

Pennsylvania Dairy Performance Indicators: 2023 Challenges

Introduction

In early 2022, the Center for Dairy Excellence approached several financial institutions within Pennsylvania that have dairy benchmarking programs to see if there was interest in developing a state benchmarking program. These discussions evolved into a joint project between Horizon Farm Credit, Penn State Extension, and the Center for Dairy Excellence that is called “Pennsylvania Dairy Performance Indicators.”

The Center facilitates the project while Horizon Farm Credit and Penn State Extension gather the data from their respective benchmarking programs, combine it into one larger, anonymous database, and then analyze the data to provide the key performance indicators. Pennsylvania dairy farm families and the industry representatives that support them can use these performance indicator averages to compare to their individual dairy performance against a “state” average. Furthermore, the dairy industry can use this data to track progress over time.

At 154 PA farms, it represents about 3% of the total Pennsylvania dairies. There is a mix of new herds and herds that participated in 2022 within the dataset. The results provide understandings of overall changing financial environment of Pennsylvania dairies.

Herd Performance Metrics

The 2023 data provides a comprehensive snapshot of herd performance across various sizes and production types, revealing distinct patterns in milk production, costs, and financial outcomes. For herd size groups, the average herd size of 381 cows reflects a diverse mix of small, medium, and large operations (Table 1). When compared to 2022, this represented fewer dairies, but the average cows per dairy were slightly higher. Some of this can be attributed to the reduced number of organic farms available in 2023. Herds with fewer than 99 cows, while smaller in scale, show a slightly lower average milk shipped per cow (23,604 pounds) compared to those in the 100 to 299 cows range (24,439 pounds) and significantly less than the largest herds, which average 25,199 pounds per cow. The increase in milk production with herd size indicates that larger herds might be leveraging advanced technology, more streamlined management practices, or economies of scale, which can contribute to higher overall productivity.

In terms of feed costs, 2023 total feed cost averaged just below the typical 50% of net cost of production. Smaller herds have slightly lower total feed costs per cow (\$2,351) compared to larger herds (\$2,441), yet they face higher feed costs per hundredweight (\$10.74) compared to larger herds (\$9.79). This discrepancy highlights the impact of scale on feed efficiency and costs. The net cost of production per cwt further underscores this, with smaller herds experiencing a higher net cost (\$21.01) compared to larger herds (\$20.87). The financial indicators reflect these operational differences, with larger herds achieving a higher net margin per cow (\$526) than smaller herds (\$599) but facing a lower net margin per cwt (\$2.09 compared to \$2.47). Due to the limited number of organic operations participating (5 in 2023 vs. 22 in 2022), no comparison based on production type was performed.

Table 1: 2023 Herd Performance Indicators by Herd Size Group

Herd Performance Indicators	2022 PA Average	2023 PA Average	2023 Herd Size Group		
			99 cows or fewer	100 to 299 cows	300 cows or more
Number of Herds	220	154	37	66	51
Average Herd Size	306	381	76	184	856
Milk Shipped per Cow	23,256	24,490	23,604	24,439	25,199
Energy Corrected Milk Shipped per Cow ¹	24,828	26,331	25,247	26,314	27,141
Costs					
Total Feed Cost per Cow ²	\$ 2,681	\$ 2,380	\$ 2,351	\$ 2,349	\$ 2,441
Total Feed Cost per Cwt. ²	\$ 11.67	\$ 9.85	\$ 10.74	\$ 9.39	\$ 9.79
Net Cost of Production per Cwt. ³	\$ 22.94	\$ 21.24	\$ 21.01	\$ 20.87	\$ 21.88
General Financial Indicators					
Net Margin per Cow ⁴	\$ 1,288	\$ 463	\$ 599	\$ 526	\$ 284
Net Margin per Cwt. ⁴	\$ 5.67	\$ 1.84	\$ 2.47	\$ 2.09	\$ 1.06
EBITDA per Cow ⁵	\$ 2,336	\$ 1,703	\$ 2,151	\$ 1,819	\$ 1,229

Notes:

¹ Energy Corrected Milk: (12.82 x lbs. of Fat + 7.13 x lbs. of Protein + 0.323 x lbs. Milk Shipped)/365/Avg Herd Size.

² Total Feed Cost: Includes Purchased Feed & Crop Expenses (Seed, Fertilizer, Chemical). Accrual adjusted if

³ Net Cost of Production: Includes depreciation expense and not principal payments. There are two methodologies used to determine this metric, one looks at whole farm and the other focuses on dairy enterprise. Both methods provide comparable results.

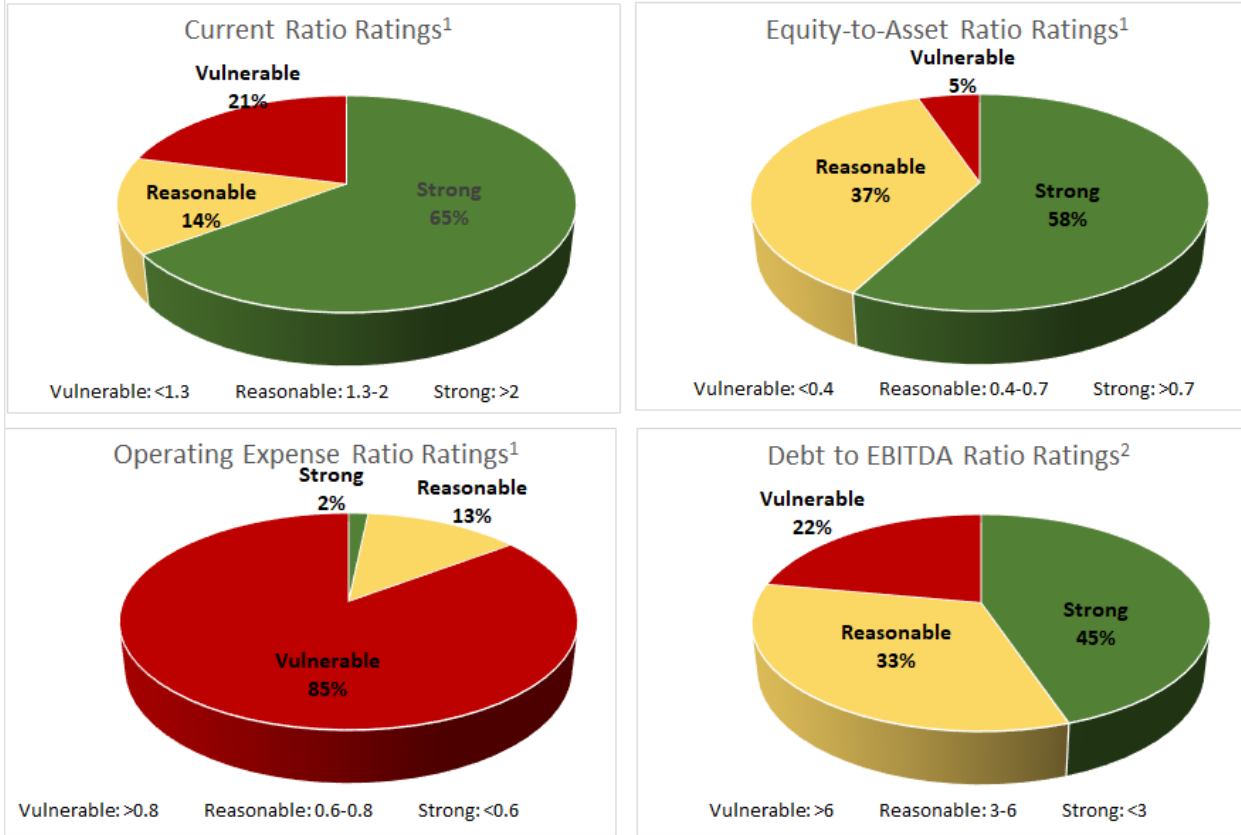
⁴ Net Margin: Gross Farm Revenue less Total Expenses, including depreciation.

⁵ EBITDA per Cow: Accrual based Earning before tax, interest, and depreciation/amortization.

Pennsylvania Financial Indicators

Assessing how 2023's economics impacted dairies, four financial indicators were evaluated: current ratio, equity-to-asset ratio, operating expense ratio, and debt to EBITDA ratio. These were chosen as barometers to liquidity, solvency, financial efficiency, and repayment capacity of the dairy operations. Given the greater reduction in milk income vs. input costs realized throughout 2023, dairies regardless of size, experienced greater economic stress in 2023. Herds were compared to the recommended guidelines from the Farm Financial Standards Council. The one difference to those recommended guidelines is the range for debt to EBITDA ratio. That range was established from industry recommended \$3,000 - \$6,700 debt per cow (Penn State Extension, 2018) and an average \$1,300 EBITDA per cow (Horizon Farm Credit, 2024). These ratings are not necessarily to be used as a scorecard to say farms did well or were not performing. The ratings offer insight into what metrics may be more critical to focus on, evaluate why a given metric is in a reasonable or vulnerable range, and what management practices or operational changes would be pertinent to address any shortcomings.

Figure 1: 2023 Financial Indicator Ratings



Notes:

¹ Recommended Ratings based on the Farm Financial Standards Council Guidelines, www.ffsc.org.

² Recommended ratings based on debt per cow recommendations (Penn State, 2018) and average EBITDA per cow (Horizon Farm Credit, 2023).

2023 delivered minimal returns and some challenges to dairies. Despite tighter margins, 65% of dairies maintained strong current ratios above 2 (for every \$1 of current debt these farms held, they had at least \$2 in current assets). In addition to strong liquidity, over half the farms rated strongly on their equity to asset ratio. This measure of solvency depicts that most farms have reasonable long-term business health. Another way to look at this metric for 2023 is that 9 in 10 farms can potentially incur a modest amount of additional debt to help spur their next business growth cycle. This remained unchanged from the previous year, but given the strength of 2022, and nominal returns in 2023, minimal financial stress was realized that would impact most farms' liquidity.

Financial efficiency is important to all businesses, especially dairy. Some markets are limiting the production growth potential through base programs, so constant evaluation and monitoring of financial efficiency is a key tool producers can deploy to help maintain net margins. This is a challenge for dairy especially. As previously stated, 50% of the cost to produce milk relates to feed alone. Given that expense pressure, it is very challenging to achieve the recommended 60% operating expense ratio, as was realized in 2023. Over 85% of dairies spent more than \$0.80 for every \$1.00 of revenue generated. This was expected given increased input costs including feed for most of 2023. As an operation increases past 80%, it limits the ability of the business to generate income to reinvest in the business. The final barometer evaluated for repayment is the debt to EBITDA ratio, which looks at how much debt does an

operation have per dollar of EBITDA generated. 2023 did realize a slight shift from the strong position of 2022 with just under half of dairies having strong levels for this ratio less than \$3 debt per dollar EBITDA. As we look to future years, it could be expected to see herds have greater variation like 2023.

Indicators still under consideration

Some of the identified indicators are being monitored for the past two years to evaluate calculations and comparability, specifically assets per cow, debt per cow, return on assets, and total revenue to total labor cost ratio. These metrics have several acceptable methods of valuation and calculation, resulting in some reporting discrepancies that are being monitored. The committee continues to review results to determine what changes may be warranted to improve the ability to share those metrics in the future.

Summary

2023 was a return to a moderate margin and increased financial challenges as compared to 2022. Establishing a longitudinal data comparison affords Pennsylvania the ability to help to identify common struggles or growth opportunities to help Pennsylvania dairies compete in the national and global markets. Despite variations in production and cost structures, the key for any dairy to be successful is to evaluate their unique situation and benchmark against themselves. This project would be enhanced by growing the number of dairies represented to get a more complete snapshot of Pennsylvania's dairy industry.

Sources

Horizon Farm Credit, 2018-2022 Dairy Success and Profitability Review, [Horizon Farm Credit | Horizon Farm Credit \(horizonfc.com\)](https://horizonfc.com); 2023.

Penn State Extension, Business and Production Guide for Dairy Cattle Operations, [Business and Production Guide for Dairy Cattle Operations - SARE Grant Management System](#); 2018.