

4 Analyzing Financial and Production Performance

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Objectives

- **Discuss important production and financial benchmarks.**
- **Identify tools available to facilitate performance analysis.**
- **Discuss strategies for improving operations.**

Ranchers often get caught up in day-to-day activities and spend little time assessing overall performance. They may even rely on tax returns for information about how the business is doing financially, though tax returns are seldom a reliable indicator of overall financial performance. In fact, disastrous profitability problems can go undetected for years if Schedule F tax forms serve as the sole source of information about ranch financial performance. Even simple ranch activities like retaining additional heifers or backgrounding a set of calves past the end of the year could distort the Schedule F and misrepresent the financial picture of the operation. Regular and consistent performance analysis can help the ranch manager:

1. Identify areas where the ranch business has excelled as well as opportunities for improvement.
2. Make more informed decisions relative to marketing, investment, production and risk management.
3. Formulate goals and monitor progress toward goals.
4. Compare the ranch investment performance to other alternatives.
5. Develop employee incentive programs.
6. Monitor and control costs.
7. Establish the competitiveness and profitability of the total business as well as individual enterprises.
8. Evaluate present resource use and identify areas for change.
9. Meet information needs of multiple owners, lenders and/or advisers, so their knowledge and skills are used more effectively.

Analyzing performance for only one year will not allow the producer to do all of the above. Regular analysis through time helps producers build a base for better management decisions and improved profitability, as well as develop new ideas for recordkeeping. With several years of analyses, producers can monitor improvement in financial and

production statistics to verify progress made and get a truer picture of the ranch's performance and potential. In addition, a great deal of personal satisfaction and reward is gained by the increased understanding of the business. Accurate financial and production records are essential for meaningful analyses.

The Kansas Farm Management Association data referenced in chapter 1 is a source of cow-calf finance benchmark data (agmanager.info/kfma). A second source of information about performance in cow-calf enterprises is the Southwest Standardized Performance Analysis (SPA) database (agecoext.tamu.edu/programs/management-programs/beef-cattle-standard-performance-analysis-spa/). Cow-calf SPA software was developed by producers, Extension staff and National Cattlemen's Beef Association Integrated Resource Management Committees to analyze production and financial performance jointly. A third source is FINBIN, a farm financial database housed at the Center for Farm Financial Management at the University of Minnesota (finbin.umn.edu). FINBIN provides analysis for multiple states and for multiple agricultural and livestock enterprises, including beef cow-calf, stockers, replacement heifers, feeding, backgrounding and others. For cow-calf producers, the most important use of benchmark data is in monitoring key statistics through time, such as cost per breeding cow and pounds weaned per exposed female. Average financial statistics for 2012-2016 in dollars per cow and dollars per cwt (\$ per cwt) of weaned calves for cow-calf producers in Oklahoma, Texas and New Mexico who participated in SPA analysis and for Nebraska and Missouri producers who participated in FINBIN analysis for those periods are summarized in Table 4.1 and Figure 4.1. At time of printing, these dates represented the most recent SPA analysis, though more should be available soon. More recent years for comparison to Nebraska and Missouri producers are available in FINBIN and Oklahoma herds are now being added. Comparisons also can be made across herd sizes within the FINBIN tool.

Less recent data from SPA analysis compared high-profit producers and low-profit producers. Data from the 2009-13 SPA (not shown here) found high-profit producers' (producers whose profit per cow ranks in the top one-third) average cost of production was \$588 per cow compared to \$998 per cow for low-profit producers during that time period—a difference of about 40%. The high-profit producers' average cost of production was \$117 per cwt. compared to \$243 per cwt. for low-profit producers for

Table 4.1. Cow-calf producer financial and production performances for Texas, Oklahoma and New Mexico producers, 2012-2016 and Missouri and Nebraska producers, 2019

Performance Measure	SPA Analysis TX, OK & NM 2012-2016	FINBIN Analysis MO & NE 2019
Percent return on enterprise assets (ROA)		
Cost Basis	7.49%	
Market Value	5.79%	
Break-even economic cost of weaned calf (\$/cwt)	191	148
Total investment per breeding cow (cost basis, \$/cow)	270	327
Total grazing cost (\$/cow)	130	86
Total pre-tax costs (\$/cow)	906	877
Net pre-tax income, after withdrawals (\$/cow)	110	-16
Pregnancy percentage (based on pregnancy tested herds)	89.8	94.2
Calving percentage	87.8	89.7
Calf death loss	3.2	3.9
Weaning percentage	84.4	84.9
Average weaning weight (lbs)	447.9	490
Pounds weaned per exposed female	444.3	416

Source: SPA Data, TX-OK-NM, 2012-2016 (agecoext.tamu.edu/wp-content/uploads/2013/08/SW-KeyMeasuresSummary.pdf)
FINBIN Data, Missouri & Nebraska, 2019, Generated 8/12/2020 (finbin.umn.edu)

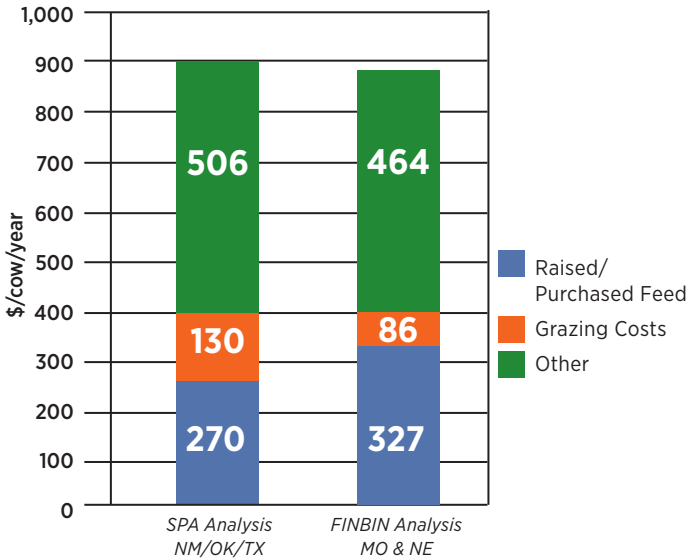


Figure 4.1. Cow-calf production costs, NM/OK/TX, 2012-2016 annual average and MO/NE 2019 average, (\$/cow)

that same period. The break-even cost figures (\$ per cwt) indicate that even with relatively low calf prices, high-profit producers are positioned to make money (or lose very little). On the other hand, low-profit producers may need to draw on other income sources to support the cow-calf enterprise even when cattle prices are high. The rate of return on

assets on a market basis for high-profit producers at 5.9% is comparable to returns that might be earned in an off-farm investment such as a stock market index fund. Negative returns on assets for lower profit, producers suggest that funds invested in the cow-calf operation could be more profitably invested elsewhere.

Historically, analysis of SPA data has shown costs of production are highest on average for herds with fewer than 50 cows and lowest for herds with more than 1,000 cows. This is evidenced in the FINBIN data as well. While small herds can be profitable, it requires superior management and diligence to control costs. Low-profit producers typically have more debt per cow than high-profit producers.

Historically, the most profitable producers have had higher pregnancy, calving and weaning percentages plus higher weaning weights, leading to more pounds weaned per exposed female than low-profit producers. From 2009-2013, the average weaning weight in the most profitable herds was 555 pounds compared to 499 pounds in the low-profit herds for ranches who participated in SPA data analysis. This pattern also is evident when reproductive success is accounted for at weaning. Average pounds weaned per exposed female are were 465 pounds for the more profitable herds compared to 413 pounds for low-profit operations. From 2009-2013, average weaning weights as well as pounds weaned per exposed female, were higher for high-profit producers than low-profit producers, suggesting high-profit producers do a good job with production while controlling costs.

Some producers assume increasing calf weaning weights ensures increased profitability for the cow herd. The cow-calf manager must determine the appropriate level of mature size, milk, muscle and growth for an individual herd. Matching these traits to the available production resources as well as striving for uniformity of size has favorable management consequences. Beef producers must use information on genetic relationships between mature size, milk, muscle and growth traits to select replacement heifers and control cow costs. For example, selecting for increased yearling weight and muscularity to an extreme may result in mature cows that are too large. With limited forage and feed resources, this cow type may not have acceptable reproductive success. This result impacts earnings as well as cost per breeding cow. To be a sustainable operation, breeding stock selection must consider resource limitations that impact the optimal genetic characteristics. Other production and marketing practices also are important in generating high gross income and, ultimately, profitability. For instance, selling larger lots of calves rather than individual calves and castrating bull calves help generate higher prices. Best marketing practices are discussed in more detail in chapters 9 and 10.

Beef Production and Reproduction Measures

Accurate cattle inventory records for the fiscal year or other time period are essential for analysis. Inventory

items are necessary for the breeding, pregnancy testing (if applicable), calving and weaning measures. A key figure needed for production and reproduction measures is the number of females exposed for breeding. The number of exposed females is adjusted for various transfers of females throughout the production cycle. The adjusted number of females exposed is used for many performance measures. Death loss and replacement rate information also are needed. A count of all calves weaned (steers, heifers and bulls) is required. Beginning and ending dates for the various production seasons are needed (breeding, pregnancy testing, if conducted, and calving and weaning).

The evaluation of reproductive efficiency requires analysis through an entire production cycle. The cycle begins when the females are exposed at the start of the breeding season. It ends when the calves conceived during the breeding season are weaned. Production cycles will overlap, since females are exposed prior to weaning a calf from the previous cycle. When reporting reproductive efficiency measures, the analysis applies to the year the calves are weaned. For example, the data for a herd calving in spring 2020 would be based on the number of females actually exposed in 2019.

Pregnancy Percentage

Pregnancy percentage is an indicator of breeding performance in the herd. This measure has more meaning if it is kept by female age group, since rebreeding may be a problem for certain age groups.

$$\text{Pregnancy percentage} = \frac{\text{Number of females exposed diagnosed as pregnant}}{\text{Number of females exposed}} \times 100$$

Accurate computations require the following adjustments to the number of females actually exposed during the breeding season:

1. Subtract the number of exposed pregnant females sold or transferred out between breeding and pregnancy diagnosis.
2. Add the number of exposed females or pairs purchased for the herd between breeding and pregnancy diagnosis. Include purchased females (pairs) diagnosed as pregnant or exposed. Do not count purchased females (pairs) that are open.
3. Keep death losses of exposed females in the exposed female numbers. Females intended to be culled and sold but remain in the exposed female herd during the breeding season are subtracted from the exposed number when sold.

Some cautions about the pregnancy percentage measure are:

1. Use this value only in comparisons of similar operations.
2. A low value may indicate a problem, but it does not explain the cause of the problem.
3. Environmental stresses will cause year-to-year variation in the pregnancy percentages.
4. This value applies only to production systems that

routinely diagnose pregnancy.

5. Adding exposed females may influence the pregnancy percentage.

Calving Percentage

Calving percentage is a good indicator of breeding performance and gestational management in the herd. Percentages may have more meaning when computed by female age group, such as first-calf heifers.

$$\text{Calving percentage} = \frac{\text{Number of calves born}}{\text{Number of females exposed}} \times 100$$

Accurate computations require deriving the number of females exposed and the following two adjustments:

1. Subtract the number of exposed pregnant females sold or transferred out between breeding and calving.
2. Add the number of exposed females or pairs purchased between breeding and calving.

Note: All term calves born should be included in the number of calves born, even if they are stillborn.

Again, the calving percentage only should be used in comparing similar operations. The measure may indicate an existing problem, but it does not pinpoint the cause. Environmental influences may cause a year-to-year variation in calving percentage. Also, the percentage does not describe the distribution of calving birth dates during the calving season.

Calf Death Loss

Calf death loss statistics can shed light on the herd health, nutrition and breeding programs and calving environment.

$$\text{Calf death loss based on exposed females} = \frac{\text{Number of calves that died}}{\text{Number of females exposed}} \times 100$$

$$\text{Calf death loss based on calves born} = \frac{\text{Number of calves that died}}{\text{Number of calves born}} \times 100$$

Calf death loss should include any calves lost at birth plus any calves that died prior to weaning. Again, deriving the number of females exposed is critical.

The type of operation—extensive versus intensive—should be considered when comparing calf death losses across herds. Likewise, the age make-up of the cow herd should be considered in any across-herd comparison. Finally, the calculations do not distinguish between calf death loss at birth versus death loss during the suckling period. More detailed records may be justified in cases of high calf death loss to determine the cause of premature deaths.

Calf Crop or Weaning Percentage

Calf crop percentage is one of the most important measures of production performance because it measures the reproductive rate of the herd. Calf crop percentage also may indicate the adequacy of the nutritional program, since reproduction is influenced by nutrition. In addition, this percentage may provide some insight on how well cows are matched to their production resources. The computation for calf crop percentage is:

$$\text{Calf crop weaning percentage} = \frac{\text{Number of calves weaned}}{\text{Number of females exposed}} \times 100$$

To accurately compute calf crop percentage, adjust the number of females exposed during the breeding season:

1. Subtract the number of exposed pregnant females sold or transferred out of the herd between breeding and weaning.
2. Add the number of exposed females or pairs purchased between breeding and weaning.
3. Subtract the number of calves purchased and grafted on females from the number of calves weaned.

Additional points to note:

1. All death losses of exposed females should remain in the number of exposed females.
2. Females intended to be culled and sold but remain in the exposed female herd during the breeding season should be subtracted from the exposed number when sold.
3. The exposed females intended to be bred, but are later culled when diagnosed as open must remain in the exposed number.
4. Do not include purchased grafted calves that are nursing cows in the number of weaned calves.

As with other performance measures, comparisons are valid only between herds with similar calving season management systems and environments. While the calf crop percentage is a good indicator of total herd output, nutritional adequacy and husbandry practices, it does not account for excessive use of inputs (feed and nonfeed).

Calving Distribution

Monitoring calving distribution within the calving season can provide insights into the reproductive performance of the herd. Tracking calving distribution is simply keeping track of when in the calving season a cow calves. Typically, this is done by splitting the calving season into thirds and tracking which cows calve in each third. For example, in a 90-day calving season, track how many total and which individual cows calve in days one through 30, 31 through 60 and 61 through 90. Ideally, a large portion of the herd would calve in the first third of the calving season. This would indicate strong management and reproductive performance. The calves from cows that calve early tend to provide benefits to everyone in the supply chain, from

heavier calf crops to increased carcass and maternal performance. For more information, see beef.unl.edu/calves-born-first-21-days-of-calving-season.

Actual Weaning Weights

Actual weaning weights are usually evaluated by individual management or contemporary groups, such as steers, bulls, heifers or creep fed and non-creep fed calves. Actual weaning weights are not standardized to a given age. The influence of production environment and feed resources may be evident in long-term trends. In addition, comparisons between operations are difficult, as pasture availability and management choices such as age of calves at weaning influence weaning weights. Fall and spring calving seasons, in particular, should be evaluated separately for an operation.

Making improvements to weaning weights is certainly an area producers seek out to improve ranch revenues. The list of methods to increase weaning weights is extensive and, as stated previously, high-profit operations tend to have higher weaning weights. However, the method to accomplish it needs to be done in a cost-effective manner. Short-term methods to improve weaning weights would include creep feeding or use of calfhod implants. Creep feeding, as an example, is a high-input method to increase weaning weights. Close attention must be paid to price slides and feed conversion if this route is selected. More long-term approaches can be taken as well. Capitalizing on hybrid vigor via strategic crossbreeding and altering calving distribution can make impacts as well. Regardless of method, an accurate estimation of cost and benefit should determine the approach to higher weaning weights.

Pounds Weaned per Exposed Female

Pounds weaned per exposed female is one of the key production figures every cow-calf operator should assess for each calf crop. By evaluating weaning performance on an exposed female basis, this measure becomes a tool to help producers optimize growth rate and reproductive rate.

The value reflects herd reproductive rate, calf death loss and the genetics for growth and maternal performance. Age at weaning and the calving distribution impact pounds weaned per exposed female, making the measures more valuable for the individual operation and year-to-year comparisons. Comparisons between farms or ranches are less meaningful if production systems vary widely.

$$\text{Pounds per exposed female} = \frac{\text{Total pounds of calves weaned}}{\text{Total number of females exposed}}$$

Financial Measures

The overall financial performance and position of a business or a single enterprise within a business is evaluated through measures of liquidity, solvency, profitability, financial efficiency and repayment capacity. Just as baseball game records are used to derive statistics such as runs batted in, earned run averages, saves and wins/losses in baseball, information from financial statements is used in calculating

business benchmarks. No single measure is sufficient for evaluating a business' financial position and performance. Several measures must be tracked through time to provide a true perspective.

Liquidity measures the ability of the business to pay bills in a timely fashion and provide for unanticipated events.

The current ratio is a liquidity measure.

Solvency measures the ability of the firm to retire debts if all of the business assets are sold. The equity/asset ratio or percent equity is one measure of solvency.

Profitability measures the financial performance of the farm or enterprise over a period of time, which is generally one year. Net income and the rate of return on assets are measures of profitability.

Financial efficiency relates physical output to input. The asset turnover ratio is a measure of efficiency.

Repayment capacity is the ability of the ranch to pay debts as they come due. Debt coverage ratios are measures of repayment capacity.

Most of the detailed information required for financial analysis comes from financial statements, including balance sheets, cash flow statements and income statements.

Balance sheets document the financial position at a point in time.

Cash flow statements show cash inflows and outflows for a time period. A monthly cash flow statement is useful in highlighting seasonal surpluses and shortfalls. Shortfalls suggest when savings or a line of credit may be needed.

Income statements combine information from the balance sheet and cash flow to determine profitability.

Balance sheets listing all that is owned and all that is owed are required, one for the beginning of the accounting period and one for the end. Another way of thinking of this would be to have a balance sheet prepared annually at close to the same date. Completing a balance sheet on January 1, 2020 would serve as a beginning balance sheet and completing another balance sheet on January 1, 2021 would serve as the ending balance sheet for the previous year and the beginning balance sheet for the upcoming year. Ideally, both cost and market values are identified for all assets listed in the balance sheet. The cost basis of assets is the book value (original cost minus accumulated depreciation); market value is the value of the asset at the time the balance sheet is developed. Most lenders use a balance sheet based on the current market value of assets. The balance sheet provides information on the ranch's current financial situation. Also, it can be used with comparisons from year to year. This provides insight on the farm or ranch operation's trend with respect to changes in assets and debt over time. Market-based balance sheets, of course, will fluctuate with changes to land and commodity prices. The assets of most agriculture enterprises are heavily weighted in these two areas. Extra attention must be paid to market value balance sheets in times of volatile commodity prices.

Asset values that move drastically can mislead or cover

up strengths and weaknesses on the balance sheet. It is important to spend the time necessary to accurately update the balance sheet. Adding assets without the corresponding liability and vice versa or not updating livestock inventories also can keep the balance sheet from accurately representing the operation.

A cash flow statement maps all the cash moving in and out of the operation during a certain time interval. Many lenders will develop an annual cash flow to determine if the new debt load can be managed. But many operations can benefit from a monthly cash flow projection for the upcoming year as a standard management practice. Highlighting the inflow and outflow of cash each month can reveal cash deficiencies or surpluses. The cash flow statement also is beneficial in making management changes. For example, if an operation wanted to plant or manage a winter grazing crop, it would require seed, additional fertilizer and other operating expenses. Developing an expected monthly cash flow statement could help dictate budgeting to ensure enough cash or credit on our operating line is available. This financial statement is simple to develop and easy to adapt to the specific farm or ranch.

An accrual income statement also is needed. This can be developed by using a cash flow statement and accrual adjustment information, including gains and losses on sales of breeding livestock (purchased and raised), changes in inventories (livestock, feed, etc.), updated depreciation schedules (machinery, livestock, buildings and improvements), summaries of cattle sales and transfers for the fiscal year, loan repayment schedule (principal and interest payments) and IRS tax forms. For analysis of the cow/calf enterprise within diversified operation, both the balance sheet and the income statement entries must be prorated to the cow-calf enterprise.

The most important attribute of data used in the financial statement is that it is as accurate and complete as possible. Any assumptions that must be made should be documented so future analyses can be compared appropriately. Review of the financial statements is a useful first step in business analysis.

Financial ratios condense large amounts of financial information into meaningful benchmarks. They provide insight into sources of farm financial stress and the extent of stress. Ideally, the numbers used in the ratios come from current financial statements (cash flow statement, balance sheet and income statement) developed in a manner consistent with Farm Financial Standards guidelines (ffsc.org/). Table 4.2 provides a visual interpretation for the financial benchmarks that follow.

Current Ratio

The **current ratio** indicates the extent to which current assets, if liquidated, would cover current farm liabilities. Current assets are those expected to be sold or used up in the coming year; current liabilities are those due in the coming year, including scheduled principal and interest payments on long-term debt. The higher the ratio, the greater the business liquidity. Lower ratios indicate the potential for cash flow problems. The ratio can vary significantly during

Table 4.2. Financial measures.

		Low stress	High stress
Current ratio	$= \frac{\text{Current farm assets}}{\text{Current farm debt}}$	2.0	1.0
Debt to asset ratio	$= \frac{\text{Total farm debt}}{\text{Total farm assets}}$	40%	70%
Net farm income	$= \begin{matrix} - & \text{Gross cash farm income} \\ - & \text{total cash farm expense} \\ - & \text{depreciation} \\ +/- & \text{Inventory changes} \end{matrix}$	+	-
Rate of return on farm assets	$= \frac{\begin{matrix} + & (\text{Net farm income} \\ - & \text{farm interest expense} \\ - & \text{value of operator's labor} \\ & \text{and management}) \end{matrix}}{\text{Average farm assets}}$	5%	1%
Rate of return on farm equity	$= \frac{\begin{matrix} - & (\text{Net farm income} \\ & \text{value of operator's labor} \\ & \text{and management}) \end{matrix}}{\text{Average farm equity}}$	10%	5%
Debt coverage ratio	$= \frac{\begin{matrix} + & (\text{Net farm operating income} \\ + & \text{net nonfarm income} \\ + & \text{depreciation} \\ + & \text{interest on term debt} \\ - & \text{income and social security taxes} \\ - & \text{family living expenses}) \end{matrix}}{\text{Scheduled principal and interest on term debt}}$	135%	110%
Operating expense ratio	$= \frac{\begin{matrix} - & (\text{Gross farm expense} \\ - & \text{farm interest expense} \\ - & \text{depreciation expense}) \end{matrix}}{\text{Gross farm revenue}}$	60%	80%
Interest expense ratio	$= \frac{\text{Interest expense}}{\text{Gross farm revenue}}$	10%	20%
Asset turnover ratio	$= \frac{\text{Current farm assets}}{\text{Current farm debt}}$	40%	20%

the year—for instance, if a crop has been harvested but not yet sold. Dairies and other businesses with steady inflows of cash can support a lower current ratio than other types of farms.

$$\text{Current ratio} = \frac{\text{Current farm assets}}{\text{Current farm debt}}$$

Debt-to-Asset Ratio

The **debt-to-asset ratio** indicates the proportion of total assets owed to creditors. The higher the ratio, the greater financial risk the business faces.

$$\text{Debt to asset ratio} = \frac{\text{Total farm debt}}{\text{Total farm assets}}$$

Net Farm Income

The **net farm income value** represents the return to unpaid labor, management and owner equity. There is no single standard for farms of different sizes with different enterprises. Net cash income is adjusted for changes in inventory and depreciation. Changes in inventory (accrual adjustments) may add to income (increases in accounts receivable, prepaid expenses, cash investments in growing crops, supplies on hand) or decrease income (increases in accounts payable, taxes due or other liabilities). Net cash income is calculated by subtracting all operating expenses from gross farm revenues. Because accrual accounting procedures are used, net farm income also reflects the gain/loss resulting from the sale of assets, as well as changes in the values of inventories. In a profitable operation, net farm income is positive and, hopefully, sufficiently large to compensate the owner for family labor and management and use of equity. Profits are needed over time to replace assets such as breeding livestock, machinery and equipment and to pay family living expenses.

$$\begin{aligned} & \text{Gross cash farm income} \\ - & \text{Total cash farm expense} \\ - & \text{Depreciation} \\ +/- & \text{Inventory changes} \\ \hline = & \text{Net farm income} \end{aligned}$$

Rate of Return on Farm Assets

Rate of return on farm assets (ROA) serves as an index of profitability. The higher the value, the more profitable the business. ROA is most meaningful in year-to-year comparisons if assets are valued using their cost basis. ROA for agricultural assets is typically low compared to nonfarm investments. The measure has some limitations. For instance, if two farms have the same net farm income but one leases land or other assets, those assets' values are not included in owned assets. The ROA for the operation with leased assets will be significantly higher simply because of the way the assets are controlled. If the ROA exceeds the cost of debt financing or average interest rate, then borrowed capital is being used profitably in the business. If the ROA is less than the interest rate on the loan (the cost of debt financing), then increasing debt will further decrease equity.

If a value for family labor is not included in the expenses or a portion of family living expenses is not assigned to the cow-calf operation, the ROA is inflated.

$$\begin{aligned} & \text{(Net farm income)} \\ & + \text{Farm interest expense} \\ & - \text{Value of operator's labor} \\ & \quad \text{and management)} \\ \text{Rate of return on farm assets} = & \frac{\quad}{\text{Average farm assets}} \end{aligned}$$

Rate of Return on Farm Equity

Rate of return on farm equity (ROE) also serves as an index of profitability. Like ROA, the higher the value, the more profitable the business. ROE is most meaningful in year-to-year comparisons if assets are valued using their cost basis. If debt is being used advantageously, ROE will be greater than ROA. ROE can be compared to the return that could be earned in alternative investments, such as certificates of deposits, bonds or stock mutual funds.

$$\begin{aligned} & \text{(Net farm income)} \\ & - \text{Value of operator's labor} \\ & \quad \text{and management)} \\ \text{Rate of return on farm equity} = & \frac{\quad}{\text{Average farm equity}} \end{aligned}$$

Debt Coverage Ratio

The **debt coverage ratio** indicates the ability of the business to cover term debt. The higher the ratio, the greater the cushion to cover all payments. Capital lease payments should be included as part of term debt. What is a reasonable value varies with farm enterprises, diversification, management abilities and stability of nonfarm income.

$$\begin{aligned} & \text{(Net farm operating income)} \\ & + \text{Net nonfarm income} \\ & + \text{Depreciation} \\ & + \text{Interest on term debt} \\ & - \text{Income and social security taxes} \\ & - \text{Family living expenses)} \\ \text{Debt coverage ratio} = & \frac{\quad}{\text{Scheduled principal and interest on term debt}} \end{aligned}$$

Operating Expense Ratio

The **operating expense ratio** indicates the proportion of total income used to pay expenses. The higher the ratio, the greater the financial risk in periods of low market prices.

$$\begin{aligned} & \text{(Gross farm expense} \\ \text{Operating expense ratio} = & \frac{\quad}{\text{Gross farm revenue}} \\ & - \text{Farm interest expense} \\ & - \text{Depreciation expense)} \end{aligned}$$

Interest Expense Ratio

The **interest expense ratio** indicates the proportion of total income committed to interest payments. Financing costs are highly variable between operations, depending on the debt structure and loan repayment terms. Operators who finance their operation through retained earnings and do not borrow money will have total financing costs of zero and an

interest expense ratio of zero. Farm operations are considered vulnerable once the ratio is 15%.

$$\text{Interest expense ratio} = \frac{\text{Interest expense}}{\text{Gross farm revenue}}$$

Asset Turnover Ratio

Profitable and efficient operations generate more revenue with a given set of resources. The **asset turnover ratio** can vary substantially between farms of different types, but the higher the ratio, the more efficiently farm assets are being used.

$$\text{Asset turnover ratio} = \frac{\text{Gross farm revenue}}{\text{Average farm assets}}$$

Financial ratios vary considerably among farms of different types, for instance, dairy operations and stocker operations. What may be critical for one farm might be tolerable for another. For more information on farm financial statements and analysis, see OSU Extension fact sheets AGEC-751, *Developing a Cash Flow Plan*; AGEC-752, *Developing a Balance Sheet*; AGEC-753, *Developing an Income Statement*; and AGEC-790, *Evaluating Financial Performance and Position* (extension.okstate.edu/fact-sheets).

Any financial measure is only as good as the information used in calculating it. The most important attribute of all data used is that it be as accurate and complete as possible. Any assumptions that must be made should be documented so future analyses can be compared appropriately. Honest insights require honest data. Consecutive years of financial measures developed in a consistent manner provide the best information about changes in financial performance and position of a business.

Contact the local county agricultural OSU Extension educator to inquire about assistance with farm business planning.

Using Analysis to Improve Ranch Performance

Measure, then manage. Performance measures condense a large amount of production and financial information into convenient summaries and ratios for analysis. Results are most useful when annual results are available for year-to-year comparisons. They can be used to identify areas of concern, then management strategies implemented to correct problems. Performance measures are most useful in directing managers to ask the right questions to solve problems. Results also may be used to identify other management tools needed. The tools may include financial and production records, financial statements (cash flow statement, income statement, balance sheets), budgets (cash flow and enterprise), reports comparing actual to budgeted values and other software, such as spreadsheets designed to analyze a specific decision.

A first step in analyzing ranch financial performance

is to identify high-cost categories. Where are costs high relative to other producers who are profitable? Comparing individual results to benchmarks such as the Kansas Farm Management Association (KFMA), SPA or FINBIN averages may indicate that a specific cost component is high. The following notes are intended to stimulate thinking about potential causes of problems. No one idea is appropriate for all cases. Review the ideas given in a situation and follow up with specialists who have the appropriate expertise.

High Feed Costs

- Buy purchased feed in bulk rather than in sacks.
- Reduce dependence on feed (reduce stocking rate, consider grazing rotations, overseeding or limit-grazing cool season forages).
- Save money buying feed rather than raising it (or vice versa). Is marketing raised hay or feed through the cows the best use for it? If hay is high quality, could it be sold in a specialty market and an adequate replacement purchased at a lower cost?
- Renegotiate rental rates (cash or share rent) if they are higher than average rental rates for comparable tracts in the region.
- Consider dramatically improving a planned crossbreeding program—to increase fertility, longevity and pounds per weaned cow exposed—without dramatically increasing costs.
- Use chemicals on raised feeds only when it is economically advantageous.
- Shop around for the best supplemental feed values. Consider alternative supplement sources.
- Try to anticipate needs and buy hay early in the season when prices are low.
- Avoid extremes in cattle size and milk production.
- Match the cattle production cycle to forage resources, both in terms of availability and nutritive quality.
- Use a systematic approach in evaluating a herd nutrition program.
- Sort cows based on nutritional needs and feed accordingly.
- Minimize feed wastes through storage and feeding practices (for example, feed hay in racks or rings with enclosed sides).
- Evaluate purchasing rather than raising replacement females.
- Analyze cost of owning versus renting land.

High Grazing Costs

- Match the cattle production cycle to forage resources (availability and nutritive quality).
- Renegotiate rental rates (cash or share rent) if they are higher than average rental rates for comparable tracts in the region.
- If the forage base includes annual pasture, use chemicals only when it is economically advantageous.
- Soil test improved pastures to determine when fertilizer is needed.
- Search for weed control methods that cost the least.
- Improve grazing management. Is the stocking rate optimal?

- Renovate and improve pastures.
- For improved pastures, evaluate the relative cost of higher levels of fertility and reduced stocking rate versus renting or purchasing more pasture land.
- Analyze cost of owning versus renting land.

High Investment Costs per Cow

- Sell unnecessary machinery, vehicles, cows and other assets that do not contribute to profits.
- Emotional attachments to assets, cows for instance, can be costly. Is machinery and equipment justified? Is the bull-to-cow ratio close to the optimum or are there too many bulls?
- Consider leasing rather than owning assets. Could grass be rented for less than it costs to own? Leasing rather than owning may increase flexibility.
- Custom-hire work if it is cheaper than owning machinery (or hiring labor).
- Weigh carefully or defer new investments and consider buying used rather than new machinery, equipment or vehicles.
- If the enterprise is profitable and resources are available, consider increasing the size of the herd to spread fixed investment costs over more cows. Manage heifers so they will have longevity in the herd. Replacing cows can be expensive.

Other Cattle Costs

- Use preventative medicine and practices to reduce emergency costs or losses.
- Plan vehicle use to minimize mileage and other equipment costs.
- Shorten breeding/calving seasons.

High Interest Costs

- Shop around for the best deal on financing.
- Lock in low interest rates for long-term loans when the opportunity arises.
- Use cash surpluses to pay down debt.
- Schedule loan repayments at times when crop and/or livestock sales are expected.
- Negotiate for lower rates if you have a good record keeping system and can provide financial statements for the lender.
- Minimize new borrowing.

High Overhead Costs

- Consider increasing the size of the herd to spread overhead costs over more cows (if the enterprise is profitable).

Low Pregnancy Percentage

- Make sure cows have an adequate forage and/or nutritional base.
- Select seedstock to match available forage resources and design management programs minimize to expensive inputs.
- Increase surveillance during breeding to ensure bulls are functional and cows are cycling.
- Build cattle with high fertility through systematic

selection, culling and grouping.

- Control the breeding season. Sell cows that do not become pregnant and wean a calf. With continuous calving systems, a cow that does not calve in a given year may go unnoticed, meaning unproductive cows typically stay in the herd longer than is desirable.
- Maintain effective herd health program.
- Conduct annual breeding soundness exams (BSE) on all bulls.
- Work with a veterinarian to ensure the herd remains free of reproductive diseases.

Low Calving Percentage

- Dead calves that are carried to term are included in the numerator for this calculation. A calving percentage significantly lower than the pregnancy percentage suggests reproductive disease.
- Low pregnancy percentages contribute to a low weaning percentage (also see items under that heading).
- Be sure cows have an adequate forage and/or nutritional base for a strong immune system throughout gestation.

Low Weaning Percentage

- A weaning percentage lower than the calving percent suggests dystocia, scours, clostridial diseases, respiratory disease or losses due to theft or predators.
- Practice systematic breeding and culling to increase calving ease and consider grouping females to monitor difficult births.
- Use preventative medicine and practices to reduce death losses.
- Low pregnancy and calving percentages contribute to a low weaning percentage (also see items under those headings).
- Target a minimum body condition score (BCS) of 5 for cows prior to calving to ensure optimal calf vigor and colostrum quality.

Low Weaning Weights

- Consider the cost of increasing weaning weight. If weaning weights are moderate to above average for the region, there may be financial opportunities by reducing production costs. On the other hand, if weaning weights are low, adopting different management practices may increase weaning weight for little additional cost.
- Use genetic selection and crossbreeding to improve uniformity of the cow herd/calf crop.
- Increase quality of grazed and harvested forage by utilizing forage tests and harvesting in a timely fashion.
- Be sure cows have an adequate forage and/or nutritional base.
- Shorten the breeding season.
- Set calving dates to capitalize on high-quality forage production.
- Evaluate balance between forage production capacity and stocking rate.

Again, consider changes in costs and returns to make sure a decision is the right one. The local county OSU Extension office is a good source of information on all of the

above subjects. Annual analysis may raise red flags, signaling a decline in the financial performance of the business. The first red flag to appear is typically a negative cash flow. This may be a temporary problem, for instance, if the operation is being expanded and/or new assets purchased. If negative cash flows persist, it can lead to economic losses. If the ranch does not generate an economic profit, then the assets could be earning more somewhere else. For example, if cows selling at market value cannot pay for raised feed, the land on which the feed is raised could be rented out for more than it is earning in the cow-calf enterprise.

An even more serious red flag is raised if the financial net income is negative, as it signals that equity capital is being consumed. In other words, each year that production continues with financial losses, equity is being consumed, leading to increasingly lower values for net worth. For ranches to survive in the long term, a positive return to labor and management as evidenced by a positive net income and rate of return on assets is essential. Equity increases in a viable business should result from retained earnings rather than capital contributed from off-farm jobs, inheritances and appreciation in asset values.

Being aware of these signals and monitoring performance on an ongoing basis allows producers to correct problems before they get out of hand. Analysis requires a commitment of time and energy, but provides better information for management than either financial or production records can do alone.

Additional Notes

Cost of production is only one part of the profit equation. Producers also should study marketing practices and alternative marketing options. Can an above break-even price be locked in using contracts or futures markets? Will profits increase by retaining ownership through a stocker or feedlot phase? Are there specialized markets? For instance, could natural beef be targeted? Are there other possible sources of revenue, such as hunting leases?

Cash shortfalls can occur even if an enterprise is profitable. Cash shortfalls in a given year can be a temporary problem associated with debt servicing, building of inventories, etc. Negative net cash flows over time are likely to be signals of more serious problems including lack of profitability. Negative values for accrual net income indicate the enterprise is currently not profitable. In this case, changes are needed in operations. Look at altering production practices, marketing, feeding, land management, cost control or all of the above. Risk management also is important in building a sustainable business.

Completing an Analysis for Your Herd

FINBIN or SPA analysis focuses on financial results from a fiscal or accounting year and production records associated with the calf crop weaned in that year. For most producers, the fiscal year coincides with a calendar year. A set of farm financial statements supplemented by tax

records and a depreciation schedule will supply the financial information needed to complete the analysis. Whole farm analysis also is available in FINBIN.

Reproductive measures are based on a full production cycle, beginning when all breeding-age females are exposed to the bulls (or artificially inseminated). The cycle ends when the calves are weaned. To make accurate comparisons from one calf crop to the next or between management groups or herds, these performance values are based on the number of exposed females (cows and first-calf heifers). Thus, cow numbers are needed for the period when the mothers of calves being weaned were exposed. Individual calf weights are not required. More information on the production and financial data required is found in OSU Extension fact sheet AGE2-222, *Cow-Calf Standardized Performance Analysis*.

The initial analysis will require some time and effort. Collecting the production and financial data may require four hours to eight hours the first time an analysis is completed, if records are in poor shape. However, a commitment to improving management practices and using standardized performance analysis brings great rewards.

Producers interested in a workshop or assistance in completing a financial performance analysis or the FINBIN package should contact the local agriculture Extension educator, area agricultural economics specialist or the state farm management specialist at (405) 744-9836 to express interest.

Conclusion

Analyzing ranch performance should be a process, not an event, for producers. Change has to take place for an analysis to be useful to producers. Many cow-calf producers can reduce production costs by addressing these issues:

- Minimize investment in depreciable assets such as machinery and vehicles.
- Monitor and control purchased feed expenses.
- Match cows to forage resources.
- In small operations, buy replacements and use terminal cross bulls.
- Consider using crossbred cows to benefit from heterosis.
- Avoid expensive seedstock production.
- Minimize investment in horses if the cows are expected to pay their expense.
- Do not overstock grazing land.
- Develop and integrate a total resource management plan including wildlife.
- Have a controlled breeding season that will optimize grazing land use, minimize purchased feed and result in high reproduction.
- Use proper health practices to ensure sound herd health and allow participation in marketing alternatives.
- Avoid industry fads that are not cost effective.
- Do not spend money to reduce IRS taxes if the investment is not a sound one which will increase after tax profits. It does not make sense to spend a dollar to save 30 cents.
- Have a bank account for the ranch separate from the

personal account so business income and expenses are not masked by personal income and expenses.

Location and other amenities are important in acquiring land to realize appreciation in value. If a goal of land ownership is to monetize expected increases in value, focus on attributes beyond grazing potential.

The large differences in performance between herds observed by OSU research and Extension specialists help validate the need to measure and manage for performance. Ranchers can begin the process by completing an analysis such as selected annual performance measures, SPA or FINBIN if a more complete analysis is sought. Making a commitment to business management can be a significant step. Focused managers measure and monitor progress toward specific written goals, use the analysis to identify areas for change, then implement the changes. Measuring performance motivates managing for performance.

The following Extension publications include more information:

Extension publications with more information are available at extension.okstate.edu/fact-sheets where OSU Fact Sheets can be searched by number, name or topic:
 AFS-3162, Expected Progeny Difference: Use of EPDs
 AFS-3010, Supplementing Beef Cows
 AFS-3018, Nutritive Value of Feeds for Beef Cattle
 AFS-3028, Limit Feeding Concentrate Diets to Beef Cows as an Alternative to Feeding Hay

AFS-3260, Planning Calendar for Beef Cattle Herd Health
 CR-3279, Cow-Calf Production Record Software
 AFS-3280, OSU Cowculator v2.0 Beef Cow Nutrition Evaluation Software
 PSS-2570, Reducing Winter Feeding Costs
 PSS-2584, Forage Budgeting Guidelines
 PSS-2585, Forage Legumes for Oklahoma
 PSS-2869, Management Strategies for Rangeland and Introduced Pastures
 PSS-2871, Stocking Rate: The Key to Successful Livestock
 PSS-2901, OSU Agronomic Services Procedures for Soil, Forage and Water Testing
 NREM-2869, Management Strategies for Rangeland and Introduced Pastures
 NREM-2870, Drought Management Strategies
 NREM-2875, Intensive Early Stocking
 NREM-2876, Eastern Redcedar Control and Management Best Management Practices to Restore Oklahoma's Ecosystems

References

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 Raper, K. (August 2020) AGECE-222, Cow-Calf Standardized Performance Analysis (Revised). Cooperative Extension Service, Oklahoma State University. extension.okstate.edu/fact-sheets/cow-calf-standardized-performance-analysis-spa-1.html

