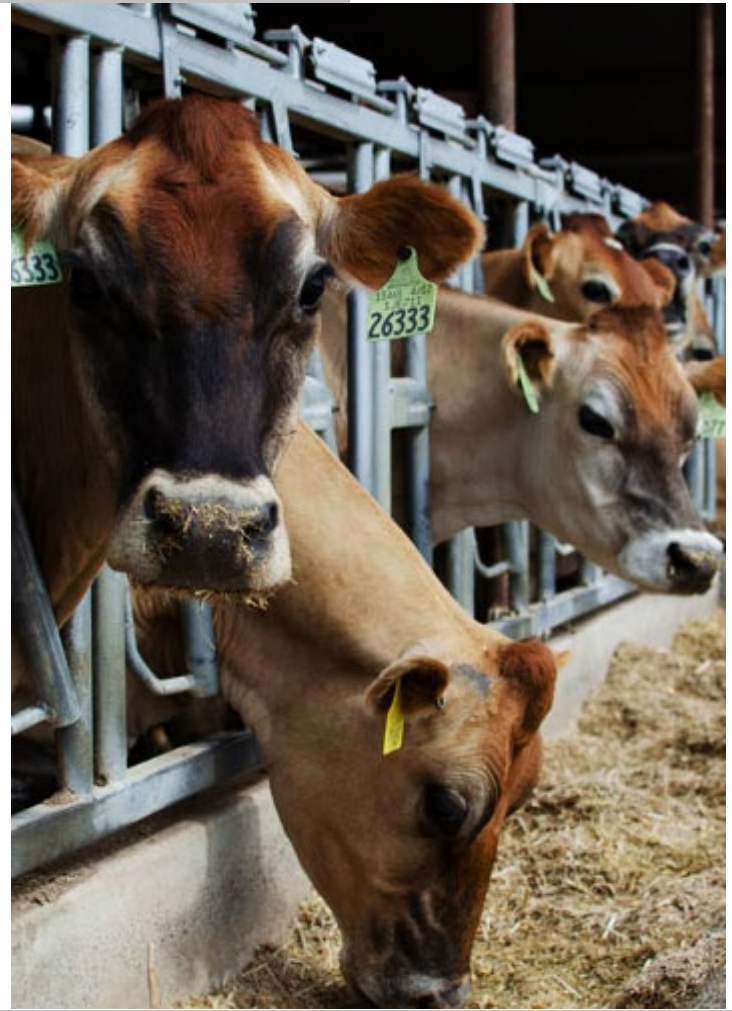


15 Measures of Dairy Farm Competitiveness



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Authors

Dianne Shoemaker
Maurice Eastridge
Bill Weiss
Jason Hartschuh
Chris Zoller
Rory Lewandowski
Debbie Brown
Glen Arnold
David Marrison
Chris Bruynis



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Authors of the original publication were: Jim Polson, Dianne Shoemaker, Ernie Oelker, and Gary Schnitkey.

2008 Revision Authors: Dianne Shoemaker, Maurice Eastridge, Don Breece, Julia Woodruff, Duane Rader, and David Marrison.

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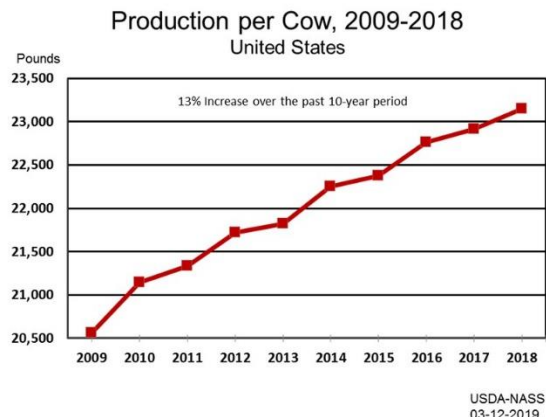
Introduction

The 15 Measures represent key characteristics of the most competitive dairy producers in the Midwest. The most competitive dairy producers already exceed many of the measures. While a single dairy business often does not meet all 15 measures, dairy producers who meet the majority of these measures should maintain long-term competitiveness with dairy producers anywhere in the world.

First published in 1997, the 15 Measures remain strong indicators of profitable, sustainable dairy businesses. As we reviewed and revised the measures, some competitive levels were adjusted to reflect current industry trends and realities. Overall, the measures continue to represent strong indicators of success in the dairy industry.

The dairy industry is very dynamic and global, with continuing trends of fewer farms with more cows per farm. This does not mean that a farm is competitive just because it is growing in size. You have to study a farm's financials to know if it is competitive.

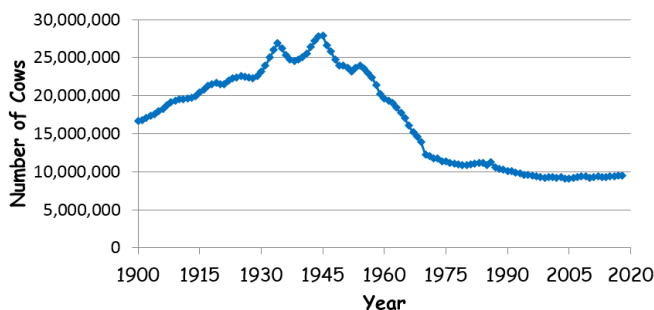
utilizing competitively priced high quality feedstuffs.



Source: https://www.nass.usda.gov/Charts_and_Maps/Milk_Production_and_Milk_Cows/

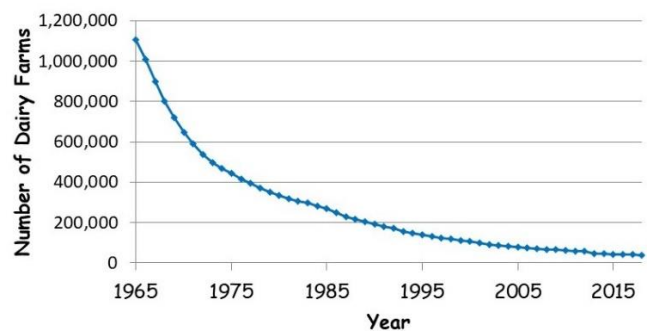
Some dairy businesses do not meet many of the measures. Without change, these producers will likely be exiting the dairy business within the next few years. There has been a steady decline in the number of dairy farms for over 50 years.

Number of Dairy Cows in US



Production per cow continues to increase due to a variety of factors including improved genetics, housing, feed quality and management practices. Highly competitive farms use well-balanced rations for the level of production in their herds while

Number of Dairy Farms in US



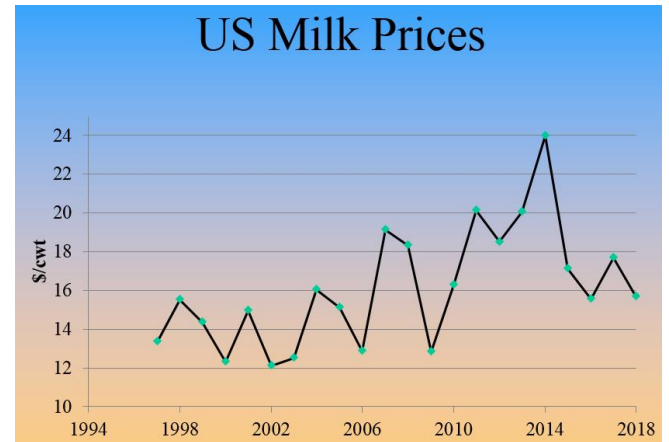


The 15 Measures fall into 11 broad areas which provide a good overview of the competitiveness of a dairy farm business. The 11 management areas are:

1. Rate of production
2. Cost control
3. Capital efficiency
4. Profitability
5. Liquidity
6. Repayment schedule
7. Solvency
8. Mission
9. Maintain family's standard of living
10. Motivated labor force
11. Capturing dairy manure nutrients

Major problems in any one area can seriously limit the ability of a dairy farm to compete. We selected one or two measures in each management area as indicators of how the farm is doing.

As a dairy farm manager, you should continuously evaluate and analyze your farm from many viewpoints. Farms performing well in some areas may have serious weaknesses in others. Evaluating your farm from several different perspectives as you plan for the future ensures that your business is structured and managed for competitiveness and growth while managing your operation through a volatile market. While the general projection is for a positive dairy industry, historical trends show us that market prices fluctuate greatly.



A summary of each measure is provided, along with instructions for how to calculate, evaluate, and interpret the measure, followed by a discussion about the competitive range. We also suggest changes to help a dairy operation move into the competitive range.

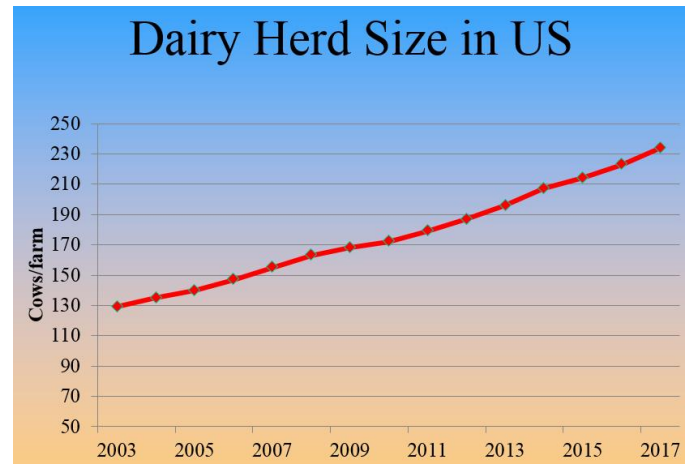
Evaluating the profitability and sustainability of a dairy farm business based on one or only a few measures may result in an inaccurate or incomplete assessment. All of the areas represented by the measures are important for the long-term viability of a business — and are related to and influenced by each other. Look for those relationships in the discussion of each measure.

Many dairy producers do not have the resources or the desire to make the changes necessary to compete with the most competitive farms on every measure. Even when they have the desire, high debt levels or limited resources make some of these measures difficult for some dairy producers to achieve. Producers who will not or cannot achieve the desired ranges may continue to operate and support a family for many years. However, primarily because of inflation, those who do not make changes to become or stay competitive in a constantly changing industry can expect a declining

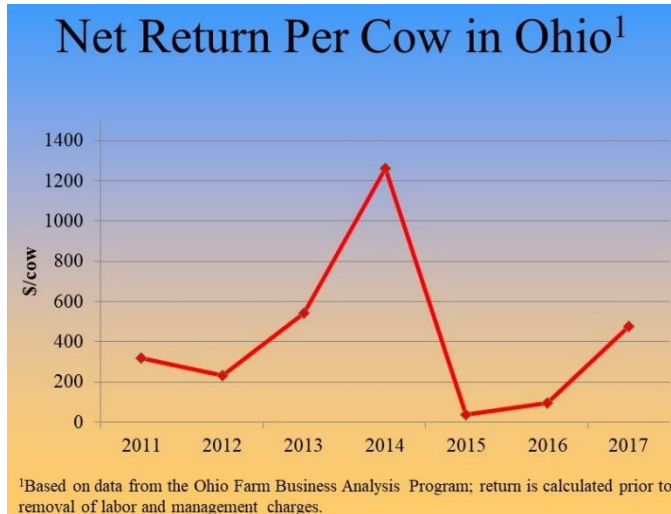
standard of living over time. These farms also run the risk of using up any equity they have built in their business and not being able to retire or pass the business on to the next generation.

Because competitiveness requires a commitment to constant improvement and change, these measures will continue to change over time. Dairy producers who want to stay competitive must continue to improve, modernize, adapt, and change.

Being competitive is more than having the newest technology. A dairy farm family with better-than-average management must continuously increase its gross farm income at the rate of inflation or greater to maintain the family's standard of living. Short- and long-term decisions can greatly impact the ability of a dairy business to grow in the future.



While the average US herd size has grown by 100 head in the last 14 years, increasing cow numbers may not always be the best way to increase gross farm income of which 5 to 10% is used for family living.



Each farm, farm manager, and farm family is different. At the end of this publication in the section titled “*The Fork in the Road for Dairy Farms*”, we offer suggestions to dairy farm managers who:

1. Already are competitive
2. Want to become competitive
3. Would like to become competitive but cannot, or
4. Do not want to become competitive

Dairy farm income per cow has gone up slightly during the last 45 years, but the declining value of the dollar (inflation) has dramatically reduced what you can buy from the income of one cow.

Unfortunately, net returns per cow have fluctuated dramatically in the last five years from over \$1000 per cow to well below \$200 per cow. Historically, we have shown that a dairy farm manager needs to increase cow numbers by 50% every 10 years just to offset the impact of inflation. However, because more cows means higher incomes and more income tax, farmers must increase cow numbers at least another 10% to pay the additional tax on the higher income.



Gaining Control of Your Business

Business managers gain and retain control of their businesses one step at a time. Thinking that you can quickly change or improve all 15 areas at once is unrealistic. Frequently, it takes many little changes and perhaps several larger moves over months and even years to make a major change in a business. However, most dairy farmers should compare their operation with all 15 of these measures at least once per year. Farmers who want to maintain or grow their operations long term must stay competitive. These farms should strive to be in the top third of dairy farms based on net return per cow.

Provided next are four broad steps for gaining control of your business:

Step 1: Set a Goal

The first step in gaining control of any part of a business is to set a goal/target. In most cases, one or more of our 15 Measures can serve as a target. In most cases, a manager will need to set a similar but slightly

different, more appropriate target for his or her specific business. Thinking you can quickly move to the level of the most competitive dairy farms in the country is unrealistic. However, setting goals higher than current performance and improving your operation to reach these goals is both realistic and necessary.

Step 2: Collect Information

The second step in gaining control of a part of your business is collecting information to see how your farm compares with other dairy farms. Many producers would benefit from using computerized year-end analysis programs, such as the one used to compile the Ohio Farm Business Analysis Dairy and Crop Summaries, New York Dairy Farm Business Summary, the Northeast Dairy Farm Summary, or FINBIN summaries maintained by the Center for Farm Financial Management at the University of Minnesota.





The FINAN program, one of the FINPACK programs supported by the Center for Farm Financial Management, is used by Extension in Ohio and 30 other states to make such calculations. The FINAN analysis will calculate most of the financial ratios listed in the 15 measures. The records needed to complete an analysis are beginning and end-of-year balance sheets, performance information, and cash records with accrual adjustments. If you use the FINAN program for several years, you can easily see and evaluate business trends over time.

Step 3: Monitor Your Progress

The third step in gaining control of your business is monitoring your progress — that is, comparing how you are doing with your goals. Make this comparison while the information is still timely, especially for many management factors that change weekly or monthly. Finding out today that the ration you were feeding six months ago caused a major drop in production is not very helpful. However, some measures like the debt-to-asset ratio only need to be calculated once per year if your operation does not undergo any major financial changes.

To see how monitoring works, consider this example:

The management team sets a goal of lowering the operating expense ratio (Measure 3) to no more than 70%. First, a budget is developed to meet the goal.

Next, someone is assigned the responsibility of measuring and monitoring income and expenses regularly (probably monthly) throughout the year. If either factor changes, the team takes corrective action in time to keep the expense ratio in line. If the person collecting the information is not a manager, he or she should report the information to a designated member of the management team.

Key, yet often overlooked, management issues are:

- (Step 1) Who is responsible for setting goals?
- (Step 2) Who is collecting information to monitor progress?
- (Step 3) Who, when, how is progress against set goals monitored?

Frequently, different people set goals, collect information, and monitor different parts of the business. Important questions are:

- Does someone have the responsibility for performing each of these steps for each goal?
- How often is this person to do it?
- With whom are they to share the information?
- What is this person to do if they find a major problem?

Management must ensure that someone is responsible and follows through!

Step 4: Take Corrective Action

The fourth and most important step is taking the appropriate corrective action, if needed. If the business is meeting a goal, no action is required unless the goal should be adjusted to increase long term farm sustainability. If the business is exceeding a goal, action may still be necessary. If the goal is exceeded because of desirable behavior by one or more people in the business, management may want to praise and reward those who helped exceed the goal. Management may also want to consider whether the goal is set too low, but management must be careful not to discourage high performers by raising the goal and “rewarding” high performance with even higher expectations.

If the goal is not met, management should do one of two things — take corrective action based on why the goal was not met, or consider if the goal is unrealistic and needs to be re-evaluated. Taking corrective action includes identifying problems and implementing the necessary steps to remedy the situation.

Managers who make things happen are able to identify the cause of a problem, and then solve it. They usually ask “Why?” until they fully understand what is causing a problem. Then they entrust others to help solve the problem while continuing to ask why and what will be affected by these changes.

The 15 Measures

<i>Measure</i>	<i>Competitive Level</i>
Rate of Production	
1. Pounds of milk sold per worker	Freestall /parlor ≥ 1,000,000 ECM
Cost Control	
2. Feed cost per cwt of milk sold Income over feed cost	Top 25%
3. Operating expense ratio (OER)	≤ 70%
Capital Efficiency	
4. Dairy investment per cow	≤ \$11,000 per cow
5. Asset turnover ratio (ATR)	≥ 0.60
Profitability	
6. Net farm income (NFI)	≥ \$1,300 per cow
7. Rate of return on farm assets (ROA)	> 10%
Liquidity	
8. Current ratio (CR) and 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



Measure	Competitive Level
----------------	--------------------------

Solvency

- | | |
|-------------------------|--|
| 10. Debt to asset ratio | ≤ 30% |
| 11. Debt per cow | < \$3,300 if not expanding
< \$4,300 during expansion |

Mission

- | | |
|--|---------------------------|
| 12. The management team agrees on why they are in business | Written mission statement |
|--|---------------------------|

Maintain Family's Standard of Living

- | | |
|--|-------------------------------|
| 13. Owner/operator(s) maintain or increase their standard of living by continual change to adopt proven technology, capture economies of size, or market opportunities so that the family(ies) supported by the business can maintain their standard(s) of living. | 5 to 10% of gross farm income |
|--|-------------------------------|

Motivated Labor Force

14. Managers use personnel management practices that lead to well-trained, enthusiastic, and empowered family members and employees who share a commitment to the mission and goals of the business.

Manure Nutrient Management

15. Cost associated with manure removal from the farm is often \$125 to \$150 per cow. Proper utilization of manure can minimize this cost and reduce environmental risks.

Measure 1

Rate of Production: Pounds of Milk Sold per Worker

Competitive Level: 1,000,000 lb of ECM per worker

Energy Corrected Milk (ECM) = (7.2 x lb protein) + (12.95 x lb fat) + (0.327x lb milk)

Calculation:	Example:
Total pounds of ECM milk sold ÷ full-time worker equivalents (FTE)	8,500,000 lb ECM milk sold ÷ (20,000 hours/2,500 hr) = 1,062,500 pounds milk sold per worker

The increasing cost of labor, combined with its impact on the overall cost of production means a dairy manager needs to measure, evaluate, and monitor labor efficiency. An excellent way to accomplish this is by calculating the pounds of energy-corrected milk (ECM) sold per full-time worker. This efficiency factor combines labor efficiency and dairy herd productivity into a single indicator.

The calculation of this measure is significantly influenced by your definition of a full-time equivalent (FTE). In Ohio, an FTE is often defined as an adult who works 50 hours per week for 50 weeks (allowing for two weeks of vacation). This translates into 2,500 work hours for each FTE. It is vital that you include all paid and unpaid labor in this calculation. Smaller dairy farms are more likely to have at least some unpaid family labor from a spouse, children, or the operator who likely works more than 2,500 hours per year.

When analyzing and comparing your farm to other benchmark data, it is important to determine how the reporting agency defines a full-time worker, and if crop production labor is included.

To calculate this measure:

1. Calculate total FTE on the farm per year. Divide total hours of paid and unpaid labor for producing your dairy's feed crops and for operating the dairy by 2,500.
2. Calculate total pounds of ECM. Total pounds of fat, protein, and milk sold should be taken from the year's milk checks. Herd average figures from dairy record systems are not an accurate reflection of milk sold because they include fresh cow milk, milk discarded from treated cows, and milk fed to calves. The pounds of salable milk fed to calves should be added to pounds of milk sold to reflect total potential milk sales.
3. Divide total pounds of ECM sold by total FTE per year.



Pounds of ECM sold per worker is an important tool for evaluating the productivity of workers and cattle. It combines efficient labor utilization with good to excellent herd production. *If all feed is purchased, the general rule is to double these benchmarks.*

Because free-stall parlor systems can handle more cows, these systems allow more pounds of milk per year per worker than tie stall or stanchion systems. Tie stall or stanchion barns entail considerably higher costs per cow than larger, modern free-stall facilities. The combination of lower investment per cow and more efficient labor utilization make free-stall housing systems much more economical because they generally result in lower costs for producing each unit of milk. However, existing tie stall or stanchion facilities may be able to compete with free-stall systems if the operation carries little or no debt.

Fewer pounds of milk per worker will likely be sold per year for small versus large breed herds, but the value of ECM sold per year may be similar under similar management systems. This occurs because of the higher value per cwt of milk for the small breeds of dairy cattle (milk is higher in concentration of fat and protein). However, because the value of milk sold is affected by milk price fluctuations, gross milk sales is not a very useful tool for measuring productivity trends over time.

If the pounds of milk sold per worker is below the competitive level:

1. **Evaluate herd productivity.** To achieve the desired level of pounds of ECM sold per worker, cows will most likely need to be above average in production for their breed. Many competitive farmers implement strategies to increase herd productivity. Some strategies include feeding balanced rations, optimizing cow comfort, using proven milking technologies, improving cow flow in parlor, milking more than two times per day, and filling facilities over 100% when labor is only slightly affected.
2. **Evaluate labor efficiency.** Antiquated facilities and uncomfortable working conditions reduce labor efficiency. Careful hiring also plays an important role in labor efficiency. Employee training, motivation, and pride in doing a job well help workers to be more efficient and effective, whether they are family members or unrelated employees. Workers in tie stall or stanchion systems should be able to handle 30 to 35 cows per FTE, including raising crops. Workers in free-stall systems should be able to handle 40 to 50 cows per FTE, including raising crops. Efficiently operating parlors will turn a minimum of 4 times per hour.
3. **Apply the four steps in the *Gaining Control of Your Business* section in the *Introduction*:** set a realistic goal, collect information for your own farm, compare your performance with the goal, and take appropriate corrective action, if needed.

Measure 2

Cost Control: FEED

Feed Cost per Cwt of Milk Sold and Income Over Feed Costs

Competitive Level: Top 25% (low feed cost or high IOFC)

Feed costs per cwt of milk sold and income over feed costs (IOFC) can be quite variable from year to year among farms because of market and management influences and which animal groups are included in the calculation. Calculations based on different animal groups can include:

- Total feed costs per cwt of milk sold (includes lactating and dry cows and heifers of all ages)
- Feed costs per cwt of milk sold for lactating cows (lactating cows only used because they generate the revenue)
- Feed costs per cwt of milk sold for lactating and dry cows (sometimes used because heifers are raised off the farm)
- IOFC is typically calculated for lactating cows only

The current feed costs should be calculated using the following web site:

<https://dairy.osu.edu/resources/financial-management>. The goal is to be in the top 25% (low feed cost or high IOFC) or green level. If herd replacements are custom raised, then feed costs per cwt milk sold should be about 30% lower than for when costs for all animals are included.

Example calculation of total feed costs for the herd per cwt milk sold:

A. Total cost of feeds fed to all dairy cows (lactating and dry) and replacement heifers, including both purchased and homegrown feeds	$\$ 408,000$ purchased feed $+ \underline{\$ 370,000}$ homegrown feed $= \$ 778,000$ total feed
B. Total cost of feeds fed to dairy herd \div total cwt of milk sold (for the same time period)	$\div \underline{85,000}$ cwt of milk $= \$ 9.15$ feed cost per cwt of milk sold

Example calculation of feed costs for lactating cows per cwt milk sold:

A. Total cost of feeds fed to lactating cows, including both purchased and homegrown feeds	\$300,000 purchased feed + <u>\$276,000 homegrown feed</u> = \$576,000 total feed cost
B. Total cost of feed for lactating cows ÷ cwt of milk sold	÷ <u>85,000 cwt of milk</u> = \$6.78 feed cost per cwt milk sold

Example calculation of IOFC for lactating cows:

(Total value of milk sold - total cost of feed fed to lactating cows) ÷ cwt of milk sold

\$300,000 purchased feed
+ \$276,000 homegrown feed
= \$576,000 total feed cost

85,000 cwt of milk * \$16/cwt = \$1,360,000

(\$1,360,000 – 576,000) ÷ 85,000 cwt of milk = \$9.22/cwt milking herd IOFC

Feed Cost Per Cwt of Milk Sold

Total feed costs per cwt of milk sold is a measure of the effectiveness of management in controlling the largest cost item in producing milk. This measure accounts for all of the feed provided to the lactating cows, dry cows, and heifers since the sale of milk is the primary revenue stream for paying for all feed expenses. Generally, 65% of the feed costs for a dairy herd that raises its own replacements will be for the lactating cows, 30% for the heifers, and 5% for the dry cows. We suggest using the market value for homegrown feeds fed to livestock if you do not know your actual cost of production. Feed harvested by the cows or heifers from pasture can be valued based on the value of hay.

Some dairy farmers can purchase feed more cheaply than they can raise it. Different

ways of determining the cost of producing your feed can be found on the web at <http://dairy.osu.edu/resources/financial-management>. Comparing feed production costs with market prices will help you evaluate the efficiency of your cropping program.

The New York Farm Business Summary uses cost of cash crop inputs to represent homegrown feed costs, but this calculation does not include machinery costs. For this analysis, calculate all machinery costs and allocate a portion to the crops used as dairy feed.

Reducing cash outlay for purchased feed is not necessarily a good way to reduce feed costs. Homegrown feed is sometimes more expensive than purchased feed. If purchased feed costs per cow are kept too low, milk production may be less than optimal, and feed cost per cwt of milk sold may still be high.

When you use market price or purchase most of your feed, feed costs will fluctuate with market prices.

If you find that you are not meeting your feed cost goals, consider these actions:

1. Produce or purchase quality forages for all cattle. You cannot afford to feed poor quality forages. However, quality of feed should be appropriate to the animal's nutritional needs. High producing cows need the highest quality forage; that same quality would be wasteful for gestating heifers or dry cows.
2. Use grouping strategies and appropriate diets based on animal needs (parity, milk yield, body condition, etc.) By grouping lactating cows, higher quality forages can be fed to the higher producing cows and lower protein diets and less use of feed additives can occur for late lactation cows.
3. Balance rations for all groups based on current feed analyses and judicious use of feed additives. Make sure that the rations are balanced for reasonable levels of production (over-formulate at a reasonable level, e.g. 5 lb above group average, but this should be based on the variation of milk yield within the group). Make sure dry matter intake is at expected levels.
4. Keep crop production input costs low by using manure nutrients, testing soil, and making wise purchases of seed, fertilizer, and chemicals.
5. Reduce feed losses from storage, losses during mixing and delivery, and refusals at the feed bunk. Collectively, all of these feeding losses are referred to as shrinkage and are included in the feed costs per cwt of milk.
6. Keep purchased feed costs low by wise buying practices (e.g., feed commodity contracting, purchasing "bargain" feeds, etc.) and efficient use of feed (e.g. feeding ingredients to appropriate animals and reducing wastage).
7. Keep crop equipment costs per acre low by using custom operators, purchasing expensive machinery with neighbors, or purchasing feeds.
8. Feed for high production if cows have the genetic ability and you have adequate facilities and sound animal health. Management areas limiting feed efficiency (e.g., high incidence of mastitis, lameness, or metabolic diseases; or over-stocked, poorly ventilated facilities) should be improved before feeding for higher milk production.
9. Keep dry periods between 45 to 60 days and address problems with reproduction and animal health.
10. Keep non-dairy culling (<25%) and death (< 5%) rates low in herds; if these two aspects are well managed, overall cull rate (dairy, non-dairy, and deaths) may have little impact on farm profitability.
11. Keep age at first calving between 22 and 24 months to reduce costs per replacement animal.
12. Eliminate causes of low milk production such as poor cow comfort, mastitis, and poor feed bunk management.

Farms can simultaneously have low feed costs per cow and extremely high feed costs per cwt of milk sold. This is frequently a result of feeding poor-quality forage and/or not balancing the ration for optimal production, resulting in low production.

Also, errors in feed mixing and delivery can have adverse effects on milk production and feed costs. Feed tracking software for TMR mixers can help monitor accuracy of feed weighing and delivery. Also, make sure animal inventories by group and age are accurate.

Total feed costs will also be influenced by how calves and heifers are reared. Longer milk-feeding periods and feeding for higher rates of gain in the pre-weaned period will increase costs, while restricted milk feeding and early weaning will decrease total costs. However, overall health and performance must be considered, as well as the targeted age at first calving when calf-raising strategies are considered.

Income Over Feed Costs

Routine monitoring of IOFC for a given farm is important. The actual farm's IOFC is calculated based on the yield of milk, milk fat and protein composition, and the price of the milk and its components paid to the farmer. The feed costs should include the value of the homegrown feeds and the purchased feeds provided only to the lactating cows. The benchmark value is calculated based on the requirements of net energy of lactation, metabolizable protein and effective NDF to produce the given amount of milk, milk fat, and milk protein produced on the farm as described and the prices for these nutritional components based on current market feed prices using Sesame[®] (<http://www.sesamesoft.com/>) .

If your IOFC is low relative to the benchmark:

1. Review the feed costs to determine if there is some cost reduction available with the homegrown feeds or to determine if you should continue growing these feeds or if you should buy them from someone else. Are your purchased

feed costs too high because of greater scrutiny needed in shopping for ration ingredients or do you need to improve forage quality?

2. Are the diets correctly formulated and adjusted routinely based on changes in feed sources or composition of feeds? Are cows grouped adequately to feed them based on nutrient needs and dry matter intake (DMI)?
3. Are the DMI values used actual or estimated from when the ration was formulated?
4. What is the feed efficiency on your farm? Feed efficiency on dairy farms affects IOFC. One common method to calculate feed efficiency is: $3.5\% \text{ fat-corrected milk (FCM, lb)} / \text{DMI (lb)}$. The equation for calculating 3.5 FCM (lb) = $(0.432 \times \text{lb milk}) + (16.23 \times \text{lb milk fat})$. The desired range for this feed efficiency is 1.4 to 1.6. The goal is usually to increase DMI, but if the intake increases without a response in milk yield, then some other positive response (e.g., improved body condition or fertility) should be occurring or the increase in feed costs is not generating an economic return.
5. Is milk income too low relative to current market potential? Should another milk processor be considered? Are milk fat and protein at expected levels relative to breed averages? Are you getting milk quality premiums based on low somatic cell and bacteria counts?

If your IOFC is high relative to the benchmark, this would usually be a positive indication, as long as the numbers used are accurate. A few areas to review are:

1. How did you price the homegrown feeds; in other words, were all costs of production for these feeds included?
2. Were the costs of feed refusals and feed shrinkage included in total feed costs?
3. Are the DMI values used for calculating feed costs actual and not estimated values?
4. Check body condition of all cows in the herd. If cows are overall low in body condition, the high IOFC is likely temporary in that the cows have been

losing body weight to support the milk yield. Fresh cows are expected to lose one body condition score (1 to 5 scale) during the first 60 days in milk, but otherwise, cows should be in a positive energy balance.

Determination of IOFC for short periods of time should be avoided (yearly preferred), but if conducted, make sure the same time period for feed costs and milk yield and income are used. For example, a high IOFC for a short time frame comparison may be inflated due to a transient increase in milk price. In such cases, a longer time frame should be used or a more realistic milk price used that reflects a more extended period of time.

Measure 3

Cost Control: Operating Expense Ratio (OER)

Competitive Level: Less than or equal to 70%

Calculation:

(Total cash operating expenses -
farm interest expense) ÷
gross farm income x 100

Example:

\$ 1,088,000 expenses
- \$ 52,000 interest
= \$ 1,036,000 total operating expenses

÷ \$ 1,450,000 gross farm income
= 0.71
x 100
= 71% OER

This ratio indicates the percentage of the gross farm income used to pay operating expenses. Expenses, not including interest, should be less than 70% of the gross farm income of a dairy business. When the percentage is lower, more money is available for loan payments (principal and interest), family living, improvements, and savings.

Take total cash operating expenses directly from Form 1040, Schedule F for the year being analyzed. These represent cash expenses that may or may not include all of the expenses incurred for production of milk in the year being analyzed. Make these (accrual) adjustments as needed:

1. Subtract the depreciation expense from Form 1040.
2. Subtract expenses that were prepaid for future production.
3. Add expenses that were prepaid in the previous tax year for items that were used to produce milk in the year being analyzed.
4. Add expenses for items that were used to produce milk but were not included on the Form 1040. This would include unpaid bills.
5. Subtract any expenses that were paid in the year being analyzed for items used in previous production years.



Gross farm income includes cash farm income adjusted for changes in inventories from year to year. If for example, you have the same number of livestock in one year as the previous year, except for five additional springing heifers worth \$10,000, add this \$10,000 to gross farm income. If you have \$20,000 less feed on hand than in the previous year, reduce gross farm income by \$20,000.

Farm interest expense includes all interest expenses reported on Schedule F.

If the operating expense ratio is lower than 70%:

Low expenses are desirable only if production and income do not suffer. If expenses are below 70% and production per cow is above that for similar animals, great!

If expenses are low, income is low, and cash flow is tight, the business may not be large enough to generate sufficient income or debt may be high. Look first at other ratios that measure output and volume of business. The business also might have too much debt, since principal and interest payments are not included in operating expenses. Check the current ratio and the debt-to-asset ratio for clues about excessive debt.

If the operating expense ratio is higher than 70%:

An operating expense ratio above 70% may reflect high expenses, low income, or both. The largest single expense on most dairy farms is feed. Make sure that feed costs per cwt of milk sold are reasonable. Are other expenses out of line or reported in the wrong year?

Another reason for the operating expense ratio to exceed 70% is low gross farm income. Look at the asset turnover ratio, milk sold per worker, and perhaps the farm's investment per cow for clues as to whether gross farm income is too low or the farm is too small.

Measure 4

Capital Efficiency: Dairy Investment per Cow

Competitive Level: Less than or equal to \$11,000 per cow

Calculation:

Total dairy investment ÷ number of cows
(lactating and dry)

Example:

$$\begin{array}{r} \$2,500,000 \text{ total dairy investment} \\ \div \quad \quad \quad 349 \text{ cows} \\ \hline = \$ \quad \quad 7,353 \text{ investment per cow} \end{array}$$

Total dairy investment is the total current market value of all dairy assets. These assets should only include land used for raising livestock feed, pasture, livestock buildings, feed storage, manure disposal, livestock machinery, milking equipment, cows and replacements, and other investments related to the dairy enterprise.

This measure indicates how efficiently the money on a dairy farm is invested. Excessive investment per cow makes receiving a high return on the dollars invested difficult. If investment per cow is greater than \$11,000, also look at the asset turnover ratio (Measure 5), return on farm assets (Measure 7), and debt per cow (Measure 11). If the business is generating a high return on assets and is not carrying excessive debt per cow, a higher investment per cow is manageable. If this is not the case, when investment per cow is high, your dollars are not working hard enough to generate dairy income.

If dairy investment is more than \$11,000 per cow:

The first question to answer is: What is out of line? Is the investment too high? Is the number of cows too low? Or both? High investment per cow may stem from a number of causes including:

1. High-priced land,
2. Overbuilt facilities,
3. Large number of owned acres per cow,
4. New or overpriced machinery,
5. New or overpriced/oversized facilities,
6. Robotic milking and feeding systems, or
7. Some combination of the above.



In Ohio, some farms have land that is now worth much more for non-agricultural uses than the agricultural value that the owners originally paid. If the farm is profitable and they wish to continue their dairy business on this land, we suggest assigning a reasonable agricultural value to the land for these calculations.

If high-priced land was recently purchased at market values or nonagricultural value **and** the cows are expected to pay for the land, use the purchase price for the land for this calculation.

Lowering investment is difficult. Rationalizing why investment is more than \$11,000 per cow is easy; however, you should address the problem because your dollars are not working hard enough. The usual solutions to high investment per cow include:

1. Restraint on future investment
2. Increasing cow numbers without further increases in investment
3. Trading a farm in a high-land value area for a larger farm in a lower-value area
4. Leasing assets instead of purchasing them
5. Selling unproductive assets.

The number of cows is too low if the facilities are not full. Filling the barns with high-producing cows almost always pays. Many competitive farmers fill their buildings above 100% of capacity.

Sometimes, it is possible to increase cow numbers by making alternate arrangements for the care and housing of dry cows and replacement heifers. Be cautious that custom raising expenses or facility rentals do not increase overall cost more than additional income. What would it take to increase the number of cows on your farm by 10%?

Measure 5

Capital Efficiency: Asset Turnover Ratio (ATR)

Competitive Level: Greater than or equal to 0.60

Calculation:

Gross farm income ÷ average total farm assets

Example:

\$1,450,000 gross farm income
÷ \$2,400,000 average total farm assets
= 0.60 ATR

The ATR measures the efficiency by which all farm assets generate revenue. The higher the ATR, the more efficiently assets generate revenue.

Gross farm income includes cash farm income adjusted for changes in inventories from year to year. If for example, you have the same number of livestock in one year as the previous year, except for five additional springing heifers worth \$10,000, add this \$10,000 to gross farm income. If you have \$20,000 less feed on hand than in the previous year, reduce gross farm income by \$20,000. Average total farm assets is the average of the total farm assets at the beginning and at the end of the year.

Farms that should have a higher ATR are those that rent their facilities or that rent some or all of the land that they might use to grow crops. Farms with greater investments in land or very expensive land and/or facilities usually have a lower ATR. It is up to the individual dairy business to determine if the return the business is generating is acceptable relative to the investment in these assets.

If the asset turnover ratio is below 0.60:

The first question to answer is: What is out of line? Are the gross revenues too low, are average

total farm assets too high, or are both causing problems? On dairy farms, the quantity of milk sold and the milk price impact gross revenues most significantly. If milk production per cow is normal, herd size is adequate, cull and other sales are normal, and milk prices are not depressed, then the problem may be with total farm assets.

Many dairy farmers commonly tie up more money in their farms than is necessary to run them. For example, due to large investments in land and large equipment, grain farmers usually have a lower ATR than dairy farmers. Dairy farms are also seeing lower ATR as they invest in large harvest equipment; some operations may benefit from custom hiring some harvest or other field operations. Some dairy farmers could increase their net incomes and their ATR by reducing the acreage of crops they raise and better managing the dairy enterprise. Building new facilities, such as parlors larger than herd size dictates, can cause low ATR. Once built, only generating more income relative to the investment will change the ATR.



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Another factor that can cause a low ATR is high-priced land. The value of some dairy farmers' land has increased significantly as a result of urban and other development pressures. Higher land values reduce ATR. If the cows are not being asked to pay for the high-priced land (the land was purchased before land prices increased), the dairy operator may be satisfied with a lower ATR as long as the farm is profitable and meeting other goals.

If asset levels are reasonable (see Measure 4, dairy investment per cow), production issues may be causing a low ATR. Many competitive farmers adopt new management practices, cautiously overfill their facilities, and milk more than two times per day to reap the most profit from their investments.

Most people do not like to move their businesses. This reluctance, along with the desire to hold on to the property until the price goes higher, causes some farm businesses to stay on high-value farms when perhaps they should not. If the farm family has adequate income to live on and the land is appreciating enough to justify continued ownership, then a low ATR may be acceptable. However, a business struggling to pay the bills and provide for family living should strongly consider cashing in or trading the farm.

FINPACK uses a different method of computing ATR than the New York Farm Business Summary (NYFBS). Both methods are acceptable, but they give different results. The NYFBS uses the gross revenue approach based on gross farm income as shown in the previous example. FINPACK uses the value of farm production method, which results in a lower ATR. FINPACK users who want to compare with this measure should calculate their ATR manually using the formula provided in this section.

Measure 6

Profitability:

Net Farm Income (NFI) Per Cow

Competitive Level: \geq \$1,300 per cow

Calculation:

(Cash receipts
 \pm inventory change
- expenses
- depreciation)
 \div number cows

Example:

\$ 1,390,000 cash receipts
+ \$ 60,000 inventory change
- \$ 1,088,000 expenses
- \$ 50,000 depreciation
= \$ 312,000 NFI

 \div 340 cows
= \$918 NFI per cow

Net farm income per cow is an excellent measure of how a dairy farm is doing. It typically represents the return to labor and management for the owner/operator. The competitive level of greater than \$1,300 per cow is typical of what the top 25% of Midwest dairy farms achieve in times of reasonable milk and feed prices.

Breaking net farm income down to a per-cow measure is useful for comparing your farm's performance to other farms within production years regardless of breed or herd size.

How is NFI used?

Part of NFI will be withdrawn for reasonable family living expenses and retirement savings. NFI must also be used for making scheduled principal payments on loans, paying income taxes, and reinvesting in the business.

Calculating NFI requires working with a year's receipts, expenses, inventories, and depreciation. Receipts, expenses, and depreciation can be obtained from the business's tax return. These cash-based figures must be adjusted to represent all the income generated and all of the expenses that were incurred for the production of milk in the year being analyzed. If the farm uses an accrual accounting system, these adjustments are not necessary.

Inventory change requires comparing inventory at the beginning and end of the year. Inventory items include grain, feed, livestock, prepaid expenses, and accounts receivable and payable. An item's inventory change equals the item's ending inventory value minus its beginning inventory value.



Inventory increases for grain, feed, livestock, and prepaid expenses are added to income while inventory decreases are subtracted from income. If accounts payable increase, the amount of the increase is subtracted from income. If accounts payable decrease, the amount of the decrease is added to income. If accounts receivable increase, the increase is added to income, but a decrease is subtracted from income.

Computer programs, such as FINAN[®], or paper systems, such as the Ohio Commercial Farm Account Book and Balance Sheets, are helpful for calculating NFI.

For a dairy farm business to be competitive, its NFI must, in most years, considerably exceed the amount needed for a good family living and to meet all scheduled principal payments and tax obligations. In years when it is not, only the most urgent obligations are met. Most competitive operators routinely reinvest in the business, maintaining and upgrading facilities to increase efficiency. However, diversifying into savings and off-farm investments are also good strategies to consider.

The goal for net farm income per cow should allow farm managers to build working capital reserves essential to surviving in today's dairy economic environment.

The NFI per cow of the high 20% of farms in the *2016 Ohio Dairy Farm Business Summary* was \$949 per cow, down from the \$1,392 average for the previous 5 years (2011 to 2015). During that same five years, the high 10% of farms participating in the *New York Farm Business Summary* averaged \$1,552 per cow while the high 20% of the herds with 300 cows averaged \$1,491. The high 25% of herds in the *Northeast Dairy Farm Business Summary* averaged \$1,274 NFI per cow (2011 to 2015).

If net farm income per cow is below the competitive level this may be the result of:

1. Productivity problems — per cow returns are low,
2. Size problems — fixed or overhead expenses need to be spread over more cows,
3. High debt per cow (Measure 11), or
4. Expenses are too high (Measures 2 and 3).

If you are not meeting your income goals, consider these actions:

1. Increase returns per cow. You can accomplish this by reducing costs per cow, especially feed costs, or increasing production of milk and/or components per cow.
2. Sell off under-used assets and pay down debt.
3. Expand the number of cows, if you are in the financial and managerial position to do so.
4. Find lower-cost ways of running the business.

Measure 7

Profitability:

Rate of Return on Farm Assets (ROA)

Competitive Level: Greater than 10%

Calculation:

(Net farm income + farm interest expense
- value of operator's labor and management)
÷ average total farm assets x 100

Example:

\$ 312,000 net farm income
+ \$ 52,000 interest expense
- \$150,000 value of operator's labor and management
= \$214,000 return to assets

÷ \$2,400,000 average total farm assets
= 0.089

X 100
= 8.9% ROA

ROA is useful for determining what the assets invested in your operation earned. The higher the ROA, the more profitable the farming operation. If you use current market values to determine the worth of your assets, you can use the ROA to compare your earnings to those of other businesses for the same time period. The ROA also represents the opportunity cost of having your assets invested in the dairy business as opposed to investing in another business or other investment opportunity that might generate a higher or lower return.

See Measure 6 for instructions on calculating net farm income and item 3 on page 28 for calculating the value of the operator's labor and management.

Factors affecting rate of return on farm assets:

1. How assets are valued,
2. Profitability of the farm business,
3. Level of owner withdrawals for unpaid labor and management,
4. Amount of unproductive or marginally productive assets, and
5. Whether assets are owned or leased.



Let's discuss these five factors in more detail:

1. You may use either a cost basis or market basis balance sheet to compare the performance of your business from year to year. Most farmers and lenders use a market value balance sheet. If you use a market value balance sheet, hold the per unit values of your breeding stock and long-term assets (land) constant from year-to-year to eliminate the impact of simply changing asset values. Using a cost basis balance sheet measures the performance of your farm, unaffected by market changes of asset values, as well as the return on dollars invested. However, a ROA calculated on a cost basis is difficult to compare with the ROA of other businesses using market valuation.

Because farm interest expenses are added to net farm income, rate of return on farm assets is not affected by level of debt or how debt is structured in the farm business. Thus, you can fairly compare actual business performance of both high- and low-debt operations.

2. Return on assets will decline during years of declining profitability. If profitability is always low, then the farm manager must look at ways to increase profitability. The ROA should be higher than the interest rate on borrowed money. If interest rates are higher, then other parts of the business are subsidizing the interest payments for any new or existing debt. It is not unusual for other parts of the farm operation to subsidize land investments, as land typically has a low rate of return.
3. The Ohio Farm Business Analysis program calculates the value of owner withdrawals

for unpaid labor and management at \$13.50/hour, plus 5% of the value of farm production as a management charge. The ROA may be overstated if owner withdrawals are lower than this, perhaps supplemented by off-farm income. Farms set up as corporations should calculate their labor and management charge and compare it to the salary and benefits that are already deducted from net farm income as owner/operator wages and benefits. If the calculated value of owner withdrawals is higher, the difference between the calculated and actual owner withdrawals should be deducted from the net returns before calculating return on assets.

4. If a business has a large investment in unnecessary and/or unproductive assets, ROA may be low. In these situations, the farm manager needs to inventory these assets carefully and determine if the business could be more profitable if the dollars those assets represent were reinvested in other ways.
5. Businesses leasing/renting the farm and/or other major assets may show a higher ROA; however, they will have higher operating expense ratios.

The ROA for the high 20% of dairy farms participating in the Ohio Farm Business Analysis Program from 2011 to 2015 averaged 12.2%. The high 10% of all farms and high 20% of herds over 300 cows averaged 14.96 and 14.3%, respectively for herds participating in the New York Farm Business Summary.

The *New York Farm Business Summary* also deducts a charge for other unpaid labor from net farm income in addition to unpaid operator labor. However, unless a dairy operation has large amounts of unpaid labor, this deduction will not significantly affect the resulting ROA calculation.

Measure 8

Liquidity:

Current Ratio and Working Capital

Competitive Level:

Current ratio (CR) = 3.0 to 3.5

Working capital (WC) = $\geq 25\%$ of Gross Revenue

Calculation:

Current ratio

= current farm assets
 \div current farm liabilities

Working capital to gross revenue

= ((current farm assets
- current farm liabilities)
/Gross farm revenue) x 100

Example:

Current ratio:

\$300,000 current assets
 \div \$173,000 current liabilities
= 1.73 CR

Working capital:

\$300,000 current assets
- \$173,000 current liabilities
= \$127,000 WC
 \div \$508,000 gross farm revenue
= 25% WC to gross revenue

Liquidity is a measure of the farm business' ability to pay obligations due in the coming year from the cash on hand and assets that can easily be turned into cash. Liquidity is often measured using the current ratio. This ratio is an indicator of the ability of the current farm assets, if liquidated, to cover current liabilities. A current ratio of 1.5 indicates that there is \$1.50 worth of current assets for every dollar of current liabilities. The higher the ratio, the greater the liquidity. The ratio is also an important indicator of short-term financial viability.

Another measure of the farm's liquidity is working capital. Working capital is the difference between the value of the farm's current assets and current liabilities.

Current assets include cash, savings, and other assets that can easily be converted to cash during the year (e.g., cash, stocks, bonds, feeder livestock, accounts receivable, prepaid expenses, and inventories, such as feed and supplies.)

Current liabilities are financial responsibilities that are due within one year of the date of the balance sheet (e.g., accounts payable, operating loans, principal portion of scheduled loan payments, and other accrued expenses).

A farm business must be able to pay its current obligations and have a cushion for unexpected cash shortfalls. Cash shortfalls may occur because of disease outbreaks,



lower than expected milk production, lower milk prices, higher input prices, or a combination of factors. A current ratio (CR) above 1.0 indicates that a farm has more current assets than current liabilities. A competitive dairy farm must pay its bills and keep its bank obligations up-to-date.

A CR of 2.0 is sometimes indicated as being strong, but with highly volatile milk markets, this is not high enough. While receiving milk checks on a regular basis helps with cash flow, long term declines in milk price require cash reserves to pay bills as they are due. The top farms have a CR of 3.5, while average farms that often struggle during market recessions have current ratios of only 2.7.

If the current ratio is low:

A persistently low current ratio indicates a major cash flow problem. Strategies to improve the farm's current ratio include:

1. Refinance existing debt with longer repayment terms,
2. Sell nonessential intermediate or long-term assets (e.g., machinery and investments), using the proceeds to reduce debt or improve the efficiency of the dairy business.
3. Increase the farm's revenue or decrease expenses, focusing on profitability.

A low CR may be the result of a lender extending non-mortgage credit on very short terms, for example, when large pieces of equipment, such as large balers, choppers, or combines, are financed for three years or less. This strategy results in ratios substantially lower than 1.0 for some farmers because large amounts of principal are due each year. Cash flow is typically very tight.

This is not problematic as long as the farm is profitable enough to make the payments and the lender continues to extend credit.

Extending non-mortgage credit gives the lender more control over the loan and the farm. These loans usually are reviewed and renewed at least annually. This large "line of credit" causes some farmers problems when they have bad years and their lenders will not extend additional credit.

Also, other lenders may consider the farm a high risk because of its poor CR. A low CR is usually a minor problem when the farm is profitable and the debt-to-asset ratio is well below 30% (Measure 10). However, this is not a long-term answer, but rather a short-term fix. With price volatility, it is important to have cash available to cover expenses when prices are below breakeven.

If the current ratio is high:

A high CR indicates surplus cash, which needs to be wisely invested to protect the farm from market down turns. Current assets usually generate lower returns than other assets. If your CR is high, consider investing in assets that generate higher returns (yet allow cash to be accessed when needed).

Working capital

Working capital is another way to evaluate the farm's liquidity and is a measure of the margin of safety in dollars, rather than as a ratio, of the farm's ability to meet short-term liabilities. The amount of working capital that is adequate is dependent upon the size and scope of the farm business. However, a common recommendation for farms is working capital equal to 25% of gross revenue.

Benchmarks for CR:

Business Summary: New York State, Cornell University, 2011-2015, All Farms, average = 2.62.

Business Summary: New York State, Cornell University, 2011-2015, Large Farms average = 2.62.

Ohio Farm Business Summary 2011-2015, Ohio State University Extension, average = 2.55

2011-2015 Northeast Dairy Farm Summary, Northeast Farm Credit, average =2.98



Measure 9

Repayment Schedule:

Scheduled Debt Payment

Competitive Level:

- A. Less than 10% of gross receipts
- B. Less than \$400 per cow

Calculation:

- A. ((Total annual scheduled principal payments + total annual scheduled interest payments + total scheduled capital lease payments) ÷ gross farm receipts) x 100
- B. (Total annual scheduled principal payments + total annual scheduled interest payments + total scheduled capital lease payments) ÷ number of cows (lactating and dry)

Example for A:

$$\begin{aligned} & \$ 158,250 \text{ scheduled principal payments} \\ & + \$ 52,000 \text{ scheduled interest payments} \\ & + \underline{-0- \text{ capital lease payments}} \\ & = \$ 210,250 \text{ total debt payments} \\ & \\ & \div \underline{\$1,450,000 \text{ gross farm income}} \\ & = 0.145 \times 100 \\ & = 14.5\% \text{ of gross receipts} \end{aligned}$$

Almost all businesses manage debt. Scheduled annual debt payments as a percentage of gross farm receipts is a good measure of competitiveness. Some debt can allow a business to take advantage of opportunities that enhance profitability. Too many scheduled principal, interest, and capital lease payments seriously affect the ability of a business to meet cash obligations, have enough left to provide desired operator income, and reinvest in the business.

If the operating expense ratio (Measure 3) which measures how much of the gross farm income is committed to paying operating expenses is 70%, and the scheduled debt payment is 10%, then 80% of the farm's gross income is committed to paying operating

expenses, principal, interest, and capital lease payments.

This leaves no more than 20% of gross income available to pay taxes, provide operator income (sole proprietorships), operator retirement investment, increase farm cash reserves, and provide dollars for reinvestment back into the business or investment off the farm.

Total scheduled principal and interest payments used in this calculation do not typically include accounts payable within the next 30 days. Other open accounts that are kept current even if the payment is due in more than 30 days, such as an annual land rent payment, would also not be included.

However, accounts payable must be considered if they are open and balances are building up because the business is unwilling or unable to pay them. How will the farm pay these balances?

One option is to commit to paying them over the next 12 months on a self-imposed payment plan. The other is to amortize the accounts payable into one or more longer-term notes with scheduled principal and interest payments. If the farm must follow this strategy, it can allow the farm to pay a lower interest rate than is typically charged on open accounts.

However, this means the farm has incurred debt for operating expenses, not debt that helped the farm become more efficient or productive. The farm must carefully evaluate how/why it got into the position of accruing unpaid balances and determine how it should change the business to minimize the possibility of this happening again.

Factors affecting scheduled annual debt payment:

1. Total farm debt
2. How debt is structured (short, intermediate, or long term)
3. Interest rates
4. Gross farm receipts

If the scheduled annual debt payment is too high:

When scheduled debt payments are too high and cause difficulties in the farm business, a manager must first determine

why they are too high and causing difficulty. Once the cause or causes are determined, then a farm manager must explore options and finally take action. If the business has significant short-term debt, rescheduling some of that debt over a longer (but realistic) term will decrease annual payments.

Review loan terms relative to the asset purchased. Loan terms should generally reflect the useful life of the item in the business. For instance, if a milking parlor with a projected 15-year useful life is financed with a 3-year note, cash flow will be severely compromised. If currently available interest rates are lower than those you are paying, refinancing is also an alternative worth investigating.

Reducing total debt through sale of unused assets or carefully planning, controlling, and spreading debt over more cows are also options. However, any alternative will only be successful if the business is profitable.

In some cases, when money is borrowed for an expansion, annual debt payments as a percentage of gross receipts decreases, even though total debt increases.

Scheduled debt payments for the high 20% of farms (based on net return per cow) in the *Ohio Dairy Farm Business Summary* averaged \$396 per cow and 5.5% of gross receipts for 2011 through 2015. The high 10% of all herds in the *New York Dairy Farm Business Summary* averaged \$388 per cow and 6% of gross receipts for the same time period. The New York numbers include the net reduction in operating debt.

Measure 10

Solvency:

Debt to Asset (D/A) Ratio

Competitive Level: Less than or equal to 30%

Calculation:

$(\text{Total farm debts} \div \text{total farm assets}) \times 100$

Example:

$$\begin{aligned} & \$ 850,000 \text{ debt} \\ & \div \$ 2,500,000 \text{ assets} \\ & = 0.34 \times 100 \\ & = 34\% \text{ D/A} \end{aligned}$$

Solvency is a measure of the ability of a business, at a point in time, to meet all debt obligations following the sale of all assets. This is measured by the D/A ratio. The D/A ratio increases as the business incurs greater levels of debt and decreases as debt is paid off. A business with little debt has a D/A ratio close to zero.

The D/A ratio will vary through the normal life of a business. Higher ratios are common in new and expanding businesses — and often approach financially stressful levels. Debt levels may reach 60% or more during some expansions — if and when a lender is willing to accept that level of risk and work with the farm. High D/A ratios are acceptable for limited periods of time when plans and projections indicate that the profitable business will quickly generate funds to pay down debt and bring the ratio back to the competitive level.

A low D/A ratio is only one indicator of the financial condition of a business. When evaluating the debt position of a business, a good business manager must also look at the liquidity of the business, or its ability to meet cash obligations (Measure 8), and its profitability (Measures 6 and 7).

The D/A ratio evaluates the total debt position of the operation. It does not evaluate how the debt is structured (i.e. how much is current, intermediate or long term). The type and mix of loans, as well as interest rates, will influence profitability and cash flow.

Shorter-term loans will have higher payments compared to the same amount of dollars financed with longer repayment terms. Trying to repay debt too quickly can cause a farm to experience severe cash flow difficulties. Financing over longer repayment periods lowers the monthly payment (at the same interest rate) but causes the farm to pay more in interest charges over the life of the loan.



Typically, assets are financed for time periods reflective of their useful life. For instance, a milking parlor or robots financed using a 3 year note could create cash-flow difficulties.

The same milking system financed over 10 to 12 years would better fit the farm's typical cash flows, while allowing for early payment if desired. Also look at repayment schedule (Measure 9) and debt per cow (Measure 11) when evaluating a farm's debt. A business may have little debt but be unprofitable and unable to generate the cash to meet all obligations. If that is the case, the other 14 measures may help determine why the business is not profitable.

D/A ratio	Financial position of business
< 30%	Strong
30 to 50%	Possibly stressed
> 50%	Very stressed

Measure 11

Solvency:

Debt Per Cow

Competitive Level:

Less than \$3,300 per cow if not expanding

Less than \$4,300 per cow during an expansion

Calculation:

Total farm debt
÷ (lactating cows + dry cows)

Example:

\$ 850,000 debt
÷ 340 cows (280 lactating + 60 dry)
= \$ 2,500 debt per cow

Another way of looking at the ability of a dairy farm to meet its debt obligations is by looking at the total level of debt per cow. While the debt to asset ratio measures the overall debt position of the business, debt per cow relates to how a manager would repay the debt. As the profit center of a dairy operation, cows generate the money needed to make both the principal and interest payments.

If debt per cow is too high:

When a business has debt per cow levels significantly higher than \$3,300, it may experience difficulty meeting all principal and interest payments. Solutions to this problem could include:

1. Selling any unproductive assets and paying down debt,
2. Increasing the number of cows with little additional debt,

3. Increasing net income per cow and paying down debt, or
4. Withdrawing less from the farm business for family living and paying down debt, **if** family withdrawals were unreasonably high.

If debt per cow is too low:

If a business has a very low debt per cow and is not highly profitable, the management team should carefully assess the operation and consider if moderate investments could increase efficiency and profitability.

Debt per cow as a planning tool:

A manager can quickly estimate the amount of additional debt possible to take on to finance an expansion and stay around \$4,300 debt per cow. Further profitability and cash flow analyses must be done to verify that the business can profitably operate at this level of debt and reduce total debt per cow following the expansion.



Example:

Cliff Farms Dairy currently has 200 cows, milking and dry, with a debt load of \$2,800 debt per cow. The dairy plans to expand to 500 cows and wants to keep total debt less than \$4,300 per cow.

Original 200 cows x (\$4,300 - \$2,800)	\$ 300,000 (Additional debt for existing cows)
Additional 300 cows x \$4,300	<u>\$1,290,000 (Debt for new cows)</u>
Total maximum new debt	\$1,590,000

This calculation does not indicate if the dairy could expand profitably and pay back principal and interest at this level of debt. Further cash flow projections must be completed and stress tested before a final decision is made.

Measure 12

Mission Statement

Competitive Level:

Management team members and employees agree on why they are in business.

Example:

“Our mission is to produce and market high-quality milk in sufficient quantity to provide a good standard of living for our family and our employees. The business should be profitable enough to provide above-average compensation for employees and long-term financial security for our families.”

The mission statement is an important tool for all dairy farms. Farms that are able to clearly communicate who they are and what they stand for are often more successful than those that don't have a true understanding of their focus. One way to develop strong communication lines and a clear understanding of what the business does is through the process of writing a mission statement. It does not matter whether the farm business consists of two people or 50, all involved must have a clear understanding of what the business does and why they do it in order to move the business in the desired direction.

A mission statement is a short and concise action plan based on things you do each day. It explains why you are in business and what you want to accomplish. Think of it as your elevator speech. Your mission statement provides direction to develop goals and future plans.

This statement is a reflection of the underlying **values, goals, and purposes** of the farm and of the management team. The mission statement must be communicated and remembered.

Steps in Developing a Mission Statement

When developing a mission statement, give attention to what is important to the business now and in the future. Start by thinking about the following questions:

- What is the basic reason for the dairy farm's existence?
- How does it serve the family and the community?
- Why is it unique?
- What are the farm's strengths?
 - Conduct a Strengths, Weaknesses, Opportunities, Threats (SWOT) Analysis (see Appendix C for additional information)



Think about the future of the farm business, family, standard of living, leisure time with family, duration of the farm business, passing the farm to the next generation, and retirement. Be sure to involve family members and employees in this process.

It is important that others involved in the farm operation have the opportunity to provide input. This will provide a more truthful statement of what the farm business does and what it values. This approach also provides for greater buy-in and acceptance by those involved in the business. Refer to Appendix D for a worksheet to help you, your employees, and family start the brainstorming process.

Second, think broadly and write down ideas as they come to you and do not limit or prioritize your ideas. Share your ideas with others involved in the farm.

Third, start thinking more specifically, maybe adding more notes, and begin to develop draft forms of the mission statement. Do not rush the process. Your mission statement can be written in paragraph or bulleted form. Either is fine. The important thing is that it be written and used. Finally, compile the notes and drafts to write the mission statement. Once the mission statement is completed, type it, frame it, and hang it in the office, milking parlor, employee break room, or another

location where it can be viewed by managers, employees, family members, and others.

The value of a mission statement comes from its active use. Use it to guide the goal-setting process and when making decisions. Successful businesses are built on strong foundations. Taking the time to develop a mission statement will provide your farm business with the meaningful foundation it needs to be successful today and in the future. Over time, the mission statement may change as the business progresses. Periodically review your mission statement and make changes when appropriate.

Measure 13

Maintain Family's Standard of Living

Competitive Level: Family living costs equal 5 to 10% of gross farm income.

Examples:

$$\begin{array}{r} \$750,000 \text{ gross farm income} \\ \times 0.10 \\ \hline = \$ 75,000 \text{ family living} \end{array}$$

$$\begin{array}{r} \$820,000 \text{ gross farm income} \\ \times 0.10 \\ \hline = \$ 82,000 \end{array}$$

Families usually wish to maintain or increase their standard of living over time. Because of inflation, farm income must increase or the standard of living falls. Above-average dairy farmers who have improved management, adopted technology, and increased production per cow have only maintained or slightly increased income per dairy cow over time. Farm families should estimate what their desired standard of living is for each year and then develop a plan to make sure farm revenue increases at a rate to meet these goals.

What to Include as Family Living Expenses

Below is a list of categories to include when you determine family living expenses for your family:

- Food
- Housing
- Taxes
- Insurance
(health, life, long-term care, home)
- Utilities
- Repairs and Maintenance
- Automobile
- Personal Loans
- Education
- Medical Care
- Furnishings and appliances
- Personal care
- Savings
- Clothing
- Child care
- Gifts
- Recreation
- Other



Determine How Much Family Income Is Needed

Farm families often underestimate requirements for family living expenses. As additional operators are brought into the farm business, a realistic estimate must be considered for additional family living expenses. Family living expense requirements are driving the size requirements of commodity agriculture. Commodity production assumes smaller profit margins. To meet future family living demands, farms will continue to grow in size and scale.

Assume it takes 70% of revenue (operating expense ratio, Measure 3) to cover out-of-pocket costs. This leaves 30% for debt service, capital replacement, growth, income taxes, and family living costs. The \$750,000 gross revenue example would net \$225,000. If \$75,000 is used for family living, \$150,000 would remain for debt payment, taxes, and investment/reinvestment. Also, note that farm businesses will need to grow each year by at least the rate of inflation just to maintain that level of income.

Considerations

Family living costs vary based on a number of factors, including number of operators, amount of any off-farm income, family size, health, etc. It is critical that the farm management team determine the present family living costs and project future family living expenses. It is better to budget on the high side for family living expenses.

Farm families planning to be in business well into the future must make realistic plans and projections. Two key areas to focus on are cost control and improving operational efficiencies. A growing dairy herd requires cash to feed additional animals, control land, purchase veterinary supplies and medicine, fuel, etc.

Farm families who have neither the desire nor the resources to expand their herds have several alternatives. First, family members should conduct a benchmark analysis on their farm's financial records to determine if there are ways to increase efficiencies when compared to established benchmarks. Ohio farms can find dairy benchmarks from the Ohio Farm Business Analysis program at <https://farmprofitability.osu.edu>. Increasing efficiency can increase revenue.

The family can diversify the operation to include more than dairy cattle or look at ways of direct marketing to consumers through value-added products. The family may also retire existing debt and/or invest in financial assets, such as stocks, bonds, and mutual funds.

Retiring debt will reduce the principal and interest expenses of the farm in the future. Investments in financial assets will provide returns, which can provide money for family living in future years. Another alternative is to seek off-farm employment. Cash flow projections will indicate whether these options will provide enough funds for family living.

Measure 14

Motivated Labor Force

As measured by:

Managers use personnel management practices that lead to well-trained, enthusiastic, empowered family members and employees who share a commitment to the mission and goals of the business.

Operating a highly competitive dairy farm requires the talents of many people. The owners, managers, and employees of the dairy operation possess individual strengths and weaknesses. Each member should take time to analyze his or her own skills to determine how he or she can fit into the farm operation. A key to success is being able to identify and capitalize on the individual strengths of employees.

Personnel managers should take time to examine the five functions of management:

1. Planning – developing a written mission statement, vision, and goals.
2. Organizing – understanding what positions need filled.
3. Staffing – finding the right people to fill positions.
4. Directing – leading employees to accomplish goals.
5. Controlling – evaluating progress and taking corrective action.

Personnel managers also need to develop a human resource plan that is consistent with the farm's mission and goals. The plan will serve as a guide as employees are hired, trained, and managed.

Motivated employees are often more productive. Dr. Bernie Erven, Ohio State University Professor Emeritus, cited an employee paradigm that states: “You can buy people’s time: you can buy their physical presence at a given place, you can even buy a measured number of their skilled muscular motions per hour. But, you can’t buy the devotion of their hearts, minds, or souls. You must earn these.”

Competitive operations understand that personnel management is a major key to profitability. An employee handbook is an excellent way to communicate job descriptions, expectations, and compensation. The manager should develop strategies to reward and motivate employees. Some of these strategies could include verbal praise, annual salary increases, bonuses, and extra vacation days. Farm business and staff meetings keep communication channels open with employees.

Dairy managers should look for opportunities to improve their management skills. A variety of management information resources and courses are provided by Extension. Resources are also available for managers hiring and managing Hispanic labor. Managers are encouraged to contact their local county Extension office to learn how Extension can help them manage their employees more effectively.



See the list below for examples of how you can become a better employee manager.

Examples of Ways to Improve Personnel Management:

- Assess your personnel needs, supervisory skills, and working conditions.
- Complete a personality assessment (e.g., Myers Briggs Type Indicator®).
- Improve your communication skills.
- If employing Hispanic workers, take a course in conversational Spanish.
- Develop written job descriptions.
- Match workers with job descriptions.
- Hire employees who fit job descriptions.
- Develop and distribute an employee handbook.
- Develop an employee training and orientation program.
- Develop and conduct advanced training programs for current employees.
- Conduct farm business meetings with employees.
- Train and reward employees.
- Schedule work effectively.
- Coach your employees.
- Evaluate employee performance and provide constructive feedback.
- Read books about employee management.
- Attend workshops about employee management.
- Talk to and learn from people who are good employee managers.

Measure 15

Manure Nutrient Management:

Capturing Dairy Manure Nutrients

The land application of manure, milking parlor water, outdoor lot runoff and silage leachate is a necessary part of dairy farming. Manure transport and application is a significant expense on dairy farms and can easily approach \$125 to \$150 per cow annually.

Capturing the nutrients in dairy manure begins with a comprehensive nutrient management plan that is current and followed to assure manure nutrients are put where they are most needed. Manure contains the macro-nutrients nitrogen, phosphorus and potash, in addition to a wide array of micronutrients and is an excellent soil amendment. Properly capturing the nutrients in dairy manure can reduce purchased fertilizer costs, enhance crop yields, and prevent buildup of soil phosphorus above maintenance levels.

The nutrient value of dairy manure will vary from farm to farm depending on feed rations, how the manure is handled and stored, bedding materials used, surface water runoff entering the manure storage, silage leachate and ages of the animals contributing to the manure volume. Thus, it's very important to get a representative manure sample.

The most accurate manure sample is a sample collected as the manure is being land applied. If the manure is applied with a drag-line, many commercial manure applicators have welded small shutoff valves near the pump for safely drawing a small amount of manure from the hose. If the manure is applied with a manure tanker, samples can be collected in a similar fashion during the loading process or from the application toolbar. Collecting several samples over the space of an hour and combining them into a single sample is the most accurate. Once collected, manure samples need to be kept out of the sun. Placing the sample in a refrigerator or freezer until it can be delivered to a certified laboratory will assure the integrity of sample is maintained.

A dairy cow and her replacement stock on the farm typically need about an acre of ground to feed the animals (corn silage), and when the manure is returned to the fields where the feed was grown, we have a closed loop system. It is very important to work closely with your commercial fertilizer provider so manure nutrients are properly credited and additional unnecessary phosphorus and potash are not added to fields receiving adequate phosphorus and potash through manure application.

Manure application rules vary in Ohio depending on your location in the state. The Grand Lake St Marys watershed has been declared distressed and portions of the Western Lake Erie Basin watershed may be declared distressed in the future. Manure application to land rules in Ohio are impacted by the state legislature and are subject to change. Check with your local Soil & Water Conservation District about the most current rules in your area.

When manure escapes from farm fields and pollutes streams, ditches or other surface water sources, this is a violation of the Ohio Pollution Abatement law. This can lead to fines for the death of aquatic creatures and the cost of the investigation by the Ohio Environmental Protection Agency, The Ohio Division of Wildlife, and the Ohio Department of Agriculture.

The best utilization of dairy manure is to apply the manure to a growing crop. Examples include fall fertilization of wheat, application to newly planted double crop soybeans to spur germination and emergence, application to sorghum/sudan grass to stimulate emergence and growth or regrowth after a cutting, or as a stimulant between cuttings of forages. Each of these applications captures the nitrogen in the manure along with many of the other nutrients. Applying manure to growing crops helps gain more revenue from the manure.

The application of manure to corn as a sidedress source of nitrogen has been the focus of research at the Ohio Agricultural Research and Development Center's Northwest station. Over five crop seasons, dairy manure was both incorporated and surface broadcast onto pre-emergent and post-emergent corn plots and compared to 28% urea-ammonium nitrate (UAN) for yield. In these research plots, the dairy manure was applied at 13,500 gallons per acre and contributed 135 lb of nitrogen. Each treatment received 200 lb of nitrogen. The remaining 65 lb of nitrogen for the dairy manure treatments was provided by 28% UAN.

The data show that incorporated dairy manure out-yielded 28% UAN by 16.1 bushels per acre on the pre-emergent plots and by 19.2 bushels per acre on the post-emergent plots. The surface applied manure produced significantly lower yields as the nitrogen in the manure likely was lost to the environment.

The application of liquid manure to emerged corn (V3 stage) is being conducted in Darke County, Ohio. A six-inch drag hose is being used to apply liquid swine manure to emerged corn to provide the sidedress nitrogen needed for the corn crop. In these fields, the only additional fertilizer the corn crop receives is 10 gallons per acre of 28% UAN as row starter.

This manure sidedress system should also work for dairy manure. For fields that have a history of manure application, the sidedress of 12,000 gallons per acre may provide the sidedress nitrogen amount needed for the crop.

Approximate Manure Nutrient Values at the Time of Application (Bulletin 604, Table 14)

Animal Type and Storage Type	Estimated Nutrient Content ¹					
	Lb/Ton			Lb/1000 Gallons		
	N	P2O5	K2O	N	P2O5	K2O
Dairy Heifer						
Manure Pack	4.2	1.7	5.6			
Open Lot	3.0	1.7	5.6			
Holding Pond				12.1	5.0	16.1
Pit				22.7	8.2	26.6
Dairy Lactating Cow						
Manure Pack	6.9	5.1	5.2			
Open Lot	4.9	5.1	5.2			
Holding Pond				18.9	13.9	14.4
Pit				28.6	18.5	19.1
Dairy Dry Cow						
Manure Pack	5.4	2.4	6.0			
Open Lot	3.9	2.4	6.0			
Holding Pond				14.7	6.4	16.4
Pit				22.1	8.4	21.5

¹ Values vary with bedding, water content, feed programs, and specific livestock.

Tri-State Fertilizer Recommendations for Corn, Soybeans, Wheat, and Alfalfa (Table 12)

Nutrients Removed in Harvested Portions of Agronomic Crops			
Crop	Unit of Yield	Nutrients Removed per unit of Yield	
Corn		P ₂ O ₅	K ₂ O
Feed grain	bushel	0.37	0.27
Silage	ton	3.30	8.00
Soybeans	bushel	0.80	1.40
Wheat			
Grain	bushel	0.63	0.37
Straw	bushel	0.09	0.91
Alfalfa	ton	13.00	50.00

OARDC-Northwest Station 2012-2016 Dairy Manure Sidedress Corn Yields

Manure Applied with a Tanker and Dietrich Sweeps			
When Applied	Application Method	Nitrogen Rate (lb)	Yield (Bu/Acre)
Pre-emergent			
28% UAN ¹	Incorporated	200	142.6
Dairy Manure + 28% UAN (65 lb N)	Incorporated	200	158.7
Dairy Manure + 28% UAN (65 lb N)	Surface applied	200	126.7
Post-emergent			
28% UAN	Incorporated	200	144.8
Dairy Manure + 28% UAN (65# N)	Incorporated	200	164.6
Dairy Manure + 28% UAN (65# N)	Surface applied	200	135.2

¹UAN = Urea-ammonium nitrate.

Corn Yields (bu/acre) in Darke County, Ohio with Sidedress of Swine Manure Using a Drag Hose

Year	Swine finishing manure	28% UAN¹
2017	165	145
2016	222	216
2015	154	121
2014	204	204
4-year average	186	172

¹UAN = Urea-ammonium nitrate.

The Fork in the Road for Dairy Farms

Dairy managers who desire to stay in business for more than 20 years must be competitive and should plan on exceeding most of the 15 measures in five years. Unprofitability, as a result of not meeting these measures, may force a dairy operation out of business. The strategies you use to increase your competitiveness will depend on your current situation and goals.

Managers Who Already Are Competitive

Managers of most dairy farms are already doing many things right. **However, to remain competitive, you will have to continue to improve your management skills, adopt new technology, and grow.**

As you determine the course of your business, carefully consider your alternatives. Becoming overly complacent or attempting to implement change too rapidly are two pitfalls to avoid as you make important business decisions.

If you become complacent, the industry will pass you by, and you will lose your competitive advantage. If you are winding down the dairy enterprise and planning to retire, this may be an acceptable course.

On the other hand, a taste of success may leave you hungering for more and more — and right away! Be careful not to move too quickly, stretch yourself too thin, or rashly adopt a new

and unproven technology. Unexpected setbacks may cause you to lose everything.

Dairy farming is a dynamic business. To stay competitive over the long haul, you have to continue to change and grow as a manager. Continue to learn about management and how to apply the five functions of management — planning, organizing, staffing, directing, and controlling. You also will need to become an expert at creative problem-solving, which cuts across all five management functions.

Managers Who Want to Become Competitive

If your dairy farm currently is not as competitive as you would like, we suggest following the steps outlined in this section. You may be in a position where income is modest, resources are available, you have good management skills, you possess a desire to improve, and you want to continue operating a dairy farm long term. If this is the case, it is time for you to make some changes.

DAIRY
Excel



Step 1: Prepare a Written Mission Statement

Before you do anything, you (and your management team and employees) need to develop or update the written mission statement for your farm. You must know why you are in business and what you want to accomplish to become competitive. Discuss your mission statement at length and revise it until it clearly states why you operate a dairy farm.

Step 2: Prepare a Written List of Long-Term Goals

Next, your management team should prepare a preliminary list of goals that you believe will make your operation more competitive. Include more long-term goals on your list than you can possibly accomplish and don't critique any of the goals. Make sure your goals are written. Unwritten goals are like uncaught fish — just dreams. If you are better at coming up with good ideas than writing them down, ask your spouse, a key employee, or a member of the family to do the writing.

Step 3: Share Your Goals and Revise Them

Share this preliminary list with members of your family and others involved in the management of the business. Involve everyone. This process will require all involved to listen to each other, discuss, and compromise. Others will likely suggest different goals. Be open to their suggestions and expect them to expand and help improve your preliminary list. Encourage others to suggest additional goals or to modify those initially suggested. Addressing the following questions may help you evaluate your list:

- Does each goal fit with the reason you are in business?
- Is the goal realistic?
- Does the goal take advantage of your strengths and opportunities?

- Does the goal address your weaknesses and any factors threatening your business?

Step 4: Prioritize Your Goals

Select one or two goals from your final list as top priorities. Most small business managers cannot attack more than one or two goals at a time. Pick one that most of the management team agrees will have the greatest impact. Consider delegating responsibility for some goals to others on the farm.

Step 5: Identify Short-Term Goals

Identify short-term goals to support the top-priority long-term goal you have chosen. A series of short-term goals lays the foundation for long-term success.

For example, assume that the first long-range goal for attention is to: "Increase net farm income from the dairy enterprise by 20% in the next fiscal year."

Here are some short-term goals that would help achieve the long-term goal:

- The management team will develop a budget by January 1 to increase net farm income with the accountant taking leadership responsibilities.
- The management team will review performance against budget at the first meeting of each month.
- The manager will find benchmark production and business performance data from similar dairy farms to compare performance at monthly meetings.

Well-written goals are “SMART” goals:

S — specific

M — measurable

A — attainable

R — rewarding

T — timed

It is clear what is to be done and who will do it, progress towards the goal can be measured, it is possible to accomplish the goal, it is beneficial to the business that the goal be accomplished, and there is an ending point to the goal. SMART goals are more likely to be accomplished and help move the business in the direction determined by the Mission Statement.

Step 6: Conduct a Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis

A SWOT analysis allows you (and your management team) to list all of the things you believe to be strengths, items that are holding you back (weaknesses) from achieving your goals, opportunities that are or may become available, and items that are threatening the future of your business. An Ohio State University Extension fact sheet and worksheet are included in Appendix C. We encourage you to spend time reviewing the information and completing the worksheet.

Step 7: Financial Planning and Analysis for Those Who Are or Want to Become Competitive

Regardless of whether you are or want to become competitive, we strongly recommend you regularly complete a comprehensive financial analysis. Ohio State University Extension’s Farm Business Analysis Program uses FINPACK[®], a software program developed by the University of Minnesota, to assist managers with assessing their current financial position and evaluate alternative plans. FINPACK[®] allows users to evaluate their

whole farm and separate enterprises to assess income, expenses, and evaluate profitability.

Contact your county Ohio State University Extension office to learn more about the program and how you can benefit. Additional information is available at <https://farmprofitability.osu.edu>.

Managers Who Want to Become Competitive But Cannot

Some farms cannot be competitive because managerial expertise is low, managers do not have the interest or ability to improve, the farm has few financial resources, and/or the operation is labor intensive. If the farm is not and cannot be profitable, the family should exit the dairy business before they compromise the equity they have built in the business. Other producers in this situation may desire to continue dairying but will have to support the family from non-dairy enterprises.

Managers Who Do Not Want to Become Competitive

Some dairy managers have no plans for making the operation competitive, and in fact, can afford to be noncompetitive. Many of these managers are in their fifties and sixties and carry little debt. The dairy operation may provide livable wages given the circumstances. Moreover, the manager does not have children, other relatives, or employees with a desire to take over the operation. Costs of being noncompetitive may be low as long as the manager is satisfied with the income generated by the operation. Managers in this position should plan on setting funds aside for their retirement. Most other managers cannot afford to remain noncompetitive when means exist for making the operation more competitive.

Younger farmers and struggling farmers who do not become more competitive eventually will find themselves in the previous group as “Managers Who Want to Become Competitive But Cannot.”

Exiting the Dairy Business

Deciding to exit the dairy business is not easy and is filled with a great deal of emotion. There are many considerations when you come to this decision. These include:

- An evaluation of your financial situation
 - Who do we owe? How much is owed to each? What is the total debt?
 - Life after a sale
 - Will you need to seek re-employment, begin a different enterprise, or retire?
 - Dairy farmers often do not recognize the many marketable skills they have developed are valued by other employers.
 - Sale
 - Will you conduct a private sale or use a realtor or auctioneer?
- What assets will you sell?
 - When will assets be sold?
 - How much money do you expect the sale to generate? Net of costs of sale?
 - How does expected revenue compare to present debt obligations?
 - What debt obligations must be paid first?
- Legal and tax issues
 - Consult your attorney to discuss any legal concerns related to a sale
 - There will be tax obligations as a result of a sale. Meet with your tax advisor to discuss tax obligations and management, before sale of assets begins.

Open communication and discussion with family, the management team, employees and vendors throughout this process is critical.



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Appendix A:

Feed Cost and Quantity Calculations

Calculating Total Homegrown Feed Cost

To arrive at total feed cost per hundredweight (cwt) of milk, add the cost of purchased feeds fed to the cost of producing homegrown feeds. Costs of producing homegrown feeds include direct costs, such as seed, fertilizer, crop chemicals, fuel, land rent, and labor, and indirect costs, such as interest, depreciation, taxes, insurance, etc. Use the worksheet in this appendix to help calculate total feed costs.

Comparing Your Cost of Producing Feed to Market Price

Divide the total cost of producing each feed fed by the number of tons or bushels produced to arrive at total costs per unit produced. Compare this average cost to the average market price of the same feed. Can you produce the feed as cheaply as you can purchase it?

Estimating Quantities of Homegrown Feeds Fed

To calculate quantities of homegrown feeds fed, start with the beginning inventory in bushels or tons, add quantities produced and purchased, subtract quantities sold and ending inventories to arrive at bushels or tons fed. Keep accurate inventories of feeds on hand at the end of each year. Take a few minutes each day during harvest to keep track of bushels and tons harvested. Monitor quantities in storage monthly. Use these methods to calculate quantities fed daily and to calculate the total fed for the year.

Name of Feed	Beginning Inventory	+ Produced	+ Purchased	- Sold	- Ending Inventory	= Fed

Dairy Feed Costs Per Hundredweight of Milk Sold¹

Feed Cost Category (including cows, heifers, and calves)	Corn	Corn Silage	Hay	Haycrop Silage	Grazing	Other Feeds
A. Purchase Price (\$/ton) ²						
B. Total cost of purchased feeds (\$)						
Feed crop production costs ³						
C. Seed (pro-rated) ⁴						
D. Fertilizer						
E. Crop chemicals						
F. Drying costs						
G. Fuel and oil						
H. Repairs						
I. Custom hire						
J. Hired labor						
K. Utilities						
L. Interest						
M. Leases, machinery, buildings						
N. Land rent						
O. Taxes						
P. Insurance						
Q. Depreciation of machinery and buildings						
R. Miscellaneous costs						
S. Total cost of feed produced (sum of C through R)						
T. Total amount harvested for feed (tons) ³						
U. Feed Crop Production Costs (\$/ton) (S/T) ³						
Comparison of Purchase Price vs. Feed Crop Production Costs (A/U) ^{3,5}						
V. Total feed costs all feeds (sum of totals in rows B and S above)						
W. Average number of cows in herd (milking and dry) for the year						
Y. Hundredweights of milk sold						
Total feed costs (all feeds) divided by average number of cows in herd (V ÷ W) ⁶						
Total feed costs (all feeds) divided by cwt of milk sold (V ÷ Y) ⁶						

¹Include all types of feed fed (purchased and raised), including minerals, vitamins, and additives. Use extra sheets if necessary.

²Include the purchase price per ton regardless of whether the feed is purchased or grown on the farm.

³Include only the feed grown on the farm and the costs of producing the feed fed; do not include costs of feed sold.

⁴Pro-rate establishment costs and annual costs of perennial crops over the average life (years) of such crops on your farm.

⁵If this ratio is < 1 , then it is more profitable to purchase the feed; if the ratio is > 1 , then it is more profitable to produce it on your farm. This should be generally evaluated over a year rather than within a season due to seasonal variations. Even with a yearly comparison, growing conditions in a given year can have a large impact on the comparison. Because of the potential for these variations, decisions about growing vs. purchasing should be made when the ratio is outside 0.95 to 1.05 for more than one year.

⁶ These costs per unit need to be evaluated relative to the benchmark based on whether heifers are raised on the farm or customraised.

Appendix B:

Projected Feed Costs Per Cwt of Milk Sold and Amount of Feed Needed for Dairy Cattle

Table A. Change in Feed Cost Per Cwt of Milk Based on Changes in Prices for Corn and Hay.¹

Cow plus replacement Heifer, 30% culling rate

Total Feed Cost Per Cwt of Milk				
Corn Price Per Bushel	Hay Price Per Ton			
	\$100	\$130	\$160	\$190
\$3.00	8.16	8.43	8.69	8.96
\$3.50	8.51	8.78	9.05	9.31
\$4.00	8.85	9.12	9.38	9.65
\$4.50	9.20	9.46	9.73	10.04

¹Calculated primarily using numbers in the Ohio Dairy Enterprise Budgets, 2014, Ohio State University Extension; large breed dairy cow producing 24,000 lb of milk. Appendix B, Table B, shows feeds and quantities fed.

Table B. Feed Requirements for a Dairy Cow and Replacements (24,000 lb production, 66% of heifers raised for replacement).¹

Item	Unit	For Cow and Replacement
Corn	Lb	5,785
Soybean oil meal	Lb	1,554
Soybean meal expellers	Lb	352
Dicalcium phosphate	Lb	16.5
Salt	Lb	16.5
Distillers	Lb	1,231
Whole cottonseed	Lb	1,583
Vitamin supplements	Lb	568
Feed additives	Lb	181
Hay equivalent ²	Lb	5,137
Corn silage	Lb	29,720
Milk replacer	Lb	27

¹Source: Ohio Dairy Enterprise Budgets, 2014, Ohio State University Extension.

²Hay equivalent composed of hay and/or haylage.

Table C. Changes in Milk Herd Feed Costs Per Cwt of Milk Sold Based on Changes in Prices for Corn and Hay.¹

Milking Herd Feed Cost Per Cwt				
Corn Price Per Bushel	Hay Price Per Ton			
	\$100	\$130	\$160	\$190
\$3.00	6.90	7.03	7.15	7.28
\$3.50	7.20	7.32	7.45	7.57
\$4.00	7.48	7.61	7.73	7.85
\$4.50	7.77	7.89	8.02	8.19

¹ Based on a balanced ration for a cow producing 24,000 lb. Appendix B, Table D, shows the individual feed ingredients in the ration.

Table D. Yearly Feed Required for a Cow Producing 24,000 lb of Milk.¹

Item	Amount (lb)
Corn	2,296
Soybean oil meal	147
Soybean expellers	352
Distillers	1,231
Whole cottonseed	1,583
Vitamin supplements	568
Feed additives	181
Hay equivalent ²	2,860
Corn silage	25,760

¹Taken partially from: Ohio Dairy Enterprise Budgets, 2014. Ohio State University Extension.

²Hay equivalent composed of hay and/or haylage.

Appendix C:

Conducting a SWOT Analysis of Your Agricultural Business

Many large businesses conduct an analysis to identify the Strengths, Weaknesses, Opportunities, and Threats (SWOT) of their business in order to keep pace with the competition. You may not consider yourself a large corporation, but completing a regular SWOT analysis of your farm or agricultural business can be beneficial to keep you competitive. It may sound like a difficult task to complete, but it does not have to be. The following paragraphs help explain what a SWOT analysis involves and how to complete this process.

Strengths and Weaknesses

The first two sections of the SWOT analysis usually examine the internal workings of your farm business. These items are usually within the control of the business owners. One example could be future management of the business. Is there a next generation owner/manager who has the interest in the business and the ability to manage the complexities of the business? Another example could be the financial position of the business. Does the farm business have too much debt held as short-term? Here are some sample questions that can be asked to assist in determining your business' strengths and weaknesses.

Strengths

- *What strengths does your business have that make you competitive?* Examples might include family, labor, machinery, farm size, etc.
- *What do you do better than anyone else?* Are you a better marketer? Are you a well-respected employer? Are you able to complete planting and harvesting duties efficiently?
- *What do your customers see as your strengths?* Ask your customers what they think.

Weaknesses

- *What could you improve?* What is holding you back? What little changes might make big impacts?
- *What should you avoid?* Have you completed a financial analysis of your business to evaluate enterprises?
- *What do your competitors do better than you?* You can work to be better than the competition, but in some cases you may be better off to fulfill a need they are not meeting.

Opportunities and Threats

The second part of the SWOT analysis requires you to look outside your business at issues that you cannot control but can manage to enhance or reduce their impact on your business. An example for a livestock producer could be the development of the neighboring farm into single-family housing units. Here are some sample questions that can be asked to assist in determining opportunities and threats to your business.

Opportunities

- *What trends are facing your business? Will you have to increase in size to remain competitive or can you remain at your present size?*
- *What is happening in your community that can be advantageous? Are new livestock facilities coming to your area that could provide a new market for crops you grow and sell? Is there an opportunity to market directly to local consumers? Is there a niche market?*

Threats

- *What obstacles do you face?*
- *What is your competition doing?*
- *Do changes in technology threaten your business?*
- *Does your financial position threaten your business?*
- *Could any particular weakness seriously threaten your farm?*

Who Should You Involve?

Generally speaking, the people most directly involved with the business should participate in a SWOT analysis. This would include family members employed in the business and hired employees. Input from outside advisors, such as your attorney, banker, Extension educator, or accountant, may also be helpful as they may see your farm from a different perspective.

Depending on the type of farm you have, asking customers their opinions can prove useful. Asking spouses, even if they are not employed in the business, for their opinions and perspective is critical. Involving them may provide a different perspective and help the business achieve its goals. Not involving spouses can potentially do more harm to the family and the business.

Next Steps

Completing a SWOT analysis of your farm business is the first step in strategic planning. A form for doing the SWOT analysis appears on the following page. The process should help you identify areas where your strengths and opportunities align with a high probability of success. Conversely, you will also identify combinations of weaknesses and threats. Your strategic plan should avoid these areas or at least provide for methods to minimize their effects on your farm business.

The SWOT analysis is not something you do one time and place on a shelf to collect dust. At least once a year, complete a new analysis. You may find little change has occurred, but it is still a good idea to review achievements, measure production efficiencies, and evaluate alternatives.

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Reviewer of this fact sheet was Bruce Clevenger, Extension Educator, Agriculture and Natural Resources/Community Development, Defiance County.

Completing Your SWOT Analysis

In the space provided, list the strengths, weaknesses, opportunities, and threats for your farm business. Once you have listed all the items you can think of, prioritize each category. Use this information in developing a strategic business plan to help your business remain competitive.

Strengths

Weaknesses

Opportunities

Threats

Appendix D:

Mission Statement Worksheet

Mission Statement Worksheet

The questions listed here should be answered individually and then those involved in the business should be brought together to answer them collectively. Your answers don't have to be confined to one page. A mission statement can be developed from the group's answers.

1. Why do I farm?

2. What do we do? What is our purpose?

3. Who are our customers? What do they want?

4. How do we accomplish our purpose? What practices do we use and who is responsible for what?

5. What beliefs and values do we hold?

Appendix E:

Planning for the Successful Transition of Your Agricultural Business

As the age of farm operators increases, transferring the ownership and management of the family business to the next generation will become one of the most important issues farm families will face.

While many farmers dream of seeing their legacy passed on to the next generation, many postpone initiating a plan for the transition of their business for a variety of reasons. Many claim that there is not enough time to discuss these matters. Or if planning does occur, it simply involves the senior generation drafting a will describing how the farm assets should be divided among heirs.

The main question that the principal operator of a farm or agribusiness should ask is: “Do I want to pass my farm operation to my heirs as an ongoing business or do I want to pass it on as a group of assets?”

If asset transfer is the goal, then an estate plan can be developed to determine who will get what, when they will get it and how they will receive it. If the goal is to keep the business intact for the next generation, then a transition plan needs to be developed.

What Is Farm Estate Planning?

Farm estate planning is determining how farm assets (i.e., land, buildings, livestock, crops, investments, land, machinery, feed, savings, life insurance, personal possessions and debts owed to or by the farm) will be distributed upon the death of the principal operator(s).

What Is Farm Transition Planning?

Farm transition planning is the process by which the ownership and the management of the family business are transferred to the next generation. The goal of transition planning is to make sure the business has the resources to continue for many generations. Transition planning helps the

Age of Ohio Farm Operators	
Year	Age of Principal Operator
2017	55.8
2012	56.8
2007	55.7
2002	53.8
1997	52.5
1992	52.0

Source: Census of Agriculture, NASS

family analyze its current situation, examine the future, and then develop a plan of action. This includes planning not only for the transfer of assets but also managerial control. It should also include developing a strategy to meet the retirement needs of each generation. Each farm family is different in regard to its goals for transition planning. Family dynamics, physical resources, financial position and managerial styles vary from operation to operation. As farmers plan to transfer the family business to the next generation, there are a myriad of decisions to be made. One of the most difficult is determining how to be fair to off-farm heirs without jeopardizing the future of the heirs who have remained with the family business. Other decisions include deciding who will manage the business in the future, how to distribute assets, how and when the senior generation will retire, and how the business will deal with the unexpected.

No two transition plans are alike. Given the complexity of individual farm businesses and the unique personalities and characteristics of family members, a cookie-cutter plan, which families can adopt, does not exist. It is recommended, however, that the family address the issues presented here when developing the transition plan.

Determine If the Business Is Profitable

A business must be profitable in order for future generations to continue the operation. In addition, a comprehensive annual financial analysis should be conducted to determine the production, financial, marketing, and personnel management strengths and weaknesses of the business.

An excellent way to accomplish this is by conducting what is called a SWOT analysis. This analysis examines the Strengths, Weaknesses, Opportunities and Threats of the farm operation. This analysis helps the business examine a variety of business performance indicators. Some of these indicators could include commodity productivity, farm efficiencies, debt structure and the financial viability of the business. (For information on how to conduct a SWOT analysis, refer to the Appendix C - *Conducting a SWOT Analysis of Your Agricultural Business.*)

After completing a SWOT analysis, it is recommended that a comprehensive business plan be developed. This plan allows the family to develop strategies to meet the production, marketing, financial, risk and personnel management sectors of the business. It can also include strategies for improving the financial position of the business so that multiple generations can be involved in the business. In short, the agricultural business plan presents a picture of the agricultural business or farm, where the business is going, and how it will get there.

Involve the Family

Transition planning is a process in which the entire family should have a role. It should not be about secret meetings between parents and the favorite sibling. Many operations utilize family business meetings as a strategy to involve the entire family in the transition process. It should be noted the underlying success of any business depends greatly on healthy family relationships and open communication. Many two-generation family business arrangements fail because of poor family communication and relationships.

Family business meetings can help the entire family communicate about sensitive issues. They can also allow the family to plan for growth so that multiple generations can earn a living from the business. These meetings also allow the family to develop a transition plan that complements the estate, retirement, investment and business operation plans. (For more information on conducting family business meetings, refer to the OSU Extension fact sheet *Conducting Family Business Meetings.*)

Develop a Plan to Transfer Assets

Planning how to transfer the tangible and intangible assets of the farm operation should also be addressed in the farm's transition plan. In most cases, these plans are made and executed through the estate plan, which is initiated upon the death of the principal operator. However, a business can also transfer many of these items to the next generation prior to the death of the principal operator.

Tangible items include things you can touch such as breeding livestock, crop inventories, machinery, equipment, land, and buildings. Rarely does the next generation take over ownership of all the tangible business assets at once. Usually ownership is assumed as their experience and commitment to the business increase. These assets can be transferred through gifts, sales, or through the estate or a trust upon death. Due to the potential tax implications of

transferring these assets, consultation should be with an attorney and tax practitioner, each having experience in transition planning.

The intangible items that should be transferred are sometimes less obvious, but they are just as important when developing the transition plan. Intangible items can include verbal agreements, goodwill, authority and location of records. The senior generation should invest the time necessary to transfer their knowledge of these items to the junior generation. For instance, there may be many unwritten arrangements with neighbors or with suppliers of feed, seed, fertilizer or veterinary services. The primary operator also has historical information that should be shared with the next generation. This could include well and tile placement, electrical wiring, and the location of legal documents vital to the operation.

Other discussions should center on when the next generation is or is not authorized to obligate the farm (buying a tractor or other expensive capital items) and when the next generation will take over control of certain activities, such as paying bills and keeping production or compliance records.

Develop Future Managers

Transferring assets to the next generation is often easier than transferring management. Many family farms have two to three generations working side by side. Farm families traditionally operate in a hierarchical structure where the older generation holds the purse strings until death. Oftentimes, the junior generation is not given any managerial control until its members are old enough to retire themselves. Farm businesses should develop a plan for sharing managerial responsibilities between generations and anticipate management voids created by people moving up, retiring or leaving the business.

Development of managers is a long-term investment in people and should not be ignored.

Many excellent community and Extension management courses exist in which the junior generation can enroll to increase their managerial skills. The senior generation should not wait until death or a few months before retirement before transferring control. The transfer of managerial skills should be treated as a process, not as an event.

Develop Plans for Retirement

No one expects to work forever. Each generation should develop an individual retirement plan, and the business should help family members meet their expected retirement needs. The two main retirement questions that will need to be addressed are how much money does each family member need for retirement and what will the farm obligation be to retirees? A variety of factors, such as age at retirement, retirement housing and other retirement accounts held by the family, will affect the amount needed for retirement. It is important that the profitability of the farm be such that a family member can retire and not adversely affect the financial position of the business. In some cases, the farm business has to be sold in order for a senior member to meet retirement needs.

Develop Contingency Plans

Successful businesses also recognize that life is full of twists and turns. Given this, attention should be given to the unexpected. Contingency plans should be made for when key managers leave the business unexpectedly or when unplanned events, such as death, divorce, disability and health problems, arise. Each of these unexpected twists could damage the viability of the operation if contingency plans have not been made.

Develop a Timetable for Implementation

It doesn't happen all at once. A timetable should be established for accomplishing each step in the transition process. Without a timetable, you won't know if you are failing or succeeding in

hitting your objectives. Many families will utilize a testing or a probationary period for the transfer of ownership, management, income and labor. Given the complexity of most farm operations, the transition process could take years.

Final Thought

Transferring a family farm or farm business to the next generation can be a challenging task. Legal issues, tax laws, and personal differences between family members are some of the issues families must confront when deciding how to transfer the managerial and asset control of a family business. Working together, families can answer the tough questions and develop a transition plan that will provide the opportunity for the agricultural business to be successful for many generations.

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