above-average performance. Working closely with your Farm Credit loan officer and/or business consultant to assess your strengths and weaknesses and develop a strategy to position your farm to meet industry challenges and take advantage of business opportunities is now more critical than ever.

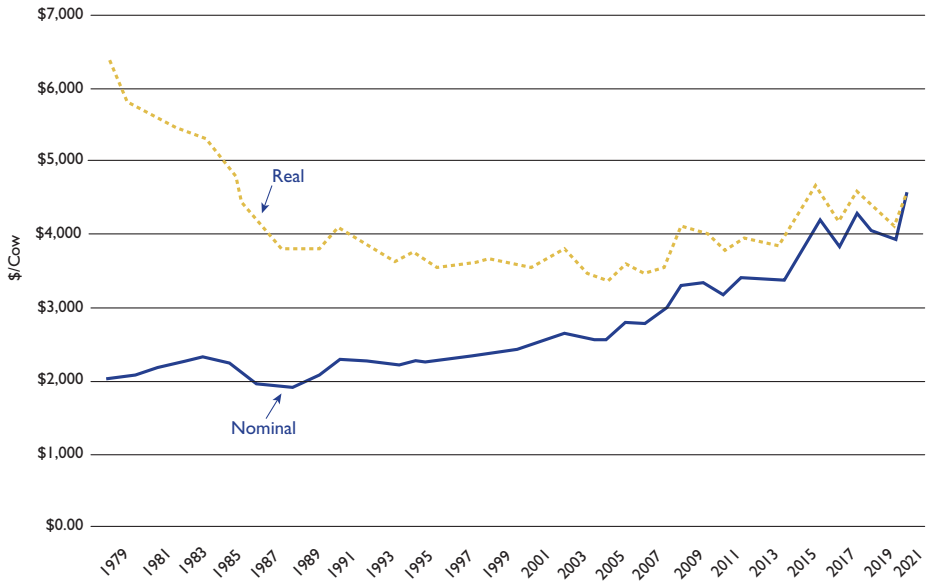
If you are interested in improving your profitability, the *DFS* is only the beginning. Farm Credit's *Success Strategies Dairy Benchmarks* delves much deeper into not only farm financial data, but a host of production and herd management metrics as well. An additional financial consulting program for dairy farmers is our Dairy Profit Analyzer/Dairy Profit Intelligence program. Clients who choose this service receive periodic reports and visits by their consultant throughout the year. At every meeting, Farm Credit consultants provide a rolling 12-month financial review compared with last year and compared with budget. In addition, these clients have access to the Dairy Profit Intelligence database, which provides real-time benchmarking on many financial and production factors. For more information on these programs, a joint project between Farm Credit East, AgChoice Farm Credit and the Pennsylvania Farm Bureau/MSC – Business Services, contact a representative of one of the partner organizations.

We hope this year's *Northeast Dairy Farm Summary* is a useful tool for managing your farm and business. It remains essential that dairy farmers and those who serve them continue to have good data upon which to make decisions in order to have a healthy, economically sustainable Northeast dairy industry. The entire Farm Credit team of loan officers, farm accounting professionals and business consultants are eager and prepared to help Northeast dairy farmers achieve financial success. On behalf of our entire team, thank you for your interest and participation.

[20] Total liabilities per cow, including current liabilities.

Figure 17

Total Liabilities Per Cow



Real = adjusted for inflation

FINANCIAL RECORDS

The following 17 tables present the detailed financial data on which this summary was based. These tables are organized into four sets:

- Tables A-1 through A-5 are COMPARISONS BETWEEN YEARS
- Tables B-1 through B-3 are DATA BY HERD SIZES
- Tables C-1 through C-6 are DATA BY PROFIT GROUPS
- Tables D-1 through D-3 are DATA BY REGIONS

Each set includes a condensed earnings worksheet, a balance sheet summary and a page of evaluation factors. The 2017-to-2021 data series includes farms in Connecticut, Maine, Massachusetts, New York, and Vermont.

Please note the following in order to properly use this data:

- Cattle purchased for replacements are considered operating expenses, but cattle purchased for expansion are capital purchases. The accrual adjustment change in the inventory of raised livestock is calculated by subtracting purchases for expansion from the total increase in cattle inventory value.
- Depreciation has been restated by applying a standard percentage of depreciation to various asset classes in order to compare consistent numbers from year to year and avoid variations driven by changes in tax laws.
- Incorporated farms were adjusted to sole proprietor status, and owner draw was recorded as Family Living Expense. If there was more than one owner, the largest draw was recorded as Family Living, and other owner salaries were recorded under Hired Labor.

- Appreciation and revaluation of capital assets do not appear in the earnings statements. They are, however, included on the balance sheets.
- Current liabilities on the balance sheet include both current debts as well as the current portion of intermediate-term and long-term liabilities.
- Government payments include state program payments and those from FSA programs. Crop insurance indemnities are recorded as Crop Revenue.

Your Farm Credit team of ag finance specialists encourages you to review the following financial data thoughtfully and thoroughly. It allows you to identify your strengths and weaknesses and to improve your operation for the future.

TABLE A-1.

COMPARISON BETWEEN YEARS / Earnings Worksheet

	2017	2018	2019	2020	2021
Number of Farms	320	305	267	204	164
Average Number of Cows	470	478	600	685	568
Receipts					
Milk Sales	$2,197,778	$2,076,327	$2,966,932	$3,277,366	$2,823,528
Cattle Sales	162,649	143,115	173,905	222,798	178,352
Crop Sales	70,293	61,039	61,240	86,660	131,208
Government Payments	33,211	45,007	59,904	387,006	114,168
Other	72,810	83,936	101,902	121,123	116,440
CASH RECEIPTS	$2,536,741	$2,409,424	$3,363,883	$4,094,953	$3,363,696
Accrual Adjustments					
+ Change in Inventory-Raised Livestock	$35,791	$30,251	$31,735	$43,538	$1,136
VALUE OF FARM PRODUCTION (a)	$2,572,532	$2,439,675	$3,395,618	$4,138,491	$3,364,832
COST OF GOODS SOLD					
Chemicals & Sprays	$23,252	$22,642	$30,463	$40,486	$29,536
Custom Hire	75,777	88,371	125,235	146,854	89,176
Purchased Feed	747,258	779,129	974,821	1,176,693	1,012,176
Fertilizer & Lime	59,211	57,980	65,732	86,408	100,536
Freight & Trucking (Marketing)	125,489	137,634	176,247	216,074	189,144
Gasoline, Fuel & Oil	71,125	83,120	97,545	85,308	98,832
Hired Labor	399,182	384,723	504,463	593,447	502,112
Seed & Plants	62,649	56,312	67,810	87,770	64,752
Supplies	122,696	107,725	142,134	164,164	138,024
Veterinary, Medicine & Breeding	101,340	90,583	117,363	133,869	110,760
Cow Replacements	3,978	1,161	3,028	11,897	6,248
Total Cost of Goods Sold	$1,791,957	$1,809,380	$2,304,841	$2,742,970	$2,341,296
Gross Margin	$780,575	$630,295	$1,090,777	$1,395,521	$1,023,536
OVERHEAD					
Insurance	29,830	28,990	36,247	40,344	44,304
Interest	75,299	91,889	124,507	101,153	87,472
Rent	48,891	50,921	78,175	95,207	57,936
Repairs	153,994	136,172	187,387	266,248	208,456
Property & Misc. Taxes	37,039	34,090	45,177	47,416	43,736
Utilities	43,598	46,135	52,370	59,696	62,480
Other	40,557	48,118	48,600	65,418	56,800
Accrual Adjustments					
+ Depreciation	155,430	154,112	186,303	204,913	191,416
Total Overhead Expenses	$584,638	$590,427	$758,766	$880,395	$752,600
Total Farm Production Costs (b)	$2,376,595	$2,399,807	$3,063,607	$3,623,365	$3,093,896
NET FARM EARNINGS (a) - (b)	$195,937	$39,868	$332,011	$515,126	$270,936
- Family Living & Income Taxes	58,930	58,815	62,963	60,795	58,504
NET EARNINGS	**$137,007**	**-$18,947**	**$269,048**	**$454,331**	**$212,432**
+ Net Nonfarm Income	10,660	15,660	13,357	13,063	22,720
NET HOUSEHOLD INCOME	$147,667	-$3,287	$282,405	$467,394	$235,152

Note: Expenses are adjusted for changes in accounts payable, prepaid expenses, and supply inventories to remove the effects of tax planning and reflect only 1 year's expenses.

TABLE A-2.

COMPARISON BETWEEN YEARS / Earnings Worksheet Per Cwt.

	2017	2018	2019	2020	2021
Number of Farms	320	305	267	204	164
Average Number of Cows	470	478	600	685	568
Receipts			DOLLARS PER CWT. OF MILK		
Milk Sales	$18.32	$17.19	$19.18	$18.48	$19.21
Cattle Sales	1.36	1.18	1.12	1.25	1.22
Crop Sales	0.59	0.51	0.40	0.49	0.89
Government Payments	0.28	0.37	0.39	2.18	0.78
Other	0.62	0.70	0.65	0.69	0.79
CASH RECEIPTS	$21.17	$19.95	$21.74	$23.09	$22.89
Accrual Adjustments					
+ Change in Inventory-Raised Livestock	$0.30	$0.25	$0.21	$0.25	$0.01
VALUE OF FARM PRODUCTION (a)	$21.47	$20.20	$21.95	$23.34	$22.90
COST OF GOODS SOLD					
Chemicals & Sprays	$0.19	$0.19	$0.20	$0.23	$0.20
Custom Hire	0.63	0.73	0.81	0.83	0.61
Purchased Feed	6.24	6.45	6.30	6.64	6.90
Fertilizer & Lime	0.49	0.48	0.42	0.49	0.69
Freight & Trucking (Marketing)	1.05	1.14	1.14	1.22	1.29
Gasoline, Fuel & Oil	0.59	0.69	0.63	0.48	0.67
Hired Labor	3.33	3.19	3.26	3.35	3.42
Seed & Plants	0.52	0.47	0.44	0.50	0.44
Supplies	1.02	0.89	0.92	0.93	0.94
Veterinary, Medicine & Breeding	0.84	0.75	0.76	0.76	0.76
Cow Replacements	0.03	0.01	0.02	0.07	0.04
Total Cost of Goods Sold	$14.93	$14.99	$14.90	$15.50	$15.96
Gross Margin	$6.54	$5.21	$7.05	$7.84	$6.94
OVERHEAD					
Insurance	0.25	0.24	0.23	0.23	0.30
Interest	0.63	0.76	0.80	0.57	0.60
Rent	0.41	0.42	0.51	0.54	0.40
Repairs	1.28	1.13	1.21	1.50	1.42
Property & Misc. Taxes	0.31	0.28	0.29	0.27	0.30
Utilities	0.36	0.38	0.34	0.34	0.43
Other	0.36	0.40	0.31	0.34	0.38
Accrual Adjustments					
+ Depreciation	1.30	1.28	1.20	1.16	1.31
Total Overhead Expenses	$4.90	$4.89	$4.89	$4.95	$5.14
Total Farm Production Costs (b)	$19.83	$19.88	$19.79	$20.45	$21.10
NET FARM EARNINGS (a) - (b)	$1.64	$0.32	$2.16	$2.89	$1.80
- Family Living & Income Taxes	0.49	0.48	0.41	0.34	0.40
NET EARNINGS	**$1.15**	**-$0.16**	**$1.75**	**$2.55**	**$1.40**
+ Net Nonfarm Income	0.09	0.13	0.09	0.07	0.16
NET HOUSEHOLD INCOME	$1.24	-$0.03	$1.84	$2.62	$1.56

Note: Expenses adjusted for changes in accounts payable, prepaid expenses and supply inventories to remove the effects of tax planning and reflect only one year's expenses.

TABLE A-3.

COMPARISON BETWEEN YEARS / Balance Sheet Summary

	2017	2018	2019	2020	2021
Number of Farms	320	305	267	204	164
Average Number of Cows	470	478	600	685	568
			DOLLARS PER FARM		
Assets					
Livestock	$1,079,116	$1,023,346	$1,307,664	$1,499,770	$1,170,080
Feed & Crops	508,234	567,738	672,930	775,267	731,584
Machinery & Equipment	933,406	994,758	1,107,211	1,284,178	1,284,248
Farm–Land & Buildings	2,523,745	2,612,937	3,296,203	3,633,060	3,527,848
All Other	688,229	750,839	1,046,802	1,493,164	1,255,848
TOTAL ASSETS	5,732,730	5,949,618	7,430,810	8,685,439	7,969,608
TOTAL LIABILITIES	1,792,421	2,034,833	2,436,846	2,726,987	2,653,696
TOTAL NET WORTH	$3,940,309	$3,914,785	$4,993,964	$5,958,452	$5,315,912
			DOLLARS PER COW		
Assets					
Livestock	$2,296	$2,141	$2,179	$2,189	$2,060
Feed & Crops	1,081	1,188	1,122	1,132	1,288
Machinery & Equipment	1,986	2,081	1,845	1,875	2,261
Farm-Land & Buildings	5,370	5,466	5,494	5,304	6,211
All Other	1,464	1,571	1,745	2,180	2,211
TOTAL ASSETS	12,197	12,447	12,385	12,679	14,031
TOTAL LIABILITIES	3,814	4,257	4,061	3,981	4,672
TOTAL NET WORTH	$8,384	$8,190	$8,323	$8,698	$9,359
			DOLLARS PER CWT. OF MILK		
Assets					
Livestock	$9.01	$8.47	$8.45	$8.46	$7.98
Feed & Crops	4.24	4.70	4.35	4.37	4.99
Machinery & Equipment	7.79	8.24	7.16	7.24	8.76
Farm–Land & Buildings	21.06	21.64	21.31	20.49	24.06
All Other	5.74	6.22	6.77	8.42	8.56
TOTAL ASSETS	$47.85	$49.27	$48.04	$48.99	$54.34
TOTAL LIABILITIES	14.96	16.85	15.75	15.38	14.97
TOTAL NET WORTH	$32.89	$32.42	$32.28	$33.61	$39.37
PERCENT NET WORTH	69%	66%	67%	69%	67%

TABLE A-4.

COMPARISON BETWEEN YEARS / Evaluation Factors

	2017	2018	2019	2020	2021
Number of Farms	320	305	267	204	164
Average Number of Cows	470	478	600	685	568
Worker Equivalents	10.0	9.6	11.6	12.7	10.9
Cows Per Worker	47	50	52	54	52
Pounds of Milk Sold Per Worker	1,200,611	1,255,688	1,337,028	1,391,525	1,343,002
Pounds of Milk Sold	11,981,710	12,076,192	15,469,414	17,728,029	14,665,582
Pounds of Milk Sold Per Cow	25,493	25,264	25,793	25,884	25,823
Milk Price Per Cwt.	$18.32	$17.19	$19.18	$18.48	$19.21
Total Crop Acres	1,020	1,009	1,194	1,314	1,240
Crop Acres Per Cow	2.2	2.1	2.0	1.9	2.2
Feed Cost Per Cow	$1,590	$1,630	$1,625	$1,718	$1,782
Feed as a Percent of Milk Sales	34%	38%	33%	36%	36%
Feed & Crop Expense Per Cow*	$1,899	$1,916	$1,898	$2,031	$2,125
Feed & Crop Expense Per Cwt.	$7.45	$7.59	$7.36	$7.85	$8.23
Machinery Costs Per Cow**	$814	$966	$837	$853	$874
Machinery Costs Per Cwt.	$3.19	$3.83	$3.24	$3.30	$3.38
Labor & Family Living Per Cow	$973	$928	$941	$952	$983
Labor & Family Living Per Cwt.	$3.82	$3.67	$3.65	$3.68	$3.81
Assets Per Cow	$12,198	$12,447	$12,385	$12,679	$14,031
Debt Per Cow	$3,814	$4,257	$4,061	$3,981	$4,672
Net Worth Per Cow	$8,384	$8,190	$8,323	$8,698	$9,359
Percent Net Worth	69%	66%	67%	69%	67%

*Feed & Crop Expense = Feed + Seed & Plants + Fertilizer + Chemicals & Spray.

**Machinery Costs = Machinery Repairs + Fuel & Oil + Custom Hire + Machinery & Equipment Depreciation.

TABLE A-5.

COMPARISON BETWEEN YEARS / Trend Analysis

ADJUSTED FINANCIAL CONDITION AS OF DECEMBER 31	2017	2018	2019	2020	2021
Current Assets	$818,377	$871,787	$1,121,123	$1,424,163	$1,282,544
Intermediate Assets	2,327,493	2,339,888	2,900,261	3,382,496	3,025,736
Fixed Assets	2,586,860	2,737,943	3,409,427	3,878,780	3,661,328
TOTAL ASSETS	$5,732,730.00	$5,949,618.00	$7,430,811.00	$8,685,439.00	$7,969,608.00
Change (+ or -) from Prior Years	$433,596.00	$216,888.00	$1,481,193.00	$1,254,628.00	-$715,831.00
Current Liabilities	$332,010	$352,043	$393,568	$424,830	$522,560
Intermediate Liabilities	733,696	876,538	1,051,316	1,147,052	944,016
Long-Term Liabilities	726,715	806,252	991,963	1,155,105	1,187,120
TOTAL LIABILITIES	$1,792,421	$2,034,833	$2,436,847	$2,726,987	$2,653,696
Change (+ or -) from Prior Years	$102,423	$242,412	$402,014	$290,140	-$73,291
NET WORTH	$3,940,309	$3,914,785	$4,993,964	$5,958,452	$5,315,912
Change (+ or -) from Prior Years	$331,173	-$25,524	$1,079,179	$964,488	-$642,540
% Net Worth	69%	66%	67%	69%	67%

I & E Farm (Cash Basis)	2017	2018	2019	2020	2021
Sales - Milk	$2,197,778	$2,076,327	$2,966,932	$3,277,366	$2,823,528
Sales - Livestock	162,649	143,115	173,905	222,798	178,352
Other Farm Income	176,314	189,982	223,047	594,790	361,816
TOTAL FARM INCOME	$2,536,741	$2,409,424	$3,363,884	$4,094,954	$3,363,696
FARM CASH EXPENSES	$2,221,165	$2,245,695	$2,877,303	$3,418,454	$2,902,480
NET CASH FARM INCOME	$315,576	$163,729	$486,581	$676,500	$461,216
ADD: Interest	$75,299	$91,889	$124,507	$101,153	$87,472
TOTAL AVAILABLE - Farm	$390,875	$255,618	$611,088	$777,653	$548,688
ADD: Net Nonfarm Income	$10,660	$15,660	$13,357	$13,063	$22,720
Sale Capital Assets	$23,658	$96,150	$44,671	$110,586	$50,864
TOTAL FUNDS AVAILABLE (a)	$425,193	$367,428	$669,116	$901,302	$622,272
Family Living + Income Taxes	$58,930	$58,835	$63,026	$60,795	$58,504
Debt Service Requirement	$285,790	$308,826	$374,707	$474,049	$416,673
TOTAL FUNDS REQUIRED (b)	$344,720	$367,661	$437,733	$534,844	$475,177
EXCESS (a – b)	$80,473	-$233	$231,383	$366,458	$147,095

TABLE B-1.

2021 DATA BY HERD SIZE / Earnings Worksheet

	HERD SIZE				
	99 COWS OR FEWER	100-299 COWS	300-699 COWS	700 COWS OR MORE	ALL FARMS
Number of Farms	35	43	36	50	164
Average Number of Cows	66	178	473	1,325	568
Receipts	DOLLARS PER COW				
Milk Sales	$3,938	$4,642	$4,777	$5,088	$4,971
Cattle Sales	421	310	350	308	314
Crop Sales	502	325	242	207	231
Government Payments	289	448	279	149	201
Other	267	189	198	206	205
CASH RECEIPTS	$5,417	$5,914	$5,846	$5,958	$5,922
Accrual Adjustments					
+ Change in Inventory-Raised Livestock	-$42	$7	-$9	$13	$2
VALUE OF FARM PRODUCTION (a)	$5,375	$5,921	$5,837	$5,971	$5,924
COST OF GOODS SOLD					
Chemicals & Sprays	$66	$50	$54	$51	$52
Custom Hire	98	131	197	151	157
Purchased Feed	1,235	1,635	1,842	1,800	1,782
Fertilizer & Lime	224	194	157	178	177
Freight & Trucking (Marketing)	277	308	314	343	333
Gasoline, Fuel & Oil	182	161	176	174	174
Hired Labor	252	626	860	942	884
Seed & Plants	154	137	117	109	114
Supplies	269	272	287	227	243
Veterinary, Medicine & Breeding	132	165	186	203	195
Cow Replacements	35	4	37	5	11
Total Cost of Goods Sold	$2,924	$3,683	$4,227	$4,183	$4,122
Gross Margin	$2,451	$2,238	$1,610	$1,788	$1,802
OVERHEAD					
Insurance	87	104	76	76	78
Interest	190	134	142	158	154
Rent	64	77	82	112	102
Repairs	393	388	373	362	367
Property & Misc. Taxes	138	106	77	71	77
Utilities	115	103	116	109	110
Other	106	117	140	86	100
Accrual Adjustments					
+ Depreciation	584	494	349	307	337
Total Overhead Expenses	$1,677	$1,523	$1,355	$1,281	$1,325
Total Farm Production Costs (b)	$4,601	$5,206	$5,582	$5,464	$5,447
NET FARM EARNINGS (a) - (b)	$774	$715	$255	$507	$477
- Family Living & Income Taxes	516	302	124	60	103
NET EARNINGS	**$258**	**$413**	**$131**	**$447**	**$374**
+ Net Nonfarm Income	443	77	39	22	40
NET HOUSEHOLD INCOME	$701	$490	$170	$469	$414

Note: Expenses adjusted for changes in accounts payable, prepaid expenses, and supply inventories to remove the effects of tax planning and reflect only one year's expenses.

TABLE B-2.

2021 DATA BY HERD SIZE / Balance Sheet Summary

	HERD SIZE				
	99 COWS OR FEWER	100-299 COWS	300-699 COWS	700 COWS OR MORE	ALL FARMS
Number of Farms	35	43	36	50	164
Average Number of Cows	66	178	473	1,325	568
	ASSETS PER COW				
Cash & Accounts Receivable	$622	$1,000	$676	$622	$663
Feed & Crop Inventory	1,438	1,313	1,251	1,288	1,288
Supplies & Prepaid Expenses	235	218	182	216	211
Other Current Assets	84	277	76	80	96
TOTAL CURRENT ASSETS	$2,379	$2,808	$2,185	$2,206	$2,258
Dairy Livestock	$1,800	$2,067	$1,921	$2,101	$2,060
Machinery & Equipment	4,500	3,504	2,367	2,009	2,261
Other Intermediate Assets	1,757	1,980	1,178	822	1,006
TOTAL INTERMEDIATE ASSETS	$8,057	$7,551	$5,466	$4,932	$5,327
Farm Real Estate	$11,584	$7,744	$6,396	$5,796	$6,211
Other Fixed Assets	505	274	305	197	235
TOTAL FIXED ASSETS	$12,089	$8,018	$6,701	$5,993	$6,446
TOTAL ASSETS	$22,525	$18,377	$14,352	$13,131	$14,031
	LIABILITIES PER COW				
Accounts Payable	$74	$107	$190	$262	$232
Farm Credit Short-Term Loans	1	35	129	114	108
Other Current Liabilities	571	544	521	599	580
TOTAL CURRENT LIABILITIES	$646	$686	$840	$975	$920
Farm Credit Intermediate Term	$1,392	$1,057	$956	$1,483	$1,351
Other Intermediate Liabilities	197	318	314	313	311
TOTAL INTERMEDIATE LIABILITIES	$1,589	$1,375	$1,270	$1,796	$1,662
Farm Credit Long-Term Real Estate	$2,400	$1,627	$1,855	$1,955	$1,923
Other Long-Term Liabilities	1,161	224	251	104	167
TOTAL LONG-TERM LIABILITIES	$3,561	$1,851	$2,106	$2,059	$2,090
TOTAL LIABILITIES	$5,796	$3,912	$4,216	$4,830	$4,672
	NET WORTH PER COW				
OWNER'S NET WORTH	$16,729	$14,465	$10,136	$8,301	$9,359
TOTAL LIABILITIES & NET WORTH	$22,525	$18,377	$14,352	$13,131	$14,031
PERCENT NET WORTH	74%	79%	71%	63%	67%

TABLE B-3.

2021 DATA BY HERD SIZE / Evaluation Factors

	99 COWS OR FEWER	100-299 COWS	300-699 COWS	700 COWS OR MORE	ALL FARMS
Number of Farms	35	43	36	50	164
Average Number of Cows	66	178	473	1,325	568
Worker Equivalents	2.5	4.1	8.9	24.2	10.9
Cows Per Worker	27	43	53	55	52
Pounds of Milk Sold Per Worker	567,245	1,036,675	1,330,890	1,445,890	1,343,002
Pounds of Milk Sold Per Farm	1,389,750	4,250,368	11,831,612	34,961,620	14,665,582
Pounds of Milk Sold Per Cow	21,044	23,884	25,023	26,385	25,823
Milk Price Per Cwt.	$18.59	$19.43	$19.06	$19.25	$19.21
Total Crop Acres	226	495	936	2,812	1,240
Crop Acres Per Cow	3.4	2.8	2.0	2.1	2.2
Crop Acres Per Worker	92	121	105	116	114
Feed Cost Per Cow	$1,235	$1,635	$1,842	$1,800	$1,782
Feed Cost Per Cwt.	$5.87	$6.85	$7.36	$6.82	$6.90
Feed as a Percent of Milk Sales	32%	35%	39%	35%	36%
Feed & Crop Expense Per Cow[1]	$1,679	$2,017	$2,169	$2,138	$2,125
Feed & Crop Expense Per Cwt.	$7.98	$8.44	$8.67	$8.10	$8.23
Machinery Cost Per Cow[2]	$1,091	$997	$928	$838	$874
Machinery Costs Per Cwt.	$5.18	$4.17	$3.71	$3.18	$3.38
Labor & Family Living Per Cow	$767	$927	$979	$997	$983
Labor & Family Living Per Cwt.	$3.64	$3.88	$3.91	$3.78	$3.81
Assets Per Cow	$22,525	$18,377	$14,352	$11,774	$14,031
Debt Per Cow	$5,796	$3,912	$4,216	$3,887	$4,672
Net Worth Per Cow	$16,729	$14,465	$10,136	$7,887	$9,359
Return on Assets[3]	0.2%	3.0%	1.9%	7.9%	3.8%
Return on Equity[4]	0.2%	2.9%	1.3%	10.0%	4.0%

[1]Feed & Crop Expense = Feed + Seed & Plants + Fertilizer + Chemicals & Sprays.
[2]Machinery Cost = Machinery Repairs + Custom Hire + Fuel & Oil + Machinery & Equipment Depreciation.
[3]Return on Assets = (Net Earnings + Interest) ÷ Average Farm Assets.
[4]Return on Equity = Net Earnings ÷ Average Farm Net Worth.

TABLE C-1.

2021 DATA BY PROFIT GROUPS / Earnings Worksheet

	PROFIT GROUP				
	BOTTOM 25%	THIRD 25%	SECOND 25%	TOP 25%	ALL FARMS
Number of Farms	41	41	41	41	164
Average Number of Cows	725	481	633	435	568
Receipts	DOLLARS PER COW				
Milk Sales	$4,601	$4,922	$5,121	$5,402	$4,971
Cattle Sales	256	306	347	351	314
Crop Sales	152	250	205	376	231
Government Payments	153	221	264	167	201
Other	204	177	198	248	205
CASH RECEIPTS	$5,366	$5,876	$6,135	$6,544	$5,922
Accrual Adjustments					
+ Change in Inventory-Raised Livestock	-$7	$0	$19	$16	$2
VALUE OF FARM PRODUCTION (a)	$5,359	$5,876	$6,154	$6,560	$5,924
COST OF GOODS SOLD					
Chemicals & Sprays	$41	$56	$48	$71	$52
Custom Hire	149	200	84	227	157
Purchased Feed	1,782	1,783	1,849	1,671	1,782
Fertilizer & Lime	189	157	167	193	177
Freight & Trucking (Marketing)	314	317	358	346	333
Gasoline, Fuel & Oil	180	172	180	155	174
Hired Labor	934	872	904	784	884
Seed & Plants	95	114	106	157	114
Supplies	244	294	226	209	243
Veterinary, Medicine & Breeding	193	196	204	185	195
Cow Replacements	40	5	27	1	11
Total Cost of Goods Sold	$4,161	$4,166	$4,153	$3,999	$4,122
Gross Margin	$1,198	$1,710	$2,001	$2,561	$1,802
OVERHEAD					
Insurance	80	76	84	70	78
Interest	185	158	135	125	154
Rent	93	112	92	122	102
Repairs	306	366	430	377	367
Property & Misc. Taxes	83	72	76	71	77
Utilities	120	105	110	101	110
Other	93	107	118	76	100
Accrual Adjustments					
+ Depreciation	300	307	368	386	337
Total Overhead Expenses	$1,260	$1,303	$1,413	$1,328	$1,325
Total Farm Production Costs (b)	$5,421	$5,469	$5,566	$5,327	$5,447
NET FARM EARNINGS (a) - (b)	-$62	$407	$588	$1,233	$477
- Family Living & Income Taxes	65	114	97	162	103
NET EARNINGS	**-$127**	**$293**	**$491**	**$1,071**	**$374**
+ Net Nonfarm Income	36	16	38	76	40
NET HOUSEHOLD INCOME	-$91	$309	$529	$1,147	$414

Note: Expenses adjusted for changes in accounts payable, prepaid expenses and supply inventories to remove the effects of tax planning and reflect only one year's expenses.

TABLE C-2.

2021 DATA BY PROFIT GROUPS / Balance Sheet Summary

	PROFIT GROUP				
	BOTTOM 25%	THIRD 25%	SECOND 25%	TOP 25%	ALL FARMS
Number of Farms	41	41	41	41	164
Average Number of Cows	725	481	633	435	568
	ASSETS PER COW				
Cash & Accounts Receivable	$497	$752	$581	$960	$663
Feed & Crop Inventory	1,272	1,293	1,295	1,293	1,288
Supplies & Prepaid Expenses	74	154	273	411	211
Other Current Assets	98	105	33	171	96
TOTAL CURRENT ASSETS	$1,941	$2,304	$2,182	$2,835	$2,258
Dairy Livestock	$2,009	$2,075	$2,122	$2,026	$2,060
Machinery & Equipment	1,950	1,960	2,549	2,682	2,261
Other Intermediate Assets	852	1,034	787	1,550	1006
TOTAL INTERMEDIATE ASSETS	$4,811	$5,069	$5,458	$6,258	$5,327
Farm Real Estate	$6,009	$6,536	$5,759	$6,815	$6,211
Other Fixed Assets	235	104	233	383	235
TOTAL FIXED ASSETS	$6,244	$6,640	$5,992	$7,198	$6,446
TOTAL ASSETS	$12,996	$14,013	$13,632	$16,291	$14,031
	LIABILITIES PER COW				
Accounts Payable	$481	$139	$87	$127	$232
Farm Credit Short-Term Loans	152	64	102	90	108
Other Current Liabilities	608	503	578	621	580
TOTAL CURRENT LIABILITIES	$1,241	$706	$767	$838	$920
Farm Credit Intermediate Term	$1,471	$1,306	$1,333	$1,221	$1,351
Other Intermediate Liabilities	370	244	337	248	311
TOTAL INTERMEDIATE LIABILITIES	$1,841	$1,550	$1,670	$1,469	$1,662
Farm Credit Long-Term Real Estate	$2,234	$2,329	$1,504	$1,554	$1,923
Other Long-Term Liabilities	77	172	202	261	167
TOTAL LONG-TERM LIABILITES	$2,311	$2,501	$1,706	$1,815	$2,090
TOTAL LIABILITIES	$5,393	$4,757	$4,143	$4,122	$4,672
	NET WORTH PER COW				
OWNER'S NET WORTH	$7,603	$9,256	$9,489	$12,169	$9,359
TOTAL LIABILITIES & NET WORTH	$12,996	$14,013	$13,632	$16,291	$14,031
PERCENT NET WORTH	59%	66%	70%	75%	67%

TABLE C-3.

2021 DATA BY PROFIT GROUPS / Evaluation Factors

	PROFIT GROUP				
	BOTTOM 25%	THIRD 25%	SECOND 25%	TOP 25%	ALL FARMS
Number of Farms	41	41	41	41	164
Average Number of Cows	725	481	633	435	568
Worker Equivalents	13.7	9.1	12.7	8.2	10.9
Cows Per Worker	53	53	50	53	52
Pounds of Milk Sold Per Worker	1,307,958	1,340,257	1,311,870	1,453,165	1,343,002
Pounds of Milk Sold Per Farm	17,919,025	12,182,936	16,686,986	11,886,890	14,665,582
Pounds of Milk Sold Per Cow	24,710	25,329	26,357	27,329	25,823
Milk Price Per Cwt.	$18.61	$19.29	$19.41	$19.77	$19.21
Total Crop Acres	1,518	1,024	1,456	963	1,240
Crop Acres Per Cow	2.1	2.1	2.3	2.2	2.2
Crop Acres Per Worker	111	113	114	118	114
Feed Cost Per Cow	$1,782	$1,783	$1,849	$1,671	$1,782
Feed Cost Per Cwt.	$7.21	$7.04	$7.02	$6.11	$6.90
Feed as a Percent of Milk Sales	39%	37%	36%	31%	36%
Feed & Crop Expense Per Cow[1]	$2,108	$2,110	$2,170	$2,092	$2,125
Feed & Crop Expense Per Cwt.	$8.53	$8.33	$8.23	$7.65	$8.23
Machinery Cost Per Cow[2]	$791	$883	$888	$979	$874
Machinery Cost Per Cwt.	$3.20	$3.49	$3.37	$3.58	$3.38
Labor & Family Living Per Cow	$991	$983	$999	$943	$983
Labor & Family Living Per Cwt.	$4.01	$3.88	$3.79	$3.45	$3.81
Assets Per Cow	$12,996	$14,013	$13,632	$16,291	$14,031
Debt Per Cow	$5,393	$4,757	$4,143	$4,122	$4,672
Net Worth Per Cow	$7,603	$9,256	$9,489	$12,169	$9,359
Return on Assets[3]	0.4%	3.2%	4.6%	7.3%	3.8%
Return on Equity[4]	-1.7%	3.2%	5.2%	8.8%	4.0%

[1]Feed & Crop Expense = Feed + Seed & Plants + Fertilizer + Chemicals & Spray.

[2]Machinery Cost = Machinery Repairs + Custom Hire + Fuel & Oil + Machinery & Equipment Depreciation.

[3]Return on Assets = (Net Earnings + Interest) ÷ Average Farm Assets.

[4]Return on Equity = Net Earnings ÷ Average Farm Net Worth.

TABLE C-4.

2021 Cost Of Producing Milk By Profit Groups

	Bottom 25%	All Farm Average	Top 25%
	DOLLARS PER CWT.		
Feed	$7.21	$6.90	$6.11
Labor	3.78	3.42	2.87
Interest	0.75	0.60	0.46
Trucking (Marketing)	1.27	1.29	1.27
Crop Expenses	1.32	1.33	1.54
All Other Expenses	6.40	6.25	5.83
Adjusted Cash Operating Expenses	$20.72	$19.79	$18.08
+ Depreciation	1.21	1.31	1.41
+ Family Living	0.26	0.40	0.59
Total Costs	$22.20	$21.50	$20.08
– Non-milk Income*	2.45	2.90	3.63
Net Cost of Production**	$19.75	$18.60	$16.46

*Nonmilk income includes accrual basis cattle, crop, and other farm income
**Before any return on equity.

TABLE C-5.

2021 Cash Margins By Profit Groups

	2017	2018	2019	2020	2021
Bottom Profit Group					
Actual Milk Price	$18.06	$16.79	$18.54	$18.34	$18.61
Break-Even Milk Price	19.39	18.96	19.91	19.66	19.93
CASH MARGIN	-$1.33	-$2.17	-$1.37	-$1.32	-$1.32
Top Profit Group					
Actual Milk Price	$18.65	$17.63	$19.45	$19.01	$19.77
Break-Even Milk Price	16.28	16.74	15.91	16.89	15.95
CASH MARGIN	$2.37	$0.89	$3.54	$2.12	$3.82

TABLE C-6.

2021 Reserve Debt Capacity By Profit Groups

	Bottom 25%	All Farm Average	Top 25%
	DOLLARS PER COW		
Debt Capacity	$2,674	$6,326	$11,419
– Capital Debt	4,152	3,752	3,284
RESERVE DEBT CAPACITY	-$1,478	$2,574	$8,135

TABLE D-1.

2021 DATA BY REGIONS / Earnings Worksheet

	REGIONS		
	NEW YORK	NEW ENGLAND	ALL FARMS
Number of Farms	138	26	164
Average Number of Cows	551	661	568
Receipts	DOLLARS PER COW		
Milk Sales	$4,980	$4,912	$4,971
Cattle Sales	325	275	314
Crop Sales	237	203	231
Government Payments	169	343	201
Other	198	237	205
CASH RECEIPTS	$5,909	$5,970	$5,922
Accrual Adjustments			
+ Change in Inventory-Raised Livestock	$4	$0	$2
VALUE OF FARM PRODUCTION (a)	$5,913	$5,970	$5,924
COST OF GOODS SOLD			
Chemicals & Sprays	$56	$33	$52
Custom Hire	148	197	157
Purchased Feed	1,721	2,041	1,782
Fertilizer & Lime	172	196	177
Freight & Trucking (Marketing)	341	300	333
Gasoline, Fuel & Oil	169	191	174
Hired Labor	880	900	884
Seed & Plants	117	102	114
Supplies	238	264	243
Veterinary, Medicine & Breeding	194	198	195
Cow Replacements	2	36	11
Total Cost of Goods Sold	$4,038	$4,458	$4,122
Gross Margin	$1,875	$1,512	$1,802
OVERHEAD			
Insurance	80	73	78
Interest	152	163	154
Rent	106	87	102
Repairs	351	436	367
Property & Misc. Taxes	80	60	77
Utilities	102	148	110
Other	106	69	100
Accrual Adjustments			
Depreciation	354	262	337
Total Overhead Expenses	$1,331	$1,298	$1,325
Total Farm Production Costs (b)	$5,369	$5,756	$5,447
NET FARM EARNINGS (a) - (b)	$544	$214	$477
- Family Living & Income Taxes	102	107	103
NET EARNINGS	**$442**	**$107**	**$374**
+ Net Nonfarm Income	35	63	40
NET HOUSEHOLD INCOME	$477	$170	$414

Note: Expenses adjusted for changes in accounts payable, prepaid expenses and supply inventories to remove the effects of tax planning and reflect only one year's expenses.

TABLE D-2.

2021 DATA BY REGIONS / Balance Sheet Summary

	REGIONS		
	NEW YORK	NEW ENGLAND	ALL FARMS
Number of Farms	138	26	164
Average Number of Cows	551	661	568
	ASSETS PER COW		
Cash & Accounts Receivable	$692	$535	$663
Feed & Crop Inventory	1325	1118	1288
Supplies & Prepaid Expenses	196	276	211
Other Current Assets	108	40	96
TOTAL CURRENT ASSETS	$2,321	$1,969	$2,258
Dairy Livestock	$2,088	$1,924	$2,060
Machinery & Equipment	2,378	1,732	2,261
Other Intermediate Assets	1015	971	1006
TOTAL INTERMEDIATE ASSETS	$5,481	$4,627	$5,327
Farm Real Estate	$6,222	$6,134	$6,211
Other Fixed Assets	234	241	235
TOTAL FIXED ASSETS	$6,456	$6,375	$6,446
TOTAL ASSETS	$14,258	$12,971	$14,031
	LIABILITIES PER COW		
Accounts Payable	$242	$184	$232
Farm Credit Short-Term Loans	53	349	108
Other Current Liabilities	595	516	580
TOTAL CURRENT LIABILITIES	$890	$1,049	$920
Farm Credit Intermediate Term	$1,342	$1,383	$1,351
Other Intermediate Liabilities	314	298	311
TOTAL INTERMEDIATE LIABILITIES	$1,656	$1,681	$1,662
Farm Credit Long-Term Real Estate	$1,891	$2,053	$1,923
Other Long-Term Liabilities	176	128	167
TOTAL LONG-TERM LIABILITES	$2,067	$2,181	$2,090
TOTAL LIABILITIES	$4,613	$4,911	$4,672
	NET WORTH PER COW		
OWNER'S NET WORTH	$9,645	$8,060	$9,359
TOTAL LIABILITIES & NET WORTH	$14,258	$12,971	$14,031
PERCENT NET WORTH	68%	62%	67%

*Regions are divided by state not Federal Milk Orders.

TABLE D-3.

2021 DATA BY REGIONS / Evaluation Factors

	REGIONS[1]		
	NEW YORK	NEW ENGLAND	ALL FARMS
Number of Farms	138	26	164
Average Number of Cows	551	661	568
Worker Equivalents	10.7	12.3	10.9
Cows Per Worker	52	54	52
Pounds of Milk Sold Per Worker	1,336,981	1,370,826	1,343,002
Pounds of Milk Sold Per Farm	14,252,217	16,833,743	14,665,582
Pounds of Milk Sold Per Cow	25,877	25,476	25,823
Milk Price Per Cwt.	$19.21	$19.24	$19.21
Total Crop Acres	1,228	1,308	1,240
Crop Acres Per Cow	2.2	2.0	2.2
Crop Acres Per Worker	115	106	114
Feed Cost Per Cow	$1,721	$2,041	$1,782
Feed Cost Per Cwt.	$6.65	$8.01	$6.90
Feed as a Percent of Milk Sales	35%	42%	36%
Feed & Crop Expense Per Cow[2]	$2,067	$2,372	$2,125
Feed & Crop Expense Per Cwt.	$7.99	$9.31	$8.23
Machinery Cost Per Cow[3]	$865	$911	$874
Machinery Cost Per Cwt.	$3.34	$3.58	$3.38
Labor & Family Living Per Cow	$979	$997	$983
Labor & Family Living Per Cwt.	$3.78	$3.91	$3.81
Assets Per Cow	$14,258	$12,971	$14,031
Debt Per Cow	$4,613	$4,911	$4,672
Net Worth Per Cow	$9,645	$8,060	$9,359
Return on Assets[4]	4.2%	2.1%	3.8%
Return on Equity[5]	4.6%	1.3%	4.0%

[1]Regions are divided by states not Federal Milk Orders.

[2]Feed & Crop Expense = Feed + Seed & Plants + Fertilizer + Chemicals & Spray.

[3]Machinery Cost = Machinery Repairs + Custom Hire + Fuel & Oil + Machinery & Equipment Depreciation.

[4]Return on Assets = (Net Earnings + Interest) ÷ Average Farm Assets. In contrast, the Balance Sheet shows the year-end values.

[5]Return on Equity = Net Earnings ÷ Average Farm Net Worth.

GLOSSARY

Net Cash Farm Income

A measure of farm profitability in terms of cash flow and net cash farm income, reflects the ability of a farm business to meet its cost of production through cash income. It is equal to:

Cash Receipts — Adjusted Cash Operating Expenses

Accrual Adjusted Operating Expenses

Farm operating expenses adjusted to reflect 12 months of operation and to remove the effect of tax planning. Adjustments account for changes in supply inventories, accounts payable and prepaid expenses. Operating expenses do not include family living costs or capital expenditures.

Net Household Income

An accrual measure of overall household earnings, reflecting all revenues and costs, including both farm and non-farm sources. It is equal to:

Net Cash Farm Income
+ Change in Accounts Receivable
+ Change in Production Inventories
+ Net Nonfarm & Noncash Income
- Depreciation
- Family Living Expenses & Taxes

Return on Assets

Measures profit earned relative to total farm assets, including assets financed with debt and those financed with farm equity. Return on assets is equal to:

$$\frac{\text{Net Earnings + Interest Expense}}{\text{Average Assets}}$$

Return on Equity

Measures profit earned relative to a farmer's equity investment in the farm operation. Return on equity is equal to:

$$\frac{\text{Net Earnings}}{\text{Average Net Worth}}$$

Debt Capacity

The maximum amount of capital debt that can be repaid from a farm's cash flow, the calculation of debt capacity is described in the summary.

Reserve Debt Capacity

The amount of additional capital debt (beyond that already incurred) that a farm can service from cash flow. Reserve debt capacity represents a farm's buffer against financial adversity. It is equal to:

Debt Capacity – Capital Debt

Overhead Costs

Costs that do not vary with a change in production output, such as depreciation, interest, repairs, taxes and insurance, etc.

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