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Focusing on Farm Profits: Record-keeping

In the first article of this series, we discussed the importance of making good decisions based on accurate information. This article will go more in-depth on the aspects of good record keeping. We will show that it is important to analyze production and financial records and argue that some measures not commonly discussed may be important.

It is difficult to overstate the importance of records to business success. The ability to keep accurate records of production and financial performance, along with other measures, will aid in determining the strengths and weaknesses of the business. Producers will be able to look for areas in which they can improve cost management. Quality records will allow the business owner to see where the business has been and where it is going. Additionally, accurate records allow for benchmarking, to both past performance and the performance of other farms.

There are many reasons to keep records: tax purposes, lender information, business management, and financial, production, or enterprise analysis. The business owner should first determine his or her objective in keeping particular records. Progressive producers have, or will want to have, records that will serve all of these purposes.

Before a producer begins tracking every imaginable measure, they should determine what it is they want to know. Then, they can organize a chart of accounts with categories that serve specific purposes. Each individual's chart of accounts can be customized to include the degree of detail that is desired. Planning is extremely important. No one wants to discover eight months later that they are missing a vital piece of information.

Another important aspect of record keeping is the accuracy of the numbers. Therefore, daily upkeep of records should be

integrated into an owner/manager's schedule. When it comes time to make an important decision, if records are not timely they are not useful. No producer would make a marketing decision today based on last year's production costs, for example.

First we will discuss production records. These are the most common type of records kept by dairy producers. However, as the industry becomes more competitive, the need to keep more detailed records of every aspect of the business has become necessary. Useful production measures include milk production per cow, pounds of milk shipped daily, calf mortality, pregnancy rate, days open, days in milk, herd cull rate (voluntary and involuntary), and the reasons for culling an animal. Table 1 lists these measures and the type of problems that can be identified when one or more of these measures is not in the expected range.

Let's now turn our attention to financial records. Upkeep of these records is more likely to be put off and their importance overlooked until absolute necessity demands it. There are numerous financial measures, however only a few of the most important ones will be discussed here. These are: cost of production, income over feed costs per hundredweight of milk sold, return on assets, term debt and lease coverage ratio, percent equity, operating expense ratio, and asset turnover ratio.

These measures are important for several reasons, the first being that, as a group, they provide an overall view of how the dairy business is performing. Individually, each measure tells a story about the management of the business. The table below discusses each measure more thoroughly, giving a definition and some potential problem areas affecting these measures¹.

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TABLE 1

Production Measures			Financial Measures		
Measure	Definition	Potential problem areas	Measure	Definition	Potential problem areas
Milk sold/cow/year	total pounds of milk sold divided by average number of cows	poor nutrition, health, cow comfort	Cost of production	cost to produce one hundredweight of milk	low production, high expenses, poor nutrition, reproduction, cow comfort
Lbs. of milk shipped daily	total lbs. of milk shipped from the dairy each day	poor milking management, nutrition, health, cow comfort	Income over feed costs/cwt. sold	margin, or amount of money per cwt. available to cover other operating and fixed costs	high feed costs/poor quality forage, high DIM, disease, low production, poor milk marketing
Calf mortality	number of calves that die out of total number born. Usually expressed as a percentage	maternity pen, calf housing, nutrition/feeding, healthcare	Return on assets	net farm income divided by value of assets	low sales, poor marketing, high family withdrawal, overinvested
Pregnancy rate	heat detection rate x conception rate	poor efficiency of heat detection before and after 1st service, how and when animals are serviced, factors affecting conception rate	Term debt and lease coverage ratio	sum of net farm income, depreciation, interest, and non-farm income minus family withdrawal (including taxes) divided by principal and interest payments on term debt (plus capital lease payments)	poor profitability, too much debt, poor debt structure, paying off debt too rapidly, poor financial management
Days open	number of days a cow is not pregnant after previous calving	nutrition, reproductive health, metabolic diseases, heat detection	Percent equity	percentage of farm assets owned outright (not financed)	highly leveraged, poor cash management
Days in milk	number of days that a cow has in her current lactation	reproductive health, heat detection, conception rate	Operating expense ratio	sum of expenses (minus interest & depreciation) divided by total income	high expenses, high cost of production, low production
Herd cull rate	percentage of cows sold for beef during a given period, usually a year	poor nutrition, healthcare, reproduction, herd management	Asset turnover ratio	gross income divided by average total assets	low production, poor marketing, overinvested

Production and financial problems are often interrelated. Having accurate records on multiple measures can assist in narrowing the focus when attempting to determine why production is declining or failing to improve, what may be the cause of poor efficiency, profitability, and/or solvency.

¹Definitions for most financial measures obtained from publications by Brad Hilty, Dairy Alliance.

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Harness the Power of Feedback, Goals, and Incentives

Feedback should not occur in a vacuum. Workers should receive feedback in the context of clearly defined performance standards and goals. In most cases, workers that are well aware of the performance standards will know right away whether their work is acceptable. Because of the innate desire of most people to do a good job, this knowledge will lead them to perform at a level that meets or exceeds the standard.

For example, a calf feeder who clearly understands that the farm's standard and his responsibility is to have all calves well-bedded at all times will make sure that all calves are well bedded. He knows that if his supervisor happens to observe that calves are messy and wet, it will reflect negatively on his own performance. This is a clearly observable and understood standard that leads to the desired performance, well-bedded calves. Because the standard is well understood, the calf feeder performs at a level that is likely to earn him positive rather than negative feedback.

Let's carry this example a little further and relate it to performance goals. Suppose the farm has a performance goal of losing no more than two calves per month that are between the ages of two days and two months. The calf raising team clearly understands this goal and also clearly understands the role that having clean, well-bedded calves plays in achieving it. The chances are quite high that every person on the calf raising team will consistently make sure the bedding is up to standard so that they can meet the goal. The desire for positive feedback is now combined with the social desire to be accepted as a valuable part of the calf raising team.

Let's take one more step with this example. Suppose that the performance goal of losing no more than two calves per month also carries a financial incentive. If the goal is met, each member of the calf raising team receives an extra \$50 bonus with his or her regular paycheck. Now, think about the pressure on each person to make sure that calves are well bedded. It's quite likely that this calf raising team is going to be motivated every day to take care of calf bedding as well as all the other little things that they know goes into a low calf mortality rate.

Research in the manufacturing and construction industries shows that well-defined performance standards and goals that are linked with incentives can lead to dramatically improved performance. Evaluate the organizational environment that you ask your employees to work in. Are standards clearly defined and easily understood by all? Do goals exist that are achievable yet challenging and lead toward improved productivity? Are incentives clearly understood and relevant to aspects of performance that the employees can control? Finally, do the incentives, the goals, and the standards all work together in a rational way? Getting these performance

influencing factors all working together can help your dairy business reach new heights of profitability.

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Motor Economics

Ever stop to think of how many electric motors of various sizes are used on modern dairy farms today? The purchase price for an electric motor is often miniscule compared to the costs for electricity to operate the motor over its lifetime, especially when the motor operates more than one third of the time and the cost of electricity exceeds \$0.07 per kWh. When it is time to replace an electric motor, always consider making the extra investment in a high efficiency motor (as compared to standard efficiency.) Consider the following example.

You need to replace a 5 hp, 3-phase, 1740 rpm totally enclosed, fan-cooled electric motor with a new 5 hp motor. A premium motor with an efficiency of 90% is available for a list price of \$491. A standard motor with an efficiency of 86% is available for a list price of \$388. (Please note that motors are almost always sold at prices significantly below their list prices.) Assuming that the total cost of electricity is \$0.09 per kWh and that the motor will be operating half the time throughout the year, can you justify paying the extra \$103 for the premium efficiency replacement motor? The table at the end of this article provides the annual costs for electricity to continuously operate a one horsepower electric motor at full load for a range of electricity prices from \$0.06 to 0.14 per kWh and for motor efficiencies ranging from 76 to 94 %. Be sure to note that the electricity cost per kWh in the table refers to the **total** cost for electricity including the costs for generation, transmission, distribution, service charges, demand charges, fuel adjustment charges, and taxes. For this example, the annual electricity costs for the premium motor with an efficiency of 90 % and an electricity cost of \$0.09 is \$1633 ($\$653 \times 5 \text{ hp} \times 0.5 \text{ operating time}$). The cost of operation for the standard motor is \$1710 ($\$684 \times 5 \text{ hp} \times 0.5 \text{ operating time}$). The amount saved each year associated with purchasing the premium motor is \$77, resulting in a simple payback of 1.34 years ($\$103/\77) or about 16 months. If the price of electricity increases over the next 16 months, then the payback period would be even shorter.

Investments that you make today to improve your efficiency will yield returns throughout the life of the motor. Furthermore, such investments will shield you to a certain extent from sky-high prices for energy that we were experiencing just one year ago.

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ANNUAL ELECTRICITY COSTS FOR CONTINUOUS OPERATION OF A ONE HORSEPOWER ELECTRIC MOTOR AT FULL LOAD

		Total Electricity Cost (\$/kWh)								
		\$0.06	\$0.07	\$0.08	\$0.09	\$0.10	\$0.11	\$0.12	\$0.13	\$0.14
Motor Efficiency, %	76	\$516	\$602	\$688	\$774	\$860	\$946	\$1,032	\$1,118	\$1,204
	78	503	586	670	754	838	922	1,005	1,089	1,173
	80	490	572	653	735	817	899	980	1,062	1,144
	82	478	558	638	717	797	877	956	1,036	1,116
	84	467	545	622	700	778	856	934	1,011	1,089
	86	456	532	608	684	760	836	912	988	1,064
	88	446	520	594	668	743	817	891	965	1,040
	90	436	508	581	653	726	799	871	944	1,017
	92	426	497	568	639	710	781	852	923	994
	94	417	487	556	626	695	765	834	904	973

*Dennis E. Buffington, P.E.
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Is the Ca:P ratio important in today's lactating dairy rations?

Regulations being implemented by government agencies has forced nutritionists to formulate rations to meet, not exceed, an animal's phosphorus requirement. However, another important mineral – calcium – has not been mentioned in regards to dietary requirements. In the past, the calcium to phosphorus ratio of a diet was considered an important value for evaluation and formulation. This ratio had merit if dietary phosphorus or calcium was deficient. When phosphorus levels are adequate in the diet, wide ranges in the ratio can be tolerated.

According to the 2001 NRC, the fact that the efficiencies of absorption of phosphorus and calcium can vary greatly depending upon sources of the elements, provides no support for recommending a specific calcium to phosphorus ratio. According to two studies, there were no differences in milk yield, persistency of milk production, milk composition, or reproductive performance of early lactation animals fed calcium to phosphorus ratios of 1 to1, 1.5 to 1, 3 to 1, 4 to1, or 8 to1. The bottom line is to ensure that the dietary requirement for both calcium and phosphorus are met.

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Housing for Milking Robots

Housing facilities for automatic milking systems (AMS) or robotic milking systems (RMS) have similar requirements as any other system. Cows must be kept clean dry and comfortable (CDC). Ventilation, freestall and walking surface requirements are all familiar to us. Cow cleanliness, including feet and lower legs is essential because at this time robots cannot determine the cleanliness of the cow. The milking robot will use the same, consistent cleaning and preparation routine for all cows. After this procedure the milking units are attached, clean teats or not. Therefore a housing system that fosters clean cows is essential.

Robots milk cows all day, so cows will be found in all parts of the housing system at all times. Therefore the manure removal system must be able to operate while cows are present. Alley scrapers and slotted floors are most common. Stall maintenance and bedding addition are another important chores that must be done while cows are present. If stall maintenance is inadequate, dirty cows will result.

To encourage regular visits to the robot by the cows a short convenient path to the robot is necessary. A robot location that the cow must pass before getting to the feed area is

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normal. In some instances, one-way gates will force the cow to visit the robot before she can gain access to the feed area (forced cow flow). Because cows visit the robot on an individual basis, there may be less group activity. This may mean that less feed space is required per cow because they are less likely to all be eating at one time. It's too early to tell if this is true.

The milking side of the robot needs to be in a well ventilated, non-freezing, fly free area. This area can be considered an extension of the milk room. Operator access between the milk room and the robot must be manure and mud free. A short distance to the milk room is desirable to minimize milk line length. For those wanting to use existing facilities the same rules apply. The cow must be kept clean dry and comfortable. The more costly it is to achieve proper housing conditions the less desirable the existing facilities are. DWD (dirty, wet and

disturbed) cows are not conducive to automatic milking systems. Remember, milking robots will milk dirty cows!

Whether new or existing, housing facilities for use with milking robots must promote clean comfortable cows with a desire to walk and visit the robot. Cows with mobility problems or dirty cows will seriously impact the productivity of the robot. Robot location must also consider access for the operator and assure that the environment around the milking side of the robot is clean, well ventilated and free from flies. Always consider flexibility for future changes such as addition of more cows and robots or even removal of the robot and installation of a conventional parlor. Who knows what the future will bring?

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Educational Resources

1. The Department of Dairy and Animal Sciences has a new web site for **nutrient management**. The link is: http://www.das.psu.edu/indexV6.cfm?PageDefs=Nutrient/_incPgDefsV6.cfm If you have questions regarding the site, please contact Ginny Ishler.

2. ***Estrous Synchronization Programs for the Dairy Herd***: Newer concepts of Ovsynch, Presynch and Modified Targeted Breeding are described along with traditional systems. This publication can be downloaded from the Dairy and Animal Sciences web site at <http://www.das.psu.edu/reproduction/check/index.html>

3. The ***Proceedings of the 2001 Mid-Atlantic Dairy Management Conference*** are now available on-line at http://www.das.edu/Index.cfm?PageDefs=Publications/MADMC2001/_incPgDefs.cfm The theme of this conference was "Implementing Competitive Business Strategies". Papers were organized into the following sections: Organizing and Structuring the Dairy Business for Profitability, Personnel Management, Freedom to Operate, CAFO Planning and Permitting and Implementation Toolbox.

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