

Dairy farm competitiveness: evaluation tools and tips for dairies of all sizes

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Abstract

Dairy farms cannot be competitive – nor can there be a viable future for the next generation – if they are not profitable. How do farms know they are profitable? What basic tools are needed to answer important financial questions? How can a farm improve profitability? These are important questions for farms of all sizes and levels of financial expertise. Veterinarians have the unique opportunity to discuss the impact of excellence in both cow and business management with their clients. With basic production information and financial documents including balance sheets and accrual-adjusted income statements, farms can easily calculate and monitor critical measures utilizing tools such as the *15 Measures of Dairy Farm Competitiveness*. State farm business analysis programs as well as some lenders and consultants provide opportunities for more in-depth analysis. Benchmarking financial performance against personal goals, industry standards and similar farms is a powerful tool allowing the farm manager opportunities to identify negative trends in sufficient time to initiate corrective actions. To effectively use benchmarks, the user must understand what each benchmark is actually measuring and how it is calculated, before comparing an individual producer's numbers to help their client meet their profitability goals.

Key words: profitability, benchmarks, competitiveness

How do dairy farms know if they are profitable?

Is the farm current or behind on their veterinary clinic account? Are there sufficient funds in the checking account to pay all of this month's bills? Is there cash in the checking account at the end of the year? Is the farm current on their loan payments? What is the line of credit balance? Was the line of credit paid down to zero during the year? Are there enough dollars available to meet family living needs? Was IRS Schedule F (farm) income positive or negative? While these types of questions have been and are still used on some dairy farms to evaluate farm profitability, they are not the best or most proactive way to evaluate and manage farm profitability.

The most accurate and reliable way to evaluate the profitability of a farm business is through regular, at least annual, analysis of the business's performance. A profitable farm's income statement will show a positive net farm income of sufficient size to generate family living appropriate for the size of the farm business, make scheduled principal payments, meet income tax obligations, build cash reserves, and/or re-invest in the business or invest off-farm. Net worth, as measured by the balance sheet, should increase from the beginning to the end of the year as a result of good business management decisions. Analysis can be done by the farm family, an accountant, consultant, or through a formal analysis program such as the Ohio Farm Business Analysis (FBA) Program. The year-end analysis should be accrual-adjusted. In other words, it includes all income generated by the farm business and expenses incurred by the farm

business for the year being analyzed regardless of when the income was received or the expenses paid. Accrual adjusted income statements will also reflect any changes in inventories that occurred during the business year. This is particularly important when expenses are prepaid to manage income tax liabilities, when payment of expenses are deferred during times of cash flow difficulties, or inventories change significantly during the year.

Basic tools needed to answer important financial questions

Standard financial statements include the balance sheet, income statement, statement of owner's equity, and the cash flow statement. Beginning and end-of-year balance sheets and the year's income statement are required to accurately evaluate the profitability of a farm.

Balance sheets

The balance sheet provides a financial picture of the dairy farm business on the date of the balance sheet that describes the assets (what is owned by the farm) and the liabilities (what is owed to others) of the farm business. Sole proprietorship balance sheets usually include personal assets and liabilities in separate schedules from the farm assets and liabilities. Balance sheets for farms organized as corporations or Limited Liability Companies (LLCs) do not include personal assets. Some farms may hold assets and liabilities in more than one business entity for transition or liability management purposes. When farms participating in Ohio's FBA program are comprised of more than one entity, the balance sheets and income statements are consolidated so the entire business can be fully evaluated and compared to other farms on an equivalent basis. Evaluation of a complete, well-constructed balance sheet can answer important questions about the cash position of the farm business (current ratio and working capital) and the farm's overall debt position (debt to asset ratio).

Income statements

A good income statement begins with a good bookkeeping system. Farms can generate excellent records with paper-based systems as well as basic and more advanced computer-based accounting software. They can also generate poor records with the same systems. Farms should use the system that works best for them and that generates the level of detail needed to make informed and effective decisions for their farm. Traditionally, farm financial records have been kept so that the farm can complete their income taxes. While this is an important use of these records, they can also provide tremendous information that should be used to monitor and manage the farm business. Most farms use cash-based accounting and complete income taxes using those cash-based records.

Net farm income is an important measure of a farm's profitability and is calculated in steps. An accrual-adjusted income

statement begins with gross cash income less total cash expenses. The difference between these equals net cash income. Accrual adjustments are made in the second step by comparing the value of current assets including prepaids and supplies, growing crops, accounts receivable, market livestock inventories, crop and feed inventories, and other current assets, as well as breeding livestock and current liabilities including accounts payable and accrued interest at the beginning and the end of the year using the farm's balance sheets. The net change in value of these asset and liability categories are added or subtracted from net cash farm income which results in the farm's net operating profit. The final step is to include a charge for the economic depreciation representing normal use, wear and tear on machinery, equipment, buildings and improvements used in the production of milk, replacement heifers and any feed raised on the farm in the year being evaluated. The Ohio FBA standard economic depreciation rates are 7% of the value of machinery and equipment, 15% for titled vehicles, and 5% for buildings and improvements. This depreciation charge is not actually "paid" in cash each year. Purchases of these assets happen over time and require larger cash outlays in the year purchased. This economic depreciation charge recognizes that over time a business must generate the funds to replace their physical assets if they wish to continue in the dairy business.

Importance of accrual-adjusted calculations

Effective business evaluation and financial decisions are made using accrual-adjusted information. Cash accounting can under- or over-state actual performance. The following example illustrates the impact of using balance sheet information as well as cash paid during the business year to calculate the total cost of feed fed to produce milk in the year being evaluated.

Example: A 100-cow dairy sold 2,500,000 pounds or 25,000 hundredweight (cwt) of milk in 2020 and purchases all of their feed. Their 1/1/2020 balance sheet showed that they had prepaid feed and feed inventories worth \$85,000 to be fed in 2020, as well as an accounts payable total of \$20,000 for feed that was fed in 2019, but not yet paid for on 1/1/2020. Cash paid for feed in 2020 totaled \$300,000. Their 1/1/2021 balance sheet showed prepaid feed and feed inventories worth \$110,000 to be fed in 2021, and an accounts payable total of \$5,000 for feed fed in 2020 that had not yet been paid for on 1/1/2021.

2020 cash basis feed cost:

Total feed cost = \$300,000 (cash paid for feed in 2020)
Feed cost per cwt = \$300,000/25,000 cwt = \$12 per cwt

2020 accrual adjusted feed cost:

Total feed cost =
\$85,000 - \$20,000 + \$300,000 - \$110,000 + \$5,000 = \$260,000
Feed cost per cwt = \$260,000/25,000 cwt = \$10.40/cwt

While the cash basis feed cost is easier to calculate, the accrual adjusted calculation includes only the cost of the feed that the cows consumed to make the milk sold in 2020 and is the accurate 2020 feed cost.

Enterprise analysis

Farms that complete enterprise analysis with the Ohio FBA program can evaluate profitability on a per cow and per cow basis. Farms choose to participate in the program, so this is not a large or a random sample, but is typically fairly representative of the range of sizes and management systems found in Ohio. The bottom-line numbers in the dairy enterprise analysis are cost of production per cwt, and net return per cow (Table 1). Average net return per cow for all farms varies from year to year, influenced primarily by milk and feed markets. Direct and overhead cost of production (COP) for all herds ranged from \$18.45 to \$19.30 per cwt, averaging \$18.95 with a 4-year average net return per cow of \$320, ranging from a loss of \$155 per cow in 2018 to a positive \$759 per cow in 2020. The summary also presents average data for the top 20 to 25% of farms sorted by net return per cow. While cost per cwt averaged 9% less for the high performing group, or \$17.24 per cwt, average net return per cow was nearly three times higher, averaging \$901 per cow from 2017 to 2020. With sufficient cow numbers, these farms are very competitive, and have greater opportunities to build cash reserves and invest in the future of their dairy farms.

Evaluating dairy farm competitiveness – a tool

In the mid-1980's, Ohio dairy farmers began to experience increasing volatility and uncertainty in milk prices, and declining margins. As these conditions intensified, farmers asked

Table 1: Comparison of total cost of production (COP) per cwt and net return per cow, average and high 20%, conventionally managed Ohio dairy farms, 2017 – 2020.

	2017	2018	2019	2020	4 year average
Number of herds	28	19	17	18	
Average of all herds					
Direct + overhead COP per cwt.	\$18.73	\$18.45	\$19.30	\$19.30	\$18.95
Net return per cow ¹	\$424	(\$155)	\$250	\$759	\$320
Average of high 20% - 25% ²					
Direct + overhead COP per cwt.	\$17.69	\$15.48	\$17.24	\$18.54	\$17.24
Net return per cow ¹	\$802	\$748	\$897	\$1,156	\$901

¹ Before labor and management charge

² Sorted by net return per cow

Data from Ohio Farm Business Analysis Program. The Ohio State University

Ohio State University's Dairy Excel Team how they should evaluate their farm businesses to help them answer two important questions: 1) How do I know if I am competitive? and 2) How do I know if I am ready to expand my herd? Generally, these farms did not have extensive financial documents to help answer these questions. With these factors in mind, the team developed and published the 15 Measures of Dairy Farm Competitiveness¹ in October, 1997. Revisions in January 2008 and January 2019 responded to on-going changes in the dairy industry.

The 15 Measures are designed for farmers to be able to calculate the 11 production and financial measures using basic production information including cow numbers and cwt of milk sold, their cash-based income statement, and basic balance sheets and then compare their results to competitive levels (Table 2). Text for each measure includes a formula, an example calculation, and a brief discussion including assistance in making accrual adjustments when needed, how to interpret the benchmark, suggestions if the benchmark is not being met, and related measures to consider.

Additional tools – farm business summaries and databases

Many states have farm business analysis programs operated by land grant universities, community colleges, private

organizations, or accounting firms. These programs offer farms the opportunity to receive assistance translating their farm's information into a complete financial analysis of the whole farm, as well as dairy and crop enterprise analysis. In Ohio, FBA participants receive personalized benchmark reports for their farm's financial performance as well as for the dairy and crop enterprises which includes costs of production per cow, cwt, acre, ton and bushel. These enterprise specific benchmark reports show the range of income and expenses broken down into 10 percentile groups. This type of report is helpful to show the range of performance achieved by similar farms operating under similar conditions. FBA programs publish annual summaries that are available to non-participating farms desiring to compare their performance to the average of all farms, the average of the highest performing farms, or the enterprise benchmark reports.

Effective use of benchmarking tools

Benchmarks can be very useful to help managers compare their performance to either industry standards, other farmers or both. Critical questions must be asked and answered before using a benchmark. These questions include:

- Where did the benchmark come from?
- What does the benchmark include?
- How is it calculated?
- What value does it have to the farm's business?

Table 2: Financial benchmarks, 15 Measures of Dairy Farm Competitiveness¹.

Measure	Competitive level
Rate of production	
1. Pounds of milk sold per worker	≥1,000,000 energy corrected milk in a freestall/parlor
Cost control	
2. Feed cost per cwt of milk sold Income over feed cost	Top 25% Top 25%
3. Operating expense ratio (OER)	OER ≤ 70%
Capital efficiency	
4. Dairy investment per cow	≤ \$11,000 per cow
5. Asset turnover ratio (ATR)	ATR ≥ 0.60
Profitability	
6. New farm income (NFI) Rate of return on farm assets (ROA)	NFI ≥ \$1,300 per cow ROA >10%
7. Rate of return on farm assets (ROA)	ROA >10%
Liquidity	
8. Current ratio (CR) Working capital (WC)	CR 3.0 to 3.5 WC ≥ 25% of gross revenue
Repayment schedule	
9. Scheduled debt payment (principal, interest, and capital lease payments).	<10% of gross receipts <\$400 per cow
10. Debt to asset ratio	≤ 30%
11. Debt per cow	<\$3,300 if not expanding <\$4,300 during expansion

Where did the benchmarks come from?

Benchmarks should be relevant to the conditions in which the farm is operating. The 15 Measures of Dairy Farm Competitiveness were developed for Midwest dairy farms, using multiple years of data from the Ohio FBA program, Cornell University's New York Dairy Farm Business Summaries, and the Farm Credit East Northeast Dairy Farm Business Summaries. These data sources are from similar Midwest farms or Northeast farms that operate in similar climate, market and growing conditions as Ohio farms. Data from these sources was standardized and the average performance of all farms was compared to the highest performing, most competitive farms to set current competitive levels.

The Farm Finance Scorecard³, developed by the Center for Farm Financial Management at the University of Minnesota and University of Vermont Extension, is an excellent tool for benchmarking standard farm financial measures, specifically the 21 financial measures identified by the Farm Financial Standards Council. The 15 Measures competitive levels for some of these measures are more rigorous as it identifies levels achieved specifically by the most competitive dairy farms.

What does the benchmark include?

This is an important question for any benchmark, but benchmarks that measure costs such as feed costs or cost of production per cow or per cwt are particularly sensitive. Are costs for the milking herd, milking and dry cows, or all adult cows and the replacement herd? Do feed costs include both concentrates and forages? Purchased feeds and home-raised feeds? How are raised feeds valued? Using market price, direct cost of production, or direct and overhead cost of production? If the benchmark does not include that information, find one that does so the farm can calculate their number using the same factors. If the farm's numbers are calculated differently than the benchmark, the comparison has no value and should not be used to make decisions.

How is it calculated?

A good benchmark should include a formula and indicate what information is needed to calculate the benchmark. Generally, financial benchmarks involving income or expenses should be accrual adjusted.

What value does it bring to the farm's business?

There are many production and financial benchmarks related to dairy farms. The 15 Measures of Competitiveness focus on benchmarks that are good indicators of efficiency, financial performance, and non-financial management priorities (mission, maintaining standard of living, maintaining a motivated labor force, and manure nutrient management) critical for success in today's dairy industry regardless of farm size. Farm managers should add additional benchmarks related to specific goals or issues faced by their farm.

Bottom line, is the farm profitable?

To ensure long-term success in the dairy industry, farms must be profitable most of the time. Milk and feed markets are increasingly volatile and susceptible to unanticipated events, and changing weather patterns add additional uncertainty and risk magnifying the need for farms to build cash reserves when possible. Accurate and complete annual financial analysis provides farms with solid data to evaluate profitability, identify strengths and concerns as they review both current performance and trends over time, and make financial decisions. For farms that may not have extensive financial data, tools such as the *15 Measures of Dairy Farm Competitiveness*¹ provide a framework to begin evaluating a farm's performance and comparing it to competitive levels, helping the farm management team identify areas of strength and opportunities to improve. It is important to note that farms should calculate all of the measures to get the most complete picture of their farm business.

Even competitive farms may not achieve the competitive level of all of the measures at any given time. For some measures they may never achieve the competitive level. For example, a farm may have a high level of debt, but is very efficient and is profitable. Another farm may have a very low level of debt (a very competitive level) but be inefficient and unable to generate positive net farm income. Farm managers must look at the array of financial indicators as well as overall farm profitability as they work to build and maintain competitive dairy farms that are prepared to meet future challenges and thrive.

Benchmarking resources and references

1. 15 Measures of Dairy Farm Competitiveness. Shoemaker, DE, Eastridge, ME, Weiss, WP., et al, 3rd ed. The Ohio State University, 2019. <https://dairy.osu.edu/sites/dairy/files/imce/2019%2015%20Measures%20of%20Dairy%20Farm%20Competitiveness%20Final%20%281%29.pdf>. Accessed Sept 25, 2021.
2. 2020 Ohio farm business summary, Dairy enterprise analysis with benchmark reports, Shoemaker, DE, Shoemaker, H., The Ohio State University, 2020. <https://farmprofitability.osu.edu/sites/fprofit/files/imce/2020%20Dairy%20Summary.pdf>. Accessed Sept 27, 2021.
3. Farm Finance Scorecard, Center for Farm Financial Management, University of Minnesota., 2014. <https://www.cffm.umn.edu/wp-content/uploads/2019/02/FarmFinanceScorecard.pdf>. Accessed Sept 27, 2021.

