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Risk Assessment and Decision-Making Guidelines for Dairy Risk Management: Part 1

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Contents

- 1 Introduction
- 1 Strategic Plans
- 2 Relevance and Evaluation of Balance Sheets
- 4 Relevance and Evaluation of Income Statements
- 6 Relevance and Evaluation of Net Cash Flow
- 7 Conclusion
- 7 Further Reading



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Introduction

UNCERTAIN ECONOMIC CONDITIONS constantly challenge the viability of dairy producers. Milk prices can jump or fall unexpectedly, resulting in volatility, while at the same time U.S. milk production continues to grow, increasing supply. Dairy farmers have tackled some of the rising surplus through exports, although with limited success. Just as important, increased consolidation within the dairy industry has brought about fewer and larger-sized dairy farms, challenging the viability and sustainability of smaller-scale operations. Indeed, many of the latter have gone out of business. As a result there is a growing critical need, especially for owners of medium- and smaller-sized dairies, to make use of financial and risk management tools, including 2018 farm bill dairy programs, to address their economic viability (Soergel 2018; Higgins 2018).

This three-part series of bulletins, based on workshops recently conducted throughout Idaho, offers various tools and guidelines to improve dairy producers' risk-management assessments and decision-making. Part 1 addresses (a) how to develop a strategic plan for a farm business; (b) balance sheets; (c) income statements; and (d) net cash flow, as well as it delineates the crucial roles all four play in maintaining a successful dairy enterprise. Parts 2 and 3 expand the discussion. Part 2 addresses (a) partial budgets and (b) capital investments; part 3 addresses price-protection strategies by hedging with futures contracts.

Strategic Plans

A strategic plan covers the long-, medium-, and short-term business directions implemented by a dairy company. The long-term direction considers the *vision* of an organization. This involves asking and addressing how and where a dairy producer pictures her/himself and/or the dairy producer's

family in the long term as a dairy business. (All dairy producers in Idaho are family owned, so it is valid to consider the family members.) There are many ways to define your vision, but an example might be “being proper stewards of the (farm) land and cows...”

Related to an organization’s vision is its *mission*. Typically, it is a central statement that describes the overall purpose or primary objective of a dairy business, one that accords with an organization’s vision and the dairy industry’s “big picture.” Consequently, it may include themes such as “we aim to stay within the range of 50% to 75% of the farm’s net worth.” It may also affirm the importance of a dairy business’ values. Examples might include showing respect for employees and customers, producing wholesome and nutritious dairy products, or advocating animal welfare. Given its breadth, an organization’s mission statement significantly influences management decisions.

The mission statement should also define the scope or framework that bounds a business. The framework outlines a variety of business aspects, delineating, for example, the minimum level of investment in machinery, the level of awareness and care of the surrounding environment, the level of debt (either high, low, or medium) that the business will carry, or the dairy cow breed(s) chosen.

Once defined, the mission enables an owner to set the *goals* of the business. Goals should be *SMART*, that is *Specific, Measurable, Achievable, Relevant, and Time-Based*. Examples of goals include setting aside \$25,000 (or some other amount) per year from earnings for the next five years; reducing somatic cell counts to less than 200,000 by the end of year 202X; buying 300 ac of land by January 202X; increasing total assets to \$30 million by December 202X; or increasing the *liquidity ratio* or *current ratio* by more than 2 in the next three years. When evaluating goals, take care not to arbitrarily change them when facing difficulties. Instead, reevaluate the situation—you may need to establish additional supplemental goals, rather than replace them.

Operating plans may sometimes be combined with the *strategic plans*. Strategic plans help maintain a dairy owner’s focus on the big/overarching picture of the business, while operating plans keep her/his

focus on the details. Examples of this include a midterm plan (perhaps covering 3–5 years), one that is very detailed for the initial years and that allows for increased flexibility toward the end of the planned period.

Relevance and Evaluation of Balance Sheets

A *balance sheet* provides a snapshot of a dairy operation’s current financial position or financial valuation. As a portrait, it will most probably change by the next period when it is “retaken,” which generally occurs at year’s end. (A balance statement usually dates its record of the value of all items to the last day of the calendar year.) Examples of items tabulated in a balance sheet include assets or loans, so updates at the end of the following year may include additional assets, loans obtained or paid down, or other financial changes. The balance sheet organizes and illustrates “all that you own and all that you owe.” What you own outright is *equity*, while what you own but pay for using a loan are *liabilities* (Figure 1).

Assets are all the items and other investments that a dairy farmer owns (for the dairy operation). On a balance sheet they are generally listed in order of liquidity or in how quickly (in length of time) the asset(s) can be converted into cash. Assets include land, buildings and improvements, machinery, livestock, and equipment. The value of each asset is the *net market value* (the price at which it can be sold, not its original purchase price).

Current assets are generally defined as items that will be used up or can be turned into cash within one year. These include cash, money savings or certificates of deposit (CDs), feed, fertilizer or seed inventories, and accounts receivable, such as shipped milk or livestock that is up for sale. *Intermediate assets* assist in the production process, having one to ten years of useful life. Examples of these include breeding livestock, milk storage tanks, or other equipment. *Long-term assets* are considered to have a useful life of more than ten years. Examples of these include land, buildings, and improvements.

Liabilities are all that is owed (as a function of the dairy operation), such as credit card debt, accounts payable, expenses accrued, operating loans and

lines of credit, term debt for machinery loans, cattle loans, and mortgages. Like assets, they separate into current, intermediate, and long-term liabilities. *Current liabilities* refer to debts that a dairy owner intends to pay off within the coming year. These include accounts payable (feed, veterinarian), accrued expenses (wages, loan interest), accrued taxes (income tax), operating loan principals, and interest on long-term loans. The notes on *intermediate liabilities* are lengthier, generally between one and ten years. These may include cattle loans, machinery loans, or other loans that expire within ten years. *Long-term liabilities* have a life longer than ten years and typically involve dairy farm mortgages.

Equity is equal to *total assets* minus *total liabilities*. That is, what you own as “personal money” or personal worth is equal to all that you have in your possession minus all that you owe.

The relevance of balance sheets cannot be overstated. You can use the sheets to track a business’ financial growth or decline across different years. This is a very beneficial exercise, because it can help an owner to identify potential problems, like increasing liabilities and/or decreasing assets. Furthermore, it’s an important tool for lenders: they use a balance sheet to evaluate a dairy farm’s credit strength, based on its liquidity, solvency, debt structure, collateral, and other financial factors. Thus for dairy owners/managers it is especially beneficial to identify patterns as they navigate toward achieving their financial and personal goals.

The term *solvency* refers to a farm’s ability to cover all of its liabilities with the assets (equity) from the operation. The higher the proportion of funding supplied directly by the farm, the less risk faced by its creditors. Two common solvency ratios are the *debt/asset ratio* and the *equity/asset ratio* or equity percentage.

Figure 1. A balance sheet.

Assets		Liabilities	
Current Assets	Value	Current Liabilities	Value
Cash and checking	\$10,500	Feed bill payable	\$962,550
Savings	\$30,000	Taxes payable	\$22,088
Feed inventories	\$105,400	Operating loan balance	\$916,670
Prepaid expenses	\$30,070	Accrued interest	\$5,580
Accounts receivable	\$46,500	Term debt principal due	\$402,467
		Accrued interest	\$19,059
Total current assets	\$222,470	Total current liabilities	\$2,309,354
Intermediate Assets		Intermediate Liabilities	
Dairy Cattle		Equipment loan principal remaining	\$1,471,524
Lactating cows	\$895,900	Livestock loan principal remaining	\$0
Dry cows	\$171,120		
Heifers	\$748,650		
Machinery & equipment	\$1,705,000		
Personal assets			
Retirement accounts	\$139,500		
Total intermediate assets	\$3,660,170	Total intermediate liabilities	\$1,471,524
Long-Term Assets		Long-Term Liabilities	
Land and buildings	\$5,022,000	Mortgage principal remaining	\$2,029,530
Improvements			
Total long-term assets	\$5,022,000	Total long-term liabilities	\$2,029,530
TOTAL Assets	\$8,904,640	TOTAL Liabilities	\$5,810,408
		NET WORTH (Owners Equity)	\$3,094,233

The debt/asset ratio is the proportion of assets obtained or provided from liabilities. The smaller the debt/asset ratio, the lower the financial risk faced by the dairy producer. If this ratio is high, for example at 70% or higher, bankers or creditors may be hesitant to lend money.

The *debt ratio* is expressed as a percentage:

$$\text{Debt Ratio (\%)} = \frac{\text{Total Liabilities (\$)}}{\text{Total Assets (\$)}} \times 100$$

Generally, maintaining a debt ratio percentage at or below 30% is very beneficial, especially when submitting an application to lenders during a credit crunch. Those scoring a ratio above 30% and below 70% should proceed cautiously and begin working to lower it. A ratio above 70% should be considered a blinking red light to a dairy business owner, indicating danger if not reconciled or lowered as soon as possible. The following calculation (see Figure 1) provides an example of a problematic debt ratio, one that the owner should hold cautiously and seek to lower in the near future.

$$\text{Debt Ratio} = \frac{5,810,408}{8,904,640} \times 100 = 65.25\%$$

Another measure of solvency refers to the equity/asset ratio. This refers to the proportion of assets obtained from (or provided by) the equity of a dairy operation. Contrary to the debt/asset ratio, the larger the equity/asset ratio the lower the financial risk faced by a dairy producer. If this ratio is big, it is much more likely that creditors will be willing to lend a client money. The *equity ratio* is expressed as a percentage:

$$\text{Equity Ratio (\%)} = \frac{\text{Total Equity (\$)}}{\text{Total Assets (\$)}} \times 100$$

Again, contrary to a debt ratio, a business that scores an equity ratio larger than 70% is considered very sound and enough of a favorable risk to merit the receipt of loans from creditors. If the ratio is between 30% and 70%, however, a dairy producer should be cautious; if it dips below 30% s/he must make changes in the business as soon as possible to increase it, particularly if pursuing a loan. For example, the equity ratio from Figure 1,

$$\frac{3,094,233}{8,904,640} \times 100 = 34.75\%,$$

should be held with caution; the recipient of such a score should endeavor to increase the ratio as soon as possible.

Liquidity refers to *current ratio*, an actual number whose calculation is

$$\text{Current Ratio (without units)} = \frac{\text{Current Assets (\$)}}{\text{Current Liabilities (\$)}}$$

Creditors like to see current ratios larger than 1.0, which imply immediate full coverage of a creditor's claims. Low current ratios of less than 1.0 indicate that a dairy business struggles to pay its (up-to-one-year) bills, since current liabilities are larger than current assets. As an example from Figure 1, consider the following current ratio:

$$\frac{\$222,470}{\$2,309,354} = 0.096$$

It's a very low ratio, one that indicates that only a bit less than 10% of current liabilities can presently be covered. The dairy business needs to address this immediately.

Another measure of liquidity refers to *working capital*, defined in actual dollars (\$) as

$$\text{Working Capital (\$)} = \text{Current Assets (\$)} - \text{Current Liabilities (\$)}$$

The second word of this term refers to "capital" that is readily available to be spent on business expenses. Having a stable or increased amount of working capital is preferred and particularly important for business expansion.

There are different ways to increase the liquidity of a dairy business. A nonexhaustive list includes the following: building the cash reserves with a goal of covering up to six months of business expenses; building the feed inventories; paying down high-interest debt; selling underused or unneeded assets (equipment); lengthening the term debt period of repayment; and checking the quality of current assets by assessing the possibilities of turning them into cash.

Relevance and Evaluation of Income Statements

An *income statement* (Figure 2) addresses questions regarding the financial performance of your dairy business. In other words, it may answer questions such as the following: is it profitable for you to produce milk?; what is the cost of production of a cwt (100 lbs) of milk and what is the break-even point?; how much remains after expenses are paid?; does your business generate a positive cash flow?; and, based on your cash flow, is it possible to invest in and/or expand the business?

An income statement not only records your production data, it compiles your financial data as well—including income and expenses. Production data include the volume (lbs or cwt) of milk shipped, which can also be split into the amount of milk shipped per cow (after specifying the number of cows or herd size). Items generating income may include milk sales, sale of cull cows and of other livestock, or sales of compost. The sum of these make up the *total net income*. Items for expenses include feed, forages and crops, labor, veterinary services and supplies, reproduction, bedding, local/state Dairy Association fees, utilities, equipment, land rental, insurance, office supplies, and the miscellaneous. The sum of these items comprises the *total operating expenses*.

The difference between total net income and total operating expenses is the *earnings before interest, taxes, depreciation, and amortization* or EBITDA in Figure 2 (\$939,781/yr = \$3,793,792/yr - \$2,854,011/yr).

This value may be either positive (preferably) or negative. After this, *depreciation and amortization* (payment of principal loans) is tacked on as an expense. After subtracting that expense from the EBITDA in Figure 2, the result is the *earnings before interest and taxes* or EBIT (\$580,581/yr = \$939,781/yr - \$359,200/yr). Again, this value may either be positive or negative. Below this figure on the statement is the *interest expense*. Subtracting it from the EBIT results in the final set of values, *earnings before taxes* or EBT (\$511,079/yr = \$580,581/yr - \$69,502/yr). Note: you can also obtain the *total cost of production* since the statement includes the figures for depreciation and amortization and *interest paid*. Thus Total Cost of Production = Total Operating Expenses + Depreciation & Amortization + Interest (\$3,282,713/yr = \$2,854,011/yr + \$359,200/yr + \$69,502/yr).

In order to calculate the *break-even price*, take your total costs of production and subtract any income

Figure 2. A sample income statement.

Parameters: Herd Size: 713 cows; Shipped Milk: 17,196, 940 lbs.; Milk Shipped per Cow: 24,119 lbs./cow year.				
	\$/year	\$/cow	\$/cwt	% Net Income
Milk sales - Net sales	3,547,956	4,976	21	93.5
Cull cow - Net sales	245,836	345	1.4	6.5
Other livestock - Net sales		0	0	0.0
Total Net Income	3,793,792	5,321	22.1	100.0
Feeding expenses	1,725,014	2,419	10.0	45.5
Forage and crops	276,188	387	1.6	7.3
Labor (includes management)	220,233	309	1.3	5.8
Veterinary services & supplies	67,643	95	0.4	1.8
Reproduction	18,138	25	0.1	0.5
Bedding	35,576	50	0.2	0.9
DHIA	8,001	11	0.0	0.2
Utilities (electricity, internet, etc.)	79,410	111	0.5	2.1
Equipment (fuel and oil, repairs)	276,923	388	1.6	7.3
Land rental	63,438	89	0.4	1.7
Insurance	35,913	50	0.2	0.9
Office supplies	14,595	20	0.1	0.4
Miscellaneous	32,943	46	0.2	0.9
Total Operating Expenses	2,854,011	4,002.82	16.6	75.2
EBITDA	939,781	1,318	5.5	24.8
Depreciation and Amortization	359,200	504	2.1	9.5
EBIT	580,581	814	3.4	15.3
Interest	69,502	97	0.4	1.8
Total Cost of Production	3,282,713	4,604.09	19.1	86.5
EBT	511,079	716.80	3.0	13.5
Break-even milk price, \$/cwt			17.6594	

that does not come directly from the sales of your milk production. Hence, you'll have to subtract sales from, for instance, cull cows. Then divide that value by the amount of milk shipped (in cwt). In the above case, the break-even price would be: $(3,282,713 - 245,836)/171,969.4 = \$17.6594/\text{cwt}$.

An example of a financial ratio that can be calculated with the use of an income statement (and a balance sheet) is *return over assets*, defined as

$$\text{Return over Assets (\%)} = \frac{\text{Net Earnings (\$)}}{\text{(Total) Assets (\$)}} \times 100$$

You can find total assets in the balance sheet (Figure 1) and *net earnings*, which usually refers to the EBITDA in the income statement (Figure 2). In this case,

$$\text{Return over Assets} = \frac{939,781}{8,904,640} \times 100 = 10.55\%$$

Another example of a useful financial ratio is *return over expenses*, defined as

$$\text{Return over Expenses (\%)} = \frac{\text{Net Earnings (\$)}}{\text{(Total) Expenses (\$)}} \times 100$$

The value for *total expenses* matches total cost of production, defined previously. In this example,

$$\text{Return over Expenses} = \frac{939,781}{3,282,713} \times 100 = 28.63\%$$

These two financial ratios may serve to compare (benchmark) the ratios of a dairy owner's operation with that of other operations in the state or from other states.

Another relevant item of income in the income statement is *changes in inventories*. Examples of how inventory changes may affect income is as follows:

Initial Inventory: 800 cows
 Final Inventory: 950 cows
 Difference of Inventory: 150 cows = (950 - 800)
 that were purchased

Assume price per cow at \$2,000/cow

In this instance, \$300,000 (from $150 \times 2,000$) of positive *noncash income* must be included in that year's income statement. However, the amount paid for these purchases should equal the same amount but be recorded as negative income (-\$300,000), thus reflected accordingly in the total net income.

In contrast, if the *initial inventory* was 950 cows and the *final inventory* 800 cows, then the difference of inventory = -150 cows (cull cows). For that situation,

assuming the same value of \$2,000/cow, the negative noncash income is -\$300,000 ($-150 \times 2,000$) for that year. However, the cull cows income item for that inventory change should once again equal the same amount in positive income (\$300,000).

Relevance and Evaluation of Net Cash Flow

Net cash flow addresses matters directly related to the amount of cash the dairy business has on hand. It indicates whether or not you are generating a positive cash flow or are able to invest or expand based on the amount of existing cash flow. Some revenues and expenses from previous income statements are not directly received or paid for in cash and thus are not taken into account to calculate net cash flow. Depreciation is a noncash charge, so it must be added back to net (cash) income to obtain the net cash flow. Net cash flow is defined as

$$\text{Net Cash Flow (\$)} = \text{Net Income (\$)} - \text{Noncash revenues (\$)} + \text{Noncash Charges (\$)}$$

Cash in the dairy business originates from selling milk, cull cows, or heifers, or selling assets such as machinery, equipment, or other related items. Having a positive cash flow may be used to reduce debt, to make investments, to increase inventories, or for family cash withdrawals. It is very important for a dairy business to maintain a positive cash flow by preparing accurate, representative budgets and using them to control expenses throughout a given year.

Consider when major needs will arise for the purpose of listing items in a detailed *budget*, including funds for purchasing feed, for crop inputs, and for harvesting and ensiling. In addition, any detailed budget must take into account all obligations with lenders, including payment amounts and due dates, which provide a clearer picture of if/when you may need to refinance a loan. In the case of having a high positive cash flow, it may be the appropriate time to consider an investment. The "best" investment(s) should be consistent with the vision, mission, and goals of your dairy business. Regarding the vision, investment(s) may address questions regarding potential growth. As for the mission, a large positive cash flow may help match the business' overall needs, particularly in the event of family cash

withdrawal(s). In the case of goals, a large cash flow may satisfy your overall immediate objectives. Indeed, a large positive cash flow enables action that may be beneficial to a business plan: It could increase the liquidity of the dairy business by boosting *cash reserves*; it could be used to reduce current debt; or it could be used to purchase “high impact” and nonperishable inputs such as corn silage, fertilizer, chemicals, or other products. For this last case, the tax effect must be considered. As noted, a large positive cash flow increases cash reserves. Examples of increased cash reserves may be six months of upfront cash flow requirements, 25% of income, or \$1,000 per cow. See below for two definitions of cash reserves, one of having cash reserves in dollars, the other in dollars per cow.

Cash Reserves (\$) = Cash (\$) + Prepaid Expenses or Inputs (\$) + Line of Credit (\$)

Cash Reserves (\$/cow) =

$$\frac{\text{Cash (\$) + Prepaid Expenses or Inputs (\$) + Line of Credit (\$)}}{\text{Average Number of Cows (Cows)}}$$

Conclusion

Taking into consideration the particular relevance of each financial tool and the critical role each plays in your dairy business is very important for the viability of a dairy operation. Parts 2 and 3 of *Risk Assessment and Decision-Making Guidelines for Dairy Risk Management* provide additional tools you can use to properly manage risk and to improve your financial decision-making.

Further Reading

Higgins, J. 2018. “Farm Bill Includes Billions Aimed at Keeping Dairy Industry Afloat.” *UPI*. December 27. https://www.upi.com/Top_News/US/2018/12/27/Farm-bill-includes-billions-aimed-at-keeping-dairy-industry-afloat/6801545920270/.

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