

*Dairy Grazing*

# Keys to Building a Profitable Pasture-Based Dairy

Pasture-based dairy producers sometimes summarize their guiding philosophy simply as, “Grow all the pasture you can grow, and let the cows harvest every pound you grow.” This statement captures their focus on operational efficiency, capital efficiency and cost control, all of which are important for a dairy to be profitable. Observations of top producers suggest the following activities are key to creating a consistently profitable pasture-based dairy farm:

- Design systems
- Focus investments
- Control costs
- Leverage carefully

This publication expands upon each of these key activities to guide producers in developing and improving the profitability of their pasture-based dairies.

## Design systems

A profitable producer designs a pasture-based dairy to be an internally consistent whole farm made up of components working together to produce low-cost milk (Figure 1). The producer examines each component to see how well it fits the system. When a component doesn't fit the system, problems arise and costs emerge to correct them. Top managers see these emerging costs

## Dairy grazing publication series

This publication is one in a series about operating and managing a pasture-based dairy. Although these publications often refer to conditions in Missouri, many of the principles and concepts described may apply to operations throughout the United States.

as symptoms of an underlying system failure rather than signs of the rising cost of doing business as usual.

## Forage

The secret to profitable milk production in any dairy system is to feed lots of high-quality, low-cost forage. A grazing system that delivers high-quality, low-cost forage can be established by following these three guidelines:

- Seed pastures to a grass or grass-legume mix selected to deliver high-quality pasture.
- Seed most paddocks in the system to a forage mix selected to persist for years to avoid the high costs of reseeding and feeding during reseeding.
- Seed some paddocks with annuals to graze during seasonal growth and quality deficits to avoid feeding high-cost stored forage and supplements.



Figure 1. The pasture-based dairy system as a whole.

Written by  
**Joe Horner**, State Specialist, Agricultural Business and Policy Extension  
**Ryan Milhollin**, State Specialist, Agricultural Business and Policy Extension

Designing pasture systems for quality, persistence and seasonal deficits is essential for low-cost dairying.

## Stocking rate

Pasture-based dairy systems in Missouri can be profitable with stocking rates ranging from three cows per acre to three acres per cow as long as the total system is designed consistently for profitability. For landlocked dairy farms with limited acreage sitting on expensive land and with sunk investments in silos, freestall barns and silage systems, a hybrid grazing–confinement system with a heavy stocking rate and lots of purchased feed can improve profitability. For a dairy without those constraints and facilities, a less intensive stocking rate that enables cows to harvest about 70 percent of their annual dry matter needs through grazing can be profitable. This less intensive system can result in extremely low-cost milk production. Although stocking rates are often implicitly designed into a grazing system, few single decisions can have as many impacts upon whole-farm profitability as stocking rate. Managers of profitable dairies should be careful when changing stocking rates in pursuit of higher margins or higher returns on capital lest they find themselves upsetting the whole system.

## Cows

Cows need to be selected to produce, persist and reproduce on pasture. An example of an inconsistently designed system would be one that expects purebred confinement-raised Holsteins to produce milk, rebreed in a seasonal calving window and persist for years in the herd while being fed mostly pasture with minimal supplementation. Two popular methods of top producers for obtaining appropriate cows are crossbreeding for heterosis (performance vigor often exhibited by crossbred animals) and selecting dairy cattle genetics proven to perform on pasture.

## Facilities

Facilities — including lanes, holding area and parlor — must be designed so that cows can be moved quickly from a paddock, milked and returned to the paddock in two hours or less in all kinds of weather. Poorly designed facilities impede cow flow, lower labor efficiency and lower milk production due to lost grazing time.

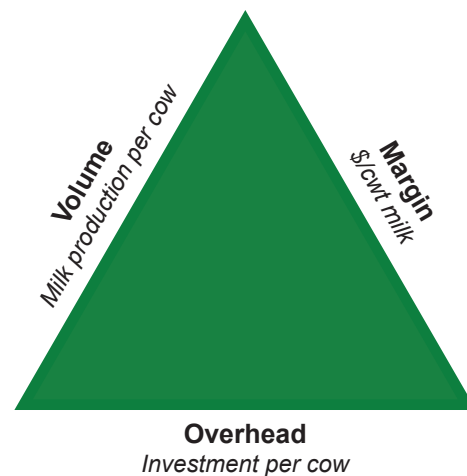
## Labor

Labor efficiency can be designed into a dairy system. As described under *Facilities*, the system should include a labor-efficient parlor and holding area with crowd gate. In addition, other labor-saving techniques, such as batch breeding, can be designed into the system. Batch breeding allows tasks such as feeding calves, breeding

and drying off to be done in short bursts of concentrated work. This batching of the workload allows more cows to be milked and more milk to be harvested by each worker, which lowers labor costs and contributes to profitability.

## Profitability triangle

Finally, the system must be designed so that the three sides of the dairy profitability triangle (Figure 2) are in balance and support each other. Each pasture-based dairy develops a farm-specific system that balances lower milk *volume*, higher gross *margins* and reduced *overhead* to create attractive returns to farmers. Remember, the goal is not to achieve maximum milk production but to sustain a low cost of production and generate enough milk production to achieve profitability. The greatest potential for gain in profitability is achieved by getting the whole system right and not by fine-tuning various aspects of the operation.



**Figure 2.** Dairy profitability triangle in balance.

U.S. dairy producers are used to receiving good technical information from vendors. These vendors typically supply helpful information about ways to improve marginal profitability via purchased inputs in conventional dairy systems focused on achieving higher milk production per cow. Few vendors supply helpful information about designing profitable dairy grazing systems, which often leaves pasture-based dairy producers to create their systems through trial and error. Top-performing pasture-based dairy producers are one of the best sources of ideas for refining grazing systems, so find opportunities to network with them.

## Focus investments

Investments should be focused on land and cattle to avoid overcapitalizing the farm. Favor investments that reproduce or appreciate rather than ones that rust, rot

or depreciate. Invest with discipline and only in critical assets needed for the operation.

An example of the impact of focusing investments wisely to achieve capital efficiency can be found in the comparison of two farms in Figure 3.

	Farm A	Farm B
Total assets	\$850,000	\$600,000
Gross margin before debt	\$75,000	\$75,000
Debt service	\$36,000	\$24,000
Net margin	\$39,000	\$51,000
Net margin/assets	4.6%	8.5%

**Figure 3.** Capital efficiency example.

Farm A and Farm B both have 100-cow herd sizes, but they have different initial capital investments in their operations, \$850,000 versus \$600,000. Both farms have identical operating expenses and debt structures (50 percent debt, 5.5 percent interest rate and 20-year amortization term). Farm B has a lower investment, lower total debt and, thus, less interest to pay. Farm B achieves a higher net margin due to having a lower interest-expense. Farm A and Farm B produced returns of 4.6 percent and 8.5 percent, respectively, even though the operational costs, excluding interest, were the same. Figure 4 depicts the huge lifetime-differences that can be achieved by small differences in profitability.

Mr. Average	Mr. Excel
25 years old	25 years old
Inherits \$200,000	Inherits \$200,000
Invests in his own dairy	Invests in his own dairy
Earns and reinvests at a <b>4 percent</b> return over the next 40 years	Earns and reinvests at a <b>6 percent</b> return over the next 40 years
Retires at 65	Retires at 65
Net worth = <b>\$960,204</b>	Net worth = <b>\$2,057,143</b>

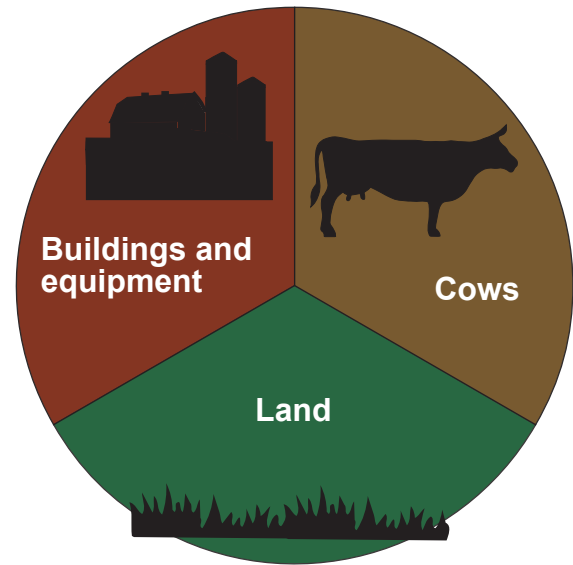
**Figure 4.** Return on assets (ROA) differences impact on wealth accumulation.

In this example, two farmers inherit the same assets at age 25. Both are successful. However, by being a bit better manager, Mr. Excel attains two percent higher return on assets each year than Mr. Average. At the end of a 40-year career, Mr. Excel's net worth will have grown to twice that of Mr. Average.

Dairy producers can become capital efficient by carefully analyzing possible capital investments to determine if they are really needed on an operation. Does the operation really need that extra tractor or three different types of forage equipment? Small dairy farms

especially should have an appropriate level of machinery and not invest heavily in depreciable assets. Custom operators can be cultivated and trained to make hay or silage when needed for dairy operations, allowing for less owned harvesting equipment.

Additionally, top managers are careful not to overinvest in milking parlors and instead make appropriate investments based on herd sizes. Generally, pasture-based dairies allocate one-third of the investment each to cows, buildings/equipment and land (see Figure 5).



**Figure 5.** Allocation of investments on a pasture-based dairy.

## Control costs

Cost control is important on any dairy farm, but on a grazing dairy with lower gross revenues per cow, carving every unnecessary penny out of the cost structure is crucial to profitability.

A good whole-farm measure of cost control is the operating expense ratio. This ratio is the proportion of total revenue absorbed by operating expenses. It is calculated by dividing total annual operating expenses (minus depreciation) by gross revenue.

Generally on a pasture-based dairy, a strong operating expense ratio would be less than 70 percent. As the ratio decreases, more dollars are available for loan payments, family living expenses, savings and dairy improvements. The operating expense ratio is an effective indicator of a dairy farm's cost control (Figure 6).

Vulnerable	Caution	Strong
Greater than 80%	70 to 80%	Less than 70%

**Figure 6.** Scorecard for a pasture-based dairy: operating expense ratio.

## Leverage carefully

Leverage is the relationship between the amount of equity capital and the debt used to finance the dairy business. Financial leverage must be used carefully and only when adding debt clearly enhances long-term profitability. Seek the absolute lowest-cost financing available. Dairy producers with conservative debt levels can more easily negotiate better terms among different bankers and refinance as needed.

Debt structure is also important to the financial flexibility of a pasture-based dairy operation. Improperly structuring debt can be a critical mistake because it impedes the dairy's ability to cash flow during tough financial times. The key is to keep annual principal and interest payments as low as possible. Amortizing debt long term using the land base as collateral is one strategy that has been used by farmers. Pasture-based dairy producers need to have the discipline to pay down debt during good years to minimize total interest costs. They also need to avoid taking on short-term debt to buy cows and machinery unless absolutely necessary.

Debt per cow		\$1,500	\$2,500	\$3,500	\$4,500
% short-term	% long-term	Annual principal and interest payment			
100	0	\$353.68	\$589.46	\$825.24	\$1,061.03
75	25	\$291.06	\$485.10	\$679.14	\$873.18
50	50	\$228.44	\$380.74	\$533.03	\$685.33
0	100	\$103.21	\$172.01	\$240.82	\$309.62

Assumptions:

- (1) Short-term: 5.75 percent interest rate and 5-year amortization period.
- (2) Long-term: 5.5 percent interest rate and 30-year amortization period.

**Figure 7.** Impact of debt structure on principal and interest payments.

An example of the impact of different debt structures can be found in Figure 7. Consider the \$2,500 debt per cow example. A dairy farmer securing this debt through 100 percent short-term (5-year) financing would pay \$589.46 per cow per year. If the farmer were to secure the debt through long-term (30-year) financing, the annual payment would be only \$172.01. That is 71 percent less. Borrowers can always pay down principal and prepay on farm loans. Having cash flow during tough financial years allows farmers flexibility to withstand a year or two of low milk prices or other financial hurdles that inevitably arise. As important as debt structure is,

the amount of debt that a dairy can support is equally important. Operations that are too financially leveraged are more susceptible to financial problems due to loan obligations that are too great to support during challenging times. Two good debt guidelines exist for pasture-based dairy operations:

- Keep debt per cow less than gross sales per cow
- Keep debt service (principal and interest payments) less than 15 percent of gross revenue

Debt-to-asset ratio is another measure of financial leverage. This ratio is calculated by dividing farm debt by the total farm assets. Farms that have less than a 40 percent debt-to-asset ratio are considered to be “strong.” This ratio is important to lenders because it is also a solvency measure. Solvency refers to the ability of a business to meet all debt obligations following the sale of assets. Lenders are rarely interested in financing operations that have high debt-to-asset ratios as these operations have considerably higher financial risk.

Vulnerable	Caution	Strong
Greater than 50%	40 to 50%	Less than 40%

**Figure 8.** Scorecard for a pasture-based dairy: debt-to-asset ratio.

## Summary

Profitability needs to be embraced by employees and management of pasture-based dairy operations. Incremental improvement in profitability can dramatically increase cash or wealth accumulation over time. Creation of a profitable pasture-based operation involves four key activities: Design an appropriate system, focus the investments, control costs and leverage finances carefully. Each component of a pasture-based system (cows, forages, facilities and human resources) has to coordinate with the others to create a profitable system of production. Dairy farmers need to understand operational efficiency measures to measure and improve profitability. An effective way to monitor and evaluate operating costs is to calculate the operating expense ratio. Farmers need to understand the financial implication of each decision they make to use their capital efficiently and should use leverage only when it improves their profitability. Farmers should properly structure and not excessively leverage their operations to minimize financial risk.