Farm Animal Welfare Evaluations: Inconvenience or Opportunity?

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Introduction

When you take a trip on an airliner don’t you want to be reasonably sure the pilot is certified to fly the plane? Don’t you want to be reasonably sure he or she has passed a medical exam, knows all about the inner workings of the aircraft’s various systems, knows how to take off and land the plane, knows how to navigate the plane to the intended destination? You also would probably have some concerns as to whether or not the plane has been serviced by mechanics who took some sort of certification program.

Further, what would you think of an airline that refused to show proof that their pilots and mechanics were properly trained and indeed follow approved procedures and regulations? I believe the vast majority of us would refuse to buy a ticket from an airline that refused to provide us these assurances of safety, capability, and confidence.

Consumer Confidence

These days consumers all over the country are concerned about how their food is produced. They especially want assurances that animals are treated in a reasonable and humane manner. You and I are closely connected to animal agriculture and its production processes. We understand that modern animal husbandry methods are designed in the animals’ best interest, because mistreated animals are unproductive and unproductive animals are unprofitable. This “positive” story doesn’t sell newspapers or generate traffic to Internet sites. Sensationalism sells. That’s why headlines were made by the downer cow incident at Westland/Hallmark Meat Company in California (1) and by the “hidden camera” videos of cattle mistreated on an Ohio dairy farm (2).

Unfortunately the vast majority of consumers have no idea what transpires on modern farms. Instead their views are shaped and forged by these sensationalized incidents perpetrated by “bad actors” that represent only a tiny fraction of animal agriculture.

Should We Do Something? What?

How should the dairy industry respond to this situation? Do we hide our heads in the sand and pretend the prob-

In this issue ...

Farm Animal Welfare Evaluations ----------- 1
Characteristics of Michigan DHI Herds ------ 3
2010 Animal Science Research Forum --------- 6
Reproductive Efficiency of High Producing Cows 7
Do Cows Adapt Quickly to Robotic Milking? 8
William Robb Retires ------------------------ 12
2010 Income Tax Planning ------------------ 13
Gain Greatest Value from Manure Nutrients ---- 14
Snapshots of Feed & Manure Management ----- 15
Artisan Cheese Workshops ------------------- 17
US Dairy Policy at a Crossroads ----------- 20

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lem and challenges don’t exist? Should we take the approach that consumers will just have to “get over it”? Some farm organizations are taking a more positive and proactive approach. For example, the National Milk Producers Federation (NMPF) and Dairy Management Incorporated have created an evaluation program called the National Dairy FARM Program\textsuperscript{tm} (3). It is not an audit or certification program per se.

The program’s stated purpose is “to bolster consumer trust and confidence in the U.S. dairy industry and demonstrate the industry’s commitment to the highest levels of animal care and quality assurance” (3). Here is another paragraph from NMPF’s National Dairy FARM Program\textsuperscript{tm} web site describing the program:

“Consumers want to purchase food from sources they know will take care of animals, and operate in a way that is consistent with their values and expectations. Dairy farmers have a longstanding commitment to doing what is right. The National Dairy FARM Program: Farmers Assuring Responsible Management\textsuperscript{™} provides consistency and uniformity to best practices in animal care and quality assurance in the dairy industry. The dairy industry is committed to ensuring the well-being of the animals in our care. The National Dairy FARM Program\textsuperscript{™} is a nation-wide, verifiable program that addresses animal well-being. Third-party verification ensures the validity and the integrity of the program to our customers and consumers. The dairy industry has an excellent track record of responsible management practices; this national effort simply brings consistency and uniformity to on-farm care and provides reassurance to consumers.”

The NMPF’s National Dairy FARM Program\textsuperscript{™} is based on principles and guidelines outlined in the National Dairy Animal Well-Being Initiative (NDAWI). The NDAWI principles and guidelines were developed through a producer-led effort and more information on them can be found at www.dairywellbeing.org. The “Caring For Dairy Animals” manual is the basis for the NMPF National Dairy FARM program and incorporates the NDAWI principles and guidelines.

**Dairy Farm Evaluation**

The National Dairy FARM manual consists of a series of standard operating procedures and protocols that encompass every aspect of dairy farm management that directly impacts animal care and handling. It also includes employee training recommendations and various record keeping systems that would be needed by producers to accomplish the goals of the program.

At the heart of this program is the evaluation of individual dairy farms which would involve an on-farm evaluation by an outside party (e.g., veterinarian, Extension educator, on co-op field person trained to perform the evaluation). The “Caring For Dairy Animals” manual would provide the guidelines used to evaluate the status of the farm.

This manual covers such aspects of management as newborn calf care, nutrition, animal health, environment and facilities, handling, movement and transportation, and special-needs animals. My perusal of the manual suggests to me that most dairy farms already follow the majority of these recommended standard operating procedures and protocols. Thus, in most cases the on-farm evaluation would serve basically to document the already acceptable animal care and management practices currently used on the farm.

Additionally, the National Dairy FARM Program\textsuperscript{™} has a third-party verification component. To access information on these programs go to the MSU Extension Dairy Team web site and go to the “Consumer” page and click on the “Animal Well-Being” button.

**Participation in Program**

Producers can contact their milk cooperative or processor representative to ask about participation in the National Dairy FARM program. For producers who would participate independently, information, including associated fees, can be accessed at www.nationaldairyfarm.com. Ultimately, I suspect that the retail side of the dairy business will require co-ops and other milk suppliers to ensure that all farms in their supply chain meet these animal welfare guidelines.

**Conclusion**

So, will you view animal welfare evaluation as an inconvenience or an opportunity? Perhaps in the end it will be a necessity. But don’t pass up the opportunity to use the process to draw on the expertise of other dairy professionals to improve your management practices and help you identify any weaknesses in your farm business. In general, viewing evaluation, audits and certification programs in this light may enable you to more than offset their costs.

**References:**


Characteristics of Michigan DHI Herds

Kathy Lee
Extension Dairy Educator
Northwest Lower Michigan

When reviewing a herd’s DHI records, dairy herd managers and their consultants may wonder how the herd compares to other DHI herds in the state and elsewhere. A comparison to herds that are managed similarly can be referenced when developing performance goals. This article provides information about Michigan DHI herds based on two management characteristics: production and herd size.

The DairyMetrics program available from Dairy Records Management Services (DRMS) was used to summarize performance data for Michigan DHI herds. For Table 1, herds were divided into 3 groups based on rolling herd average for milk (< 22,000 lb, 22,000 - 25,999 lb, and ≥ 26,000 lb). The herds are grouped in Table 2 by herd size (< 100 cows, 100 - 249 cows, and ≥ 250 cows). The items in each table are from the DHI-202 Herd Summary report and include key indicators of overall herd management. Data presented in each table are the averages for each key indicator.

Trends -- Production Groups
Several general trends were observed across the production groupings.

• The highest production group has the lowest average days open and the highest pregnancy rate. In addition, this group has the lowest days to first service and the highest percentage of heats observed. However, the highest average for percentage of successful first services was in the lower production group.

• The highest production group has the lowest average somatic cell counts.

• Higher producing herds use a higher percentage of AI sires with a higher percentile ranking for Net Merit.

• Larger herd size average is associated with the highest production group.

These trends should not be considered a cause-and-effect relationship between milk production and the other key indicators. More likely, management factors that influence milk production also have an impact on other aspects of herd performance.

Trends -- Herd Size Groups
Some trends also existed across the groupings based on herd size.

• The larger herds tended to have more desirable reproductive performance. The average days open was lowest in the largest herd category. The largest herd category also had the highest average pregnancy rate, highest percentage heats observed, and lowest days to first service.

• The larger herds tended to have higher rolling herd averages, a trend that has existed for a number of years. It should be noted that there was a significant range in production in each herd size.
category. In fact, the maximum rolling herd average for milk was at or above 30,000 lb milk in each category.

The items in both tables are indicators of herd performance only. Other business management criteria would be considered when evaluating the financial status of the herd.

**Using DairyMetrics**

DairyMetrics is a benchmarking tool for dairy farm performance evaluation. DHI members and their herd consultants can compare their own herds to a group of herds that meet the criteria that they select (cohort herds). The cohorts can be selected based on parameters within 5 categories (general, production, udder health, reproduction and genetic information). Herds from other states that are processed by DRMS can also be included in comparisons.

The reports available through DairyMetrics contain information about the specific herd in addition to the averages, standard deviations, minimums and maximums for the cohort herds. They also give the percentile ranking for each herd performance parameter in comparison to the cohort group.

The DairyMetrics program is available at the DRMS website (http://www.drms.org). NorthStar DHI Services (800-631-3510) can provide more information about using DairyMetrics.

### Table 1: Averages of Michigan DHI Herds by Rolling Herd Average Milk Categories

<table>
<thead>
<tr>
<th>Key Indicator</th>
<th>All Herds</th>
<th>RHA Milk &lt; 22,000 lb</th>
<th>RHA Milk 22,000 to 25,999 lb</th>
<th>RHA Milk ≥ 26,000 lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnancy Rate (yr)</td>
<td>17</td>
<td>15</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>Days to First Service</td>
<td>92</td>
<td>104</td>
<td>90</td>
<td>81</td>
</tr>
<tr>
<td>Projected Days Open</td>
<td>155</td>
<td>176</td>
<td>149</td>
<td>135</td>
</tr>
<tr>
<td>% 1st Services Successful</td>
<td>44</td>
<td>48</td>
<td>44</td>
<td>40</td>
</tr>
<tr>
<td>% Heats Observed</td>
<td>43</td>
<td>33</td>
<td>44</td>
<td>54</td>
</tr>
<tr>
<td>Age at First Calving (mo)</td>
<td>26</td>
<td>27</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>% Bred to AI Sires</td>
<td>77</td>
<td>68</td>
<td>77</td>
<td>88</td>
</tr>
<tr>
<td>Percentile Rank of Proven AI Sires</td>
<td>52</td>
<td>42</td>
<td>53</td>
<td>65</td>
</tr>
<tr>
<td>% Cows Dry 40-70 Days</td>
<td>67</td>
<td>55</td>
<td>69</td>
<td>78</td>
</tr>
<tr>
<td>% Cows Left Herd</td>
<td>35</td>
<td>36</td>
<td>36</td>
<td>35</td>
</tr>
<tr>
<td>Average SCC Score</td>
<td>2.4</td>
<td>2.7</td>
<td>2.3</td>
<td>2.1</td>
</tr>
<tr>
<td>Average SCC (1,000)</td>
<td>245</td>
<td>294</td>
<td>219</td>
<td>196</td>
</tr>
<tr>
<td>Summit Milk - 1st Lact.</td>
<td>76</td>
<td>66</td>
<td>78</td>
<td>86</td>
</tr>
<tr>
<td>Summit Milk - 2nd Lact.</td>
<td>97</td>
<td>82</td>
<td>101</td>
<td>114</td>
</tr>
<tr>
<td>Summit Milk - 3rd+ Lact.</td>
<td>103</td>
<td>87</td>
<td>107</td>
<td>121</td>
</tr>
<tr>
<td>Rolling Herd Avg. Milk, (lb)</td>
<td>23,312</td>
<td>19,176</td>
<td>24,085</td>
<td>27,718</td>
</tr>
<tr>
<td>Number of Herds</td>
<td>537</td>
<td>188</td>
<td>207</td>
<td>142</td>
</tr>
<tr>
<td>Average Herd Size</td>
<td>269</td>
<td>115</td>
<td>304</td>
<td>432</td>
</tr>
</tbody>
</table>

** SCC=Somatic Cell Count

** DairyMetrics summaries based on DRMS data available on September 2, 2010.
### Table 2: Averages of Michigan DHI Herds by Herd Size Categories

<table>
<thead>
<tr>
<th>Key Indicator</th>
<th>All Herds</th>
<th>Herd Size &lt; 100 Cows</th>
<th>Herd Size 100-249 Cows</th>
<th>Herd Size ≥ 250 Cows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnancy Rate (yr)</td>
<td>17</td>
<td>15</td>
<td>16</td>
<td>19</td>
</tr>
<tr>
<td>Days to First Service</td>
<td>92</td>
<td>107</td>
<td>91</td>
<td>79</td>
</tr>
<tr>
<td>Projected Days Open</td>
<td>155</td>
<td>173</td>
<td>153</td>
<td>137</td>
</tr>
<tr>
<td>% 1st Services Successful</td>
<td>44</td>
<td>49</td>
<td>46</td>
<td>39</td>
</tr>
<tr>
<td>% Heats Observed</td>
<td>43</td>
<td>43</td>
<td>42</td>
<td>54</td>
</tr>
<tr>
<td>Age at First Calving</td>
<td>26</td>
<td>27</td>
<td>26</td>
<td>25</td>
</tr>
<tr>
<td>% Bred to AI Sires</td>
<td>77</td>
<td>74</td>
<td>74</td>
<td>83</td>
</tr>
<tr>
<td>Percentile Rank of Proven Al Sires</td>
<td>52</td>
<td>46</td>
<td>54</td>
<td>56</td>
</tr>
<tr>
<td>% Cows Dry 40-70 Days</td>
<td>67</td>
<td>59</td>
<td>66</td>
<td>75</td>
</tr>
<tr>
<td>% Cows Left Herd</td>
<td>35</td>
<td>36</td>
<td>35</td>
<td>36</td>
</tr>
<tr>
<td>Average SCC Score</td>
<td>2.4</td>
<td>2.7</td>
<td>2.3</td>
<td>2.2</td>
</tr>
<tr>
<td>Average SCC (1,000)</td>
<td>245</td>
<td>298</td>
<td>228</td>
<td>205</td>
</tr>
<tr>
<td>Summit Milk - 1st Lact.</td>
<td>76</td>
<td>70</td>
<td>77</td>
<td>81</td>
</tr>
<tr>
<td>Summit Milk - 2nd Lact.</td>
<td>97</td>
<td>88</td>
<td>98</td>
<td>106</td>
</tr>
<tr>
<td>Summit Milk - 3rd+ Lact.</td>
<td>103</td>
<td>93</td>
<td>104</td>
<td>112</td>
</tr>
<tr>
<td>Rolling Herd Avg. Milk, lb</td>
<td>23,312</td>
<td>20,944</td>
<td>23,654</td>
<td>25,402</td>
</tr>
<tr>
<td>Number of Herds</td>
<td>537</td>
<td>179</td>
<td>212</td>
<td>146</td>
</tr>
<tr>
<td>Average Herd Size</td>
<td>269</td>
<td>63</td>
<td>160</td>
<td>701</td>
</tr>
</tbody>
</table>

** SCC=Somatic Cell Count  
**DairyMetrics summaries based on DRMS data available on September 2, 2010.
The 5th Annual Animal Science Graduate Research Forum was held on Friday, September 10, 2010. There were oral and poster presentations on a variety of topics by graduate students, post-doctorates and staff. The all-day event provided opportunity for sharing of research efforts as well as receiving valuable feedback especially from the faculty.

Topics related to dairy science in oral presentations were “Effect of Exit Alley Blocking Incidences on the Accessibility of the Automatic Milking System” by Jaquelyn Jacobs, and “Dietary Saturated Fatty Acid Source and Parity Influence Lactational Performance of Early Lactation Holstein Dairy Cows” by Marcus Hollmann. The poster presentations were: “Hypophagic Effects of Propionate Relative to Acetate Decrease as Days in Milk Increase and Plasma NEFA Concentration Decreases” by Sarah Stebulis; “Method Development and Preliminary Evaluation of the Potential for Using Erythrocyte Membranes in the Assessment of Long-Chain Polyunsaturated Fatty Acid Status in Dairy Cows” by Courtney Preseault; and two by Kim Kammes, “Zinc and Heat Treatments Reduce Ruminal Protein Degradation of Grass Leaf Protein” and “Nutrients Demand Interacts with Orchardgrass Maturity to Affect Dry Matter Intake and Yields of Milk and Milk Fat”.

Assessing the day’s event, Dr. Janice Swanson, interim chair of the department emphasized, “The forum was excellent; I was impressed by the professionalism of our students and the breadth and depth of their research.”

On the overall significance of the Forum, Dr. Swanson added that, “Training the scientists of the future is an important part of our mission. The creative minds of tomorrow will have plenty of problems to solve and new discoveries that will allow animal agriculture to thrive well into the future. It’s an investment that pays great dividends.”

Photos: Ike Iyioke
Debunking the Dogma: A Fresh Look at Reproductive Efficiency of High Producing Cows

Nora Bello & Rob Tempelman, Dept. of Animal Science
Ron Erskine, Dept. of Large Animal Clinical Sciences

Dairy Herd Management

Introduction

Herd health morning… cows are lined up and the vet is putting on a palpation sleeve. In your hand, a clipboard with the list of bred cows to check… and off you go down the alley. —“1520, 41 days...” Seconds later, the vet’s response: “Pregnant.” Next, — “1322, 35 days...” — “Open...” She is 90 days in milk and her last test day is staring at you from the clipboard: 150 pounds at this point, you are probably tempted to think that her high milk yield is the reason she’s not pregnant… Now, is that the whole story? In this article, we dig deeper into the question “What is the relationship between high milk production and reproductive performance of dairy cows? There may be a lot more to this question than meets the eye.

New Findings

Recent research from our group indicates that the association between milk production and fertility of dairy cows is more complex and multi-layered than anything we anticipated. Indeed, for a given high producing cow that is found open, more than just her superior production seems to be involved. Our group recently developed cutting-edge statistical methods to take a fresh, deeper look into the relationship between milk yield and fertility in dairy cows. We applied these research methods to large DHIA data sets from Michigan several hundred farms, comprising of over 120,000 cows calving during 2005 and 2006.

Long story short. Our results provided solid evidence that it is an oversimplification to think that “one-size-fits-all” describes the relationship between milk yield and reproductive performance of dairy cows. Instead, we found the production-reproduction relationship to be highly variable and differing with management practices and characteristics of the herd. This is certainly good news as it implies that it might be possible to enhance or fine-tune farm management to jointly optimize both milk yields and dairy cow reproduction.

In particular, highly specialized management practices that typically characterize intensive production systems, such as rbST supplementation and 3X milking frequency, were associated with a favorable link between milk yield and reproduction. In other words, under intensive management, high yields did not necessarily match up with poor reproduction. In some cases, the opposite was actually true and high milk yield went hand in hand with good reproductive performance. For example, among herds that used rbST extensively, calving intervals shortened by 1.3 days for approximately every 200-pound increase in herd 305-d milk yield. Similarly, high producing cows milked 3X were getting pregnant sooner than high yielding cows milked twice daily. Please note: We are not stating that rbST or increased milking frequency were the direct causes for enhanced reproductive performance of high producing cows; nor should Michigan herds all be moving to more frequent milking and hoping to have rbST back on our shelves. Instead, consider rbST and 3X milking as more general indicators of intensive farm management, noting that both practices imply more frequent opportunities for observing cows. Thus, intensive management practices that encourage higher milk productivity also may facilitate better than average reproductive performance if the same level of management leads to more attentive and responsive observation of cows. Further investigation certainly will be required to better describe these conditions our group is already working on it.

Our New Research Approach

Given the age-old dogma that high milk yield inevitably results in poor reproduction, why would anyone believe our results? Our research methods were novel in that we deliberately accounted for cows and herds as separate units of performance that are interconnected with each other as cows are managed within herds. We can think of herds as production units, whereas cows managed within those herds may be considered physiological units of performance. So the physiological (cow-level) relationship between milk production and repro-
Do Cows Adapt Quickly to Being Milked by Robots?

Janice Siegford & Jacquelyn Jacobs
Dept. of Animal Science

Introduction

Last summer, the milking herd at MSU’s Kellogg Biological Station Pasture Dairy Research and Education Center (PDREC) moved into a new free stall barn, equipped with two robotic milkers. As we reported in a previous issue of Michigan Dairy Review (October, 2009), we collected data on the cows’ responses to being milked by the new system. The information allowed us to evaluate how well the cows adjusted to being milked by the robots. In this article, we report on some of that information more fully.

In Case You Were Wondering

Why is it important to understand how (or if) cows adapt to being milked by robots? As many of you know, stress during milking can inhibit milk let-down, which can reduce milk yield and could lead to health problems such as mastitis. Animals can experience stress for a number of reasons, including being introduced to something new, even if this new thing is not particularly painful or frightening. And since being milked by a robot would be new and different, even for an experienced milking cow, it could cause her to experience stress and inhibit her milk let-down.

In theory, there are several reasons that robotic milkers should provide a lower stress milking environment compared with a conventional milking parlor. First, a cow can choose when and how often she wants to be milked, setting her own milking schedule. Second, a cow doesn’t have to spend time waiting in a crowded pen outside the parlor before each milking. This should translate into less time away from feed, water, and stalls to lie in, and also into less bullying by other cows. Robotic milkers also remove humans from the picture, which for more timid or fearful cows, could be a good thing. And, last but certainly not least, the cow receives some concentrate feed while she is being milked by a robot. All of these elements translate into an environment with less stress, more reward, and more control for the cow, which for all animals, including dairy cows and humans, are typically good things.

Reproductive Efficiency ...

Continued from 7

Productive performance within herds is not necessarily the same as the production unit-based (herd-level) relationship between average milk production and reproductive performance across herds. For example, we found that there was generally a negative relationship between milk yield and reproduction within herds whereas high producing herds tended to have, on average, better reproductive performance.

Clearly, the delicate intricacies of a cow’s physiology were not mirroring the management mechanisms of the production system in which the cow was living. Previous research had failed to make this cow vs. herd distinction. Such omission may have resulted in the general assumption that does not necessarily apply to all cows in all herds. Moreover, we should realize that we cannot just look at the connection between milk production and reproduction without accounting for other potential confounding factors such as genetics, nutrition, energy balance, body condition, presence of infectious diseases, metabolic diseases, and seasonal effects. Our research statistical methods are more comprehensive than anything used in this field before. They were recently published in a leading biological statistics research journal. These methods allow us to jointly evaluate milk production and reproduction while accounting for numerous other variables. This is a powerful new tool that provides a fresh perspective on the long-misunderstood issue of fertility of high producing cows.

Conclusion

In summary, high milk yield does not mean that cows will definitely have poor reproductive performance. In fact, it is apparent that high quality management upon which high production is based also can support good reproductive performance. So, keep an open mind when it comes to reproductive expectations of your high producing cows and give them the very best management and attention available... your very best cows CAN really thrive both reproductively and in milk yield.
“There are several reasons why robotic milkers provide a lower stress milking environment than a conventional milking parlor: a cow can choose when and how often she wants to be milked...; a cow doesn’t have to spend time waiting in a crowded pen outside the parlor before each milking...; humans are out of the picture...; and, the cow receives a small amount of grain while she is being milked by a robot.”

But as we mentioned previously, when a cow is first milked by a robot this is a new and possibly stressful experience. A cow may need some time to adjust to being milked in a different environment, with different equipment before she can learn to enjoy the theoretical advantages to robotic milking. If she adapts quickly, the change from one system to another will probably not have a big effect on her productivity and health. If she does not adapt, or adapts slowly, the consequences could range from a drop in production, to a cow that becomes sick more easily, or to a cow that may need to be culled from the herd.

What We Did
Our study consisted of observing 75 lactating Holstein cows at PDREC as they made the transition from a double-six herringbone parlor to a Lely Astronaut A3 Milking System. Prior to the transition, PRDEC cows were milked three times a day in the parlor and were managed in three groups (first lactation cows, multiparous cows, and special needs cows).

Following the move, the herd was divided into two groups, balanced for parity and stage of lactation; each group had access to a single robotic milking machine. To go about measuring how well the cows adapted to being milked by the new robotic system, our study measured the number of times cows vocalized, defecated, urinated, stepped and kicked while in the robots (Figures 1a & 1b).

We began our observations starting with each cow’s first milking (day 0) by the new robots. We continued to collect data for 32 days. We also measured milk yield over the same time period. We predicted that the cows would adapt quickly to the robotic milkers, and that as they became more comfortable in their new milking environment, they would show fewer stress-related behaviors while being milked.

What We Found
During their first robotic milking (day 0), the cows vocalized, eliminated, stepped and kicked frequently, suggesting that they did not initially like being in the robotic milking stall or being milked by the robot. However, in less than 24 hours, stepping and kicking prior to teat attachment dropped and vocalizing and eliminating in the robot stalls nearly disappeared (Figures 2a & 2b). The rapid decline of these stress-related behaviors could be due to the cows becoming more comfortable with the milking stall and robotic milking equipment and process, including the movement of the robotic milking arm and teat cups. The cows also could have become more focused on eating grain in the robot’s feeder and less focused on the actions of the robotic arm.

Curiously, steps and kicks after teat attachment to the milking cups (i.e., during the milking process) increased between day 0 and 32. There are a number of possibilities as to why this may have happened, although it is impossible to accurately identify a single answer without additional research. During the first month, the new barn’s manure scrapers were not working well, leading to a large amount of manure in the barn and consequently a large number of flies. We were unable to discriminate between steps and kicks related to fly avoidance versus steps and kicks linked to discomfort with the milking process. Another possible reason...
the cows kicked more with the robots is the difference in pulsation ratio between the old conventional parlor and the robotic system.

The parlor milking system used had a pulsation ratio of 60:40, while the Lely robot milks at a pulsation ratio of 65:35. The difference in milking and resting ratio could have led to some discomfort during milking as the teats adjusted to the change. However, we did not inspect teats at the time, so it is impossible to know if the discomfort was a result of declining teat end condition. Lastly, the discomfort during milking could be due to cows’ being uncomfortable with being milked on a per quarter basis. In the previous milking system, all four udder quarters were milked for the same duration of time. Although unlikely, it is possible that the cows took longer than 32 days to adapt to this change.

The number of incidents of elimination and vocalization were great during the first 24 hours of use of the robot system (Figure 3a). However, subsequently these events were low to nil.

Importantly, milk yield, which had dropped to an average of 35 lb/cow in their first 24 hours in the new barn, rebounded to nearly 70 lb/cow/day within 4 days Figure 3b). Reduced milk yield in that first day was most likely because the cows were not fully letting down, particularly during their first milking by the robots.

During the first milking, the robot uses lasers to scan the udder and teats to learn the cow’s conformation. This process can take several minutes, which caused the first robotic milking to be longer than all later milkings; a fact which may have contributed to the cow’s discomfort during her first milking by the robot.

Another indication that cows adapted quickly to the robotic milkers was the number of cows that milked themselves voluntarily versus the number that needed to be fetched by the stockperson to be milked. Within a week of introducing the cows to the robotic milkers, over 80% of the herd was milking voluntarily. After 2 weeks, over 90% of the herd was milking voluntarily and after 2 months over 97% of the herd was milking voluntarily. Only 2-3 cows needed to be fetched every 12 hours to be milked while the remainder of the herd went through the robotic milkers voluntarily over 2.5 times per day.

Conclusion
In summary, according to most of our measures, the cows seem to have adapted quickly to being milked by the robotic milkers. One puzzling piece was the increase in the number of steps and kicks following teat attachment. Unfortunately, this result seems to have left us with more questions than answers, and it may be worthwhile to further investigate the rate of adoption between these two systems. Extending the data collection period beyond 32 days also may be necessary during future investigations, as it may take longer for cows to adjust to milking with a new machine than previously thought.
The PDREC farm staff worked closely with Lely representatives to design a transition protocol based on the manufacturer’s previous experience and our particular herd and facility. If you are considering a transition to robotic milkers, we recommend taking advantage of the manufacturer’s advice. You also should invest some time talking to other producers who have made the transition to learn about possible problems and solutions.

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Acknowledgements: The data presented in this article was collected as part of Jacquelyn Jacobs’ Master’s research. Thanks to Aislin Hardee, Krista Beeker, Courtney Daigle, Jolene Talaski, Matt Haan, Olivia Genther, and Chelsey Shivley for their help collecting data and hair dyeing cows for identification. Thanks to Rob Ashley and the PDREC farm crew for their assistance with this project.
Bill Robb Retires from MSU Extension

George Atkeson
Retired MSU Extension Dairy Agent, & Kathy Lee, MSU Extension Dairy Educator

On September 30, 2010 G. William (Bill) Robb retired from MSU Extension. During his career, Bill was a friend and educator for Michigan dairy producers and agricultural industry.

Bill Robb’s entire life has been involved in and dedicated to the Michigan dairy industry. Born and raised on a dairy farm in the Fowlerville area, he was taught well how to work with cows and people by his father, George Robb, who was a registered Holstein breeder. They both loved to show their cattle and compete.

Learning the crop farming needs for the cows gave Bill a total farming experience as he grew up. He was involved in 4-H as were his six sisters and one brother.

After high school he attended Michigan State University and received a B.S. in Dairy Science. He continued his education at Pennsylvania State University with a Master’s of Science degree in Dairy Science, with a focus on dairy reproduction.

Bill started his career with MSU Extension in July 1976 as a Dairy-Livestock Agent in St. Clair and Macomb counties. Other positions that he held with MSU Extension were:

- 1980-1989 County Extension Director, Mason County
- 1989-1995 County Extension Director, Allegan County
- 1995-2005 Extension Dairy Agent, Southwest Michigan
- 2005-2009 Extension Dairy Educator, West Central Michigan
- 2009-2010 Extension Senior Dairy Educator, West Central Michigan

In the changing culture in which we now live, Bill is unique in that he has worked for only one organization during his entire professional career of 34 years. You might say he knows Extension inside out.

Bill has some qualities that make him special as an educator and a role model for his Extension colleagues. Over the years he has adapted to many changes in both teaching and communications such as computers, cell phones, ipods, PowerPoint presentations and the Internet.

As well as the new technology, Bill experienced several organization changes within MSU Extension. Ultimately he had the ability to stay focused on providing relevant programs to the people on the farms and in the related agribusinesses.

His connections with the dairy industry have been exceptional. He knew personally most veterinarians and feed dealers in the area to which he was assigned and often worked with them regarding concerns of producers. He also had a good relationship with farmer organizations associated with the dairy industry.

For many years Bill had a weekly radio show that helped him and producers stay connected. It also was a great public relations tool for letting people in the county know that he and MSU Extension were working for them. A news column also kept producers and the general public informed about dairy issues.

Perhaps his strongest tool for staying connected to all producers was his newsletter. It was timely and contained information for the dairy producers that he may not have worked with individually but still wanted to keep informed as to changes and events in their industry. In 2000 Bill received the National Communications Award from the National Association of County Agricultural Agents for his outstanding dairy newsletter, “Dairylines”.

Bill conducted a number of educational programs related to dairy production and management. Some of his most significant projects included a mastitis mail program, milk marketing and multiple component pricing, Spanish Dairy Phrases CD-ROM, Dairy Employee Education Program (DEEP), Telfarm and business financial management, livestock manure management programs, Spartan Dairy Ration software, and most recently artisan cheese classes at the MSU Dairy Plant.

Bill placed strong emphasis on the economic implications of business and management changes that he discussed with producers. He was a strong supporter of a business plan and business analysis as both related to current and future decisions on the farm.

Producers appreciated Bill’s direct procedure in addressing a problem or a request for information. If he did not know he said so, but then would follow up with the answer in a timely manner.

In addition to the award for his outstanding newsletter, Bill has received the following recognition for his excellent Extension programming and leadership:

- Achievement Award - National Association of County Agricultural Agents (NACAA)
- Distinguished Service Award - NACAA
- MSU Extension Team Award - Epsilon Sigma Phi

Continued on Page 13
2010 Income Tax Planning

Larry Borton
Dept. of Agricultural, Food & Resource Economics

Business & Management

Tax planning can help retain more income through the tax system by paying the lowest and correct amount of taxes. Congress has many tax items that may be decided before we have to file for 2010, but we will look at the current tax rules to use in planning this year.

• Farmers do not have to file estimated income taxes if they file and pay by March 1, 2011. A farmer is defined in this part of the tax code as a taxpayer with at least 2/3 of gross income (not net) from farming in either 2009 or 2010.

• Tax rates are lower this year and scheduled to increase next year. The 10% tax bracket will disappear after 2010 so the lowest bracket will be 15%. The highest bracket will increase from 35% to 39.6% for ordinary income. The long term capital gains rate (used for raised, cull cows that are sold, for example) increases from 0% or 15% to 10% or 20%. These will happen without Congress changing any laws.

• Social Security and Medicare remain at 15.3% on the first $106,800 of earned income and 2.9% for higher income. Farmers have an optional method to pay Self-Employment (SE) tax even if income is low or negative. Work credits can be earned toward retirement or disability eligibility. Often, the SE tax paid in this option may be refunded as Earned Income Credit.

• The Domestic Production Activity Deduction (DPAD) increased to 9% of Qualified Production Activities Income. It has limitations including not more than 50% of W-2 wages paid by the farm employer. A cooperative may pass along a DPAD to a member-farmer even if the farmer has no hired labor wages. This cooperative DPAD may cause confusion because it is a deduction based on what we formerly called milk sales. Now the milk sales are “per unit retains paid in money” (PURPIM). Most farms will actually be receiving a 1099 statement noting the PURPIM which are reported as income on a different line from milk sales on the Schedule F of Form 1040. Treating this income as retains is proper for tax reporting but it can be treated as milk sales for business analysis purposes.

• Michigan income tax rate remains at 4.35% for 2010

• The direct expensing of depreciable items stays at $250,000 for 2010 with phaseout beginning at $800,000 of qualified property placed into service.

• For 2009 and 2010 the American Opportunity Tax Credit for post-secondary education allows a maximum of $2,500 per year per student for the first four years of study (the Hope Credit was previously $1,800 per year for the first two years). Up to 40% of this is refundable which means you can get a refund even if you don’t owe any income tax. The Lifetime Learning Credit of 20% of up to $10,000 expenses or a maximum credit of $2,000 is still available if not qualified for the American Opportunity or Hope Credits.

• First-time homebuyer’s credit (refundable) of up to $8,000 if the house was purchased by April 30, 2010 and closed by September 30, 2010. Long-time resident homebuyers with 5 consecutive years out of 8 in their principal residence could be treated as first-time homebuyers with up to $6,500 in credit.

• A maximum of $1,500 credit for qualifying energy property purchased for your principal residence. It’s calculated as 30% of the purchase price for items that qualify.

• An alternative energy credit of 30% of wind, solar, and other property is available through 2016.

• An employment tax deduction is available for employers that hire previously unemployed workers. It exempts the 6.2% employer’s share of social security from March 19 to December 31, 2010 of qualifying workers hired after February 3, 2010. Workers should fill out and sign Form W-11 if they were unemployed for the 60-day period (not more than 40 hours of work) prior to employment.

• A new general business tax credit, New Hire Retention Credit, for 2011 income tax returns equal to 6.2% of wages paid to each qualified employee who is retained for

Continued from Page 12

Bill Robb ...

Continued on Page 19

• President’s Citation - Michigan Association of Extension Agents

Bill’s friends and colleagues know he loves to hunt and fish. These are two ways that he relaxes and shares time with his friends. He knows every back road and riding with him is an experience. He likes to keep the pedal to the metal.

The MSU Extension Dairy Team thanks him for sharing his experience and leadership. The dairy producers and the dairy industry wish him well in his retirement as he has served them well.
As soon as the crops come off fields in the fall, manure applications begin in earnest for most dairy producers. Surface applications are fast and convenient, but run the risks of odors, runoff and loss of nitrogen into the air. Capturing this nitrogen for the next crop can make incorporation cost-effective. More nitrogen would be retained if manure was applied onto cover crops or after temperatures dip below 50F. Granted, it isn’t always prudent to wait for cooler weather to haul manure.

Plant available nitrogen is highly dependent on application rates, method of application, timing and type of manure. The chart below shows a “typical” dairy manure test from the milking herd, and describes the difference in nitrogen value from surface and injected applications.

Ammonium (NH₄-N)
- The ammonium form of N in manure is readily available to plants.
- Most of the ammonium will volatilize when surface applied during hot, dry conditions (e.g., on wheat stubble in late summer).
- Under cool, damp soil conditions (such as spring and late fall) more of the ammonium-N is retained in the soil.
- Incorporation into soil within hours or injection greatly improves the retention of the ammonium fraction, as will a light rain after applications.

Manure Management

- Manure injected in the spring should retain almost 100% of the ammonium in the manure.
- Add up both the estimated ammonium fraction of manure with the amount of mineralized nitrogen for a total nitrogen credit to the current crop.
- A pre-side dress nitrate test (PSNT) is the best method to measure the total nitrogen from manure applications. It will measure both the ammonium and organic fraction from manures as they are converted to nitrates in the spring.
- Fall stalk tests can be an indicator of over or insufficient nitrogen as a double check on manure and nitrogen rates on corn.

Continued on Page 18
Snapshots of Feed and Manure Management on Dairy Farms

Mark Powell
Research Soil Scientist-Agroecology
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US Dairy Forage Research Center, Madison, Wisconsin

Introduction
Escalations in feed and fertilizer cost, and ebbing milk prices are motivating many dairy farmers to find new ways to improve nutrient use on their farms. On many farms, it may be possible to put more feed nutrients into milk and more fertilizer and manure nutrients into crops and pasture. This would not only reduce farm input costs and enhance profits, but such improvements in nutrient use efficiency (NUE) also could reduce nutrient losses from dairy farms, which would allow farmers to comply more easily with environmental regulations. Over the past several years various procedures have been developed to provide ‘snapshot’ assessments of feed, fertilizer and manure use on a wide range of dairy farm types.

Overall Approach
Questionnaires are used during initial face-to-face interviews to compile information on herd size and composition, livestock facilities, land use, management practices, and motivations and goals related to feed, fertilizer and manure management. The questionnaire is designed to provide a ‘snapshot’ of nutrient management for the period ‘yesterday-today-tomorrow’. Then, retrospective questions are posed to define broad, seasonal differences in nutrient management. For example, timelines are established for when dairy cow diets may change, for when manure is spread, for crop rotations, etc. The information obtained during the first interview is used to establish benchmark NUE values and to develop additional survey tools for subsequent farm visits. Subsequent farm visits (usually monthly or quarterly) are set up to collect additional data, feed and manure samples, and to discuss survey results with farmers.

Focus on Feed Management
During each farm visit, farmers are asked the number of lactating cows, dry cows and heifers they have. With the focus on the day of the visit, questions are asked related to feed management, such as whether the lactating herd is subdivided into different feeding groups, the basis for herd grouping, how often rations are balanced, the use of milk production technologies, milking frequencies, and average milk production per cow (usually the previous day’s bulk tank volume divided by cows milked). The types and amounts of feed being offered are recorded for each feeding group, and samples of each feed component and/or the total milked ration (TMR) are taken for analyses.

The information provided by the farmer on what feed they offer to their cows, milk production, and feed and milk nutrient analyses are used to calculate feed nutrient use efficiencies (FNUE) as follows:

\[ FNUE = 100 \times \frac{\text{nutrients in milk (lbs/cow/d)}}{\text{nutrient consumed in feed (lbs/cow/d)}} \]

Our studies of FNUE have focused on nitrogen (N, or crude protein) and phosphorus (P) because putting more feed N and P into milk (and less into manure) has both cost reduction and environmental benefits. Excess feed N is a wasted cost. It is simply excreted as urea in urine, which is lost rapidly as ammonia gas or leached through the soil as nitrates in groundwater (and may be re-emitted as nitrous oxide, a greenhouse gas). Excess

“On many farms, it may be possible to put more feed nutrients into milk and more fertilizer and manure nutrients into crops and pasture...”
dietary P is also a wasted cost and is excreted in feces, which after land application, can runoff from fields and pastures into lakes and streams and promote algae growth and declines in water quality. Table 1 provides an example of snapshot estimates of feed N consumption, milk N secretion, and manure N excretion.

Table 1. Milk production, feed N intake, manure N excretion and feed N use efficiency (FNUE) on Wisconsin dairy farms determined by snapshot methods.

| Milk Production | Feed N Intake | Manure N excretion | FNUE%
|-----------------|---------------|--------------------|-------
| lb/cow/day      | percent       |                    |       |
| Average         | 65            | 1.44               | 24.9  |
| Range (low to high) | 32 to 90     | 0.77 to 2.28       | 12.5 to 45.7 |

Focus on Manure Management
To determine the relative amount of manure that farmers collect (and available for application to cropland) the snapshot survey contains a series of questions related to herd management, barn cleaning and manure storage practices. To determine the amount of manure that goes uncollected (a wasted resource), the survey questionnaire is designed to determine where and for how long livestock spend outside. Time spent outside is delineated by animal type (e.g., lactating cows, dry cows, heifers), season (spring, summer, fall, and winter) and location. Information on relative time spent in outside areas is combined with manure nutrient excretions to determine loading rates in areas where manure is not collected. Table 2 provides the type of information obtained using snapshot assessment of manure collection practices.

Table 2: Snapshot assessment of manure collection on Wisconsin dairy farms

| Category                     | Sub-category | Manure collection (% of annual excretion)
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stanchion</td>
<td>66 (±18.9)</td>
<td></td>
</tr>
<tr>
<td>Free-stall</td>
<td>89 (±16.5)</td>
<td></td>
</tr>
<tr>
<td>Herd size (cows/farm)</td>
<td>&lt;50</td>
<td>57 (±12.6)</td>
</tr>
<tr>
<td>50-99</td>
<td>76 (±18.2)</td>
<td></td>
</tr>
<tr>
<td>100-199</td>
<td>95 (±5.1)</td>
<td></td>
</tr>
<tr>
<td>&gt;200</td>
<td>100 (±0)</td>
<td></td>
</tr>
</tbody>
</table>

The survey part related to manure collection is followed by an exercise using farm maps and information on crop rotations to assess when, where and how collected manure is land-applied. This information can be used to calculate approximate manure application rates to cropland. The information also provides the basis for developing manure spreading logs which can be used by farmers to track actual spreading practices. Using these logs, farmers record information on the type of manure spread (semi-solid, liquid, bedded pack), the type of spreading equipment used, when and which fields receive manure, etc. Manufacturer information on manure spreader holding capacities and relative fullness of each load are used to estimate manure amounts (tons) spread. Manure samples taken by farmers are analyzed to estimate the amount of manure nutrients spread on a per field basis.

Sharing Validation Data with Farmers
We have used various methods to validate the ‘snapshot’ estimates of feed intake, milk production, and manure nutrient excretion; and of the manure collection and manure spreading practices. For example, cow nutrient balances and associated feed requirements can be used to calculate the errors associated with data on apparent feed nutrient intake and calculated feed nutrient use efficiencies, and manure nutrient excretions can be compared published values of relationships between feed, milk, and manure.

Once a farm’s information has been compiled and analyzed, a report can be compiled to depict various NUEs for individual farms, how each farm’s NUEs compares to NUEs on other study farms, and where improvements in NUE can be made. We’ve found that this type of information provides for interesting discussion with producers (and dairy nutrition consultants) on how the farm’s FNUE compares to other farms, and what may be needed for the herd to attain the potential FNUE established under experimental conditions.

A sample questionnaire, manure spreading log, a final farmer report, and scientific articles related to the snapshot assessments are available on the U.S. Dairy Forage Research Center web site under the Products & Services tab. www.ars.usda.gov/mwa/madison/dfrc
Artisan Cheese Workshops

Bill Robb
Senior Dairy Educator, WC Michigan
John Partridge
Depts. of Food Science and Human Nutrition, and Animal Science

Artisan cheese is defined as cheeses handcrafted from locally sourced milk using traditional craftsmanship and recipes. These diverse cheese types can offer rich flavors available to local markets and add value to farm production. When the science of cheesemaking is married to this practice, cheesemakers can produce a uniform, high quality product and meet today’s food safety regulations. The primary goal of the MSU Artisanal Hands-on Cheesemaking Workshop is to train cheesemakers in preparation for start up of new businesses or to add enterprises to existing businesses in Michigan.

The three-day workshop is designed for novice cheesemakers as well as those who want to improve their skills in order to improve and differentiate their cheese business. Participants learn about cleaning and sanitation, milk characteristics and quality, ingredients, processes for a variety of cheeses, and techniques and requirements for aging cheese. In addition, the business planning required to establish a farmstead or artisan cheese enterprise is covered.

The heart of the workshop is the hands-on opportunity to make cheese in the MSU Dairy Plant. The teaching laboratory offers staff and equipment to help make a variety of cheeses in a short amount of time. Participants make a number of different cheeses that may include Gouda, Tomme, or Alpine-style in the aged cheese category and lactic, Ricotta and Mozzarella cheeses in the soft, fresh cheese category. Both cow and goat milks are used to demonstrate the difference in curd formation and culture requirements. A cheese tasting featuring the workshop’s creatively flavored, fresh cheeses as well as locally produced artisanal cheeses is an enjoyable part of the workshop.

To date three workshops have been offered involving 60 participants. Each class has filled to the capacity of 20 people. The class, with a structure of both lecture and hands-on cheesemaking, was rated great by 32 of the 38 participants. Eight of the first 40 class participants are planning to make and sell cheese, and even though many of the plans are in infant stages may represent over 67,500 pounds of cheese annually. At $10 per pound this may represent over $675,000 or more of new farm income. The annual workshop will help jump start the artisan cheese industry in Michigan.

Dr. John Partridge, MSU Dairy Foods Specialist, and Mr. Bill Robb, MSU Extension emeritus, organized the previous workshops that featured Mr. Peter Dixon, of Consider Bardwell Farms in Vermont as the lead instructor. A new workshop is scheduled for March 7-8-9, 2011. Although Peter will not be a part of the instructional team for the 2011 offering of the Workshop, John and Bill are pleased to add Ms. Barbara Jenness of Dancing Goat Creamery in Byron Center, MI, as a member of the instructional team.

John has extensive experience in sanitation, milk quality and composition, and cheesemaking and Bill has developed a strong portfolio in the area of business planning and operations. Barbara will bring her experience with goat and cow milk and cheesemaking to the team. Through classes and internship programs, Barbara has demonstrated a real heart for passing along the knowledge that she has collected from participating as a student in many educational programs and through the operation of her own cheese making enterprises.

During the past year, the MSU Product Center for Agriculture and Natural Resources has facilitated the formation of the Michigan Cheese Makers Cooperative, to provide an organization through which Michigan cheesemakers can promote and support handmade artisan and farmstead cheeses. The Michigan Cheese Makers web site is http://www.greatlakesgreatcheese.com/.

To request registration information for the 2011 workshop please contact Dr. John Partridge at partridg@anr.msu.edu.

References:
Greatest Value from Manure Nutrients

Continued from Page 14

Try combining manure and inorganic fertilizer applications so that the future crop’s needs are met and not exceeded. Reducing or eliminating commercial fertilizer use on any fields where soil tests indicate that these nutrients are not needed, or where manure has already been applied to supply the necessary nutrient amounts, reduces the risk of nutrient loss. Matching the combination of commercial fertilizer and manure will save money, without yield loss. To gain the greatest value from manure nutrients, it must be applied to fields that need the phosphorus and potassium.

If surface applying manures, select fields with no adjacent surface waters when possible. When there are surface waters nearby, assess slopes and employ management practices to decrease the risks of runoff, such as:

- incorporating manure within 24 hours when possible;
- basing application rates on the ability of the soil to accept and store water and the ability of plants to utilize nutrients;
- observing a spreading setback from surface waters and from drain inlets; surface application of 150 ft is recommended;
- knowing the slopes in fields, and installing conservation practices to control runoff and erosion;
- planting permanent vegetative buffers by creeks and ditches;
- monitoring the outlets in tile-drained fields prior, during and after manure applications;
- applying manure uniformly and at known rates;
- leaving as much previous crop residue as possible and managing tillage to leave the field surface rough;
- planting crop rows perpendicular to slopes;
- planting cover crops ahead of planned manure applications;
- avoiding manure application during rain or when rain is impending; and
- combining several of the practices listed here.

Winter-time spreading increases the risks of runoff during melting and rain events. Field-by-field assessments should be conducted on all fields to select those most appropriate for winter spreading. Liquid manure may be applied in winter on fields with slopes of 3% or less. Solid manures may be applied on fields with slopes of 6% or less. Slopes above 6% should not be surface applied during frozen and snow-covered seasons.

Managing Manure Nutrients for Profitable Crop Production

- apply manure to lowest-testing fields for greatest benefit from all nutrients in the manure;
- soil test every 3 years, in less than 20-acre increments;
- take manure samples annually or frequently enough to monitor change over time;
- adjust application rates of manure to supply crop needs and water holding capacity of soils;
- calibrate manure spreaders to apply the desired rate and to monitor accuracy;
- train farm employees and family members to maintain desired manure nutrient rates are consistently applied to the fields; and
- spread manure evenly and consistently, treat it like the fertilizer it is. Do not apply manure in a manner that creates ponding or soil erosion.

Finally, apply, monitor, evaluate and RECORD manure applications.

See www.animalagteam.msu.edu for more information on manure nutrients.
Tax Planning …

Continued from Page 13

“Many people want to know what the costs of the new health care bill will be to a farm operation or business. We’ll have to wait as regulations are developed.”

Continued on Page 20

Improving Your Bottomline

Farmers may want to minimize deductions and increase income for this year if their taxable income is low or negative. Depreciation can be reduced by choosing a slower recovery method but only for items placed into service in 2010. Items previously placed into service already have a method that cannot be changed now. If a taxpayer has the 0% long term capital gains bracket available (for taxable income below the 25% ordinary income tax bracket), it makes sense to use this bracket. If profits are made in the next three years, then income averaging still might use these brackets if unable to use them this year.

Another way to increase personal income is to convert a traditional IRA, SEP-IRA or a SIMPLE IRA to a Roth IRA. As of 2008 an employer-sponsored retirement plan like a 401(k) or 403(b) may also be directly converted to a Roth IRA. These were usually not taxed when contributions were made and will be taxed when distributions are made. The amounts converted count as taxable income in the conversion year but if the tax rate is zero, then there will be no tax. Future qualified distributions from a Roth IRA will not be taxable income. Converting may be done by a farmer or even a spouse if married, filing jointly. Some farmers may want to increase expenses or defer income. Prepaying expenses reduces net income and may reduce taxes but there must be a business reason for it like getting a discount or insuring a supply is available.

Something to Keep in Mind

A complication may arise if milk income was deferred from the end of one year to the beginning of the next. The IRS has a program to audit dairy farmers to check for this. Any deferral of income from milk sales is being disallowed based on a Minnesota court case where grain delivered to a cooperative was not considered a sale until it was later sold by the cooperative. Since the farmer did not “sell” the grain to the cooperative, no installment sale (or deferral of income) was possible in spite of having a contract in place before delivery of the commodity. This seems consistent with treating milk sales as per unit retains for the DPAD instead of as milk sales.

If a farmer has a business Net Operating Loss (NOL), then there is an option to carryback the loss to years when income tax was paid in order to get a tax refund. If unable to carry the losses to previous years, then the loss may be carried forward to reduce income tax in future years.

The annual exclusion from gift tax remains at $13,000 per person without any gift tax or without using up the $1 million lifetime exemption. For example, anyone reading this article can mail me a check for $13,000 as a gift and neither of us will have to pay any extra tax for the gift. It is not taxable income to me and not a deductible expense for you. I, however, would need to increase my Michigan Household Income by $13,000 which may affect some of my Michigan tax credits that are determined by household income like the Homestead or Farmland Preservation Credits.

While there is no estate tax this year, when a death occurs in 2010, the executor (or personal administrator) can increase the basis of property inherited by $1.3 million plus an extra $3.0 million if there is a surviving spouse. Property subsequently sold may be subject to tax on the gains, but that is much less than the estate tax rates of past years and in 2011.

Next year the familiar rules of getting a step-up in basis (or a step-down) to the fair market value on the date of death will return. However, there is only $1 million of the estate that won’t be subject to estate tax. It’s easy for farms to get above that value. Check your last year’s balance sheet to get an approximation of that fair market value. Please see your legal advisor and/or MSU Extension farm management educator this winter about estate planning for next year.

The current Alternative Minimum Tax exemption amount is $45,000. If Congress does not increase it to about $70,000 for married, filing jointly, then many farmers may become subject to this tax. The Alternative Minimum Tax is a completely separate method to calculate the income tax due. Most software tax programs automatically check to see if it applies.

The week after the health care bill passed, many phone calls asked what the costs of it will be to a farm operation or business. That is a
US Dairy Policy at a Crossroads

Christopher Wolf  
Dept. of Agricultural, Food & Resource Economics

The dire financial consequences of low milk prices and high feed prices on dairy farms of the past couple of years has jump-started a national dairy policy debate that might be part of the next Farm Bill or possibly enacted at an earlier date. Several policy proposals are currently being discussed by industry and policy-makers. This article considers the current policies, the set of dairy alternative proposals, some of the economic consequences of these alternatives, and the dairy policy outlook.

Current Dairy Policies
A review of the current policies—their origins, purposes, and current issues with their functioning—is a useful place to begin this discussion. At the present time the major aspects of dairy policy include milk marketing orders, the dairy product price support program (DPPSP), the milk income loss contract (MILC) program, export subsidies and import tariffs. Milk marketing orders have been around since the 1930s. Federal Milk Marketing Orders set minimum prices of milk based on end use and blend the revenues to assure all farmers in the order receive a minimum average blend price. They were created to ensure an adequate supply of fluid milk and deal with equity issues across farms. A major Order restructuring occurred in 2000 with 32 Federal Orders consolidated to eleven (now 10 as the Western Order was voted out of existence a few years back). That Order reform also included setting minimum prices based on wholesale product prices. Using wholesale prices necessitated determining how much of that price should be credited to processing the milk (called a make allowance). That process is unwieldy to say the least and has been a source of contention, calling for the need for better “price discovery” of farm milk price. Marketing Orders smooth out wholesale price changes to some degree as they blend product prices together and some prices enter with a time lag. The regional nature of milk marketing orders has fed disputes relative to dairy policy discussions in the past. Milk Marketing Orders are not intended to support milk prices but rather to pass a share of the value of milk on to the farmers based on end use and assure an average share to each qualifying producer.

The dairy price support program has existed since 1948 as an open offer by the government to purchase cheese, butter, and non-fat dry milk. Following several years of large government dairy product purchases to support those high prices, the support price was ratcheted down to a level that basically has not interfered with milk price since the early 1990s and volatility has increased greatly. In the most recent Farm Bill, the support program was changed from supporting milk price at the farm level to supporting dairy product prices which would then indirectly support farm milk prices. Besides the support being basically too low to matter much in today’s market, the program has been accused of squelching incentive to innovate in dairy products and supporting import prices when world prices are low. With the exception of non-fat dry milk purchases, the support program has not had a great deal of relevance in recent years and seems to be on the chopping block as far as most everyone in the industry is concerned.

The MILC program came about in 2002 and provides deficiency payments for milk when the price falls below a target level (i.e., $13.69/cwt Class III milk). The payments were originally limited to the first 2.4 million pounds of annual milk production and later increased to 2.985 million pounds. A feed cost adjuster was later added to make the payments greater when grain

Tax Planning ...
Continued from Page 19

really tough question about a couple thousand page bill that few had ever read before voting on it. While we can explain specific items in it, regulations to implement the rules are still at the beginning stage of development. Many items do not take effect for several years. More information will become available as regulations are developed.

Conclusion
Rules mentioned in this article are covered in general to help understand the tax laws. Phaseouts, additional eligibility criteria and timing limits exist for many of these. Congress may take actions over the next few months that change these rules which would require you to make adjustments in your tax plan based on that information. For specific applications be sure to talk to your MSU Extension Educator and/or your tax advisor.
price volatility increased. This program is much more important to small farms than large farms as a consequence of the payment limits. The MILC program has been accused of retarding the market signal to contract milk production by insulating farms from low milk prices.

Dairy trade regulations and the dairy export incentive program (DEIP) also have been important dairy policies. Historically, the US has exported about five percent of production in the form of bulk cheese, butter, non-fat dry milk, dry whey and whole milk powder. Prior to the world-wide recession that occurred in late 2008 the US had several years of export growth and appeared poised to be a major dairy supplier to emerging markets in Asia. On the flip side, the US generally imports about the same amount of product (in milk equivalents) but the imports are composed of higher value specialty products (e.g., specialty cheeses). While government export incentives were utilized heavily years ago, more recently competitive US prices and industry programs have made them less important.

Cooperatives Working Together (CWT) is an industry, rather than a government, program that has been very important since its creation in 2003. The program is funded voluntarily by cooperatives and independent farm members. The funding has been utilized for herd removals ten different times, representing more than 510,000 total cows and subsidizing dairy exports. While the longevity of the program is a testament to the ability of dairy farmers to cooperate, membership in the program has deteriorated somewhat especially as the economic conditions of 2009 made it difficult to afford the payments.

Many existing dairy policies, like many existing US agricultural policies, have their origins in the Great Depression era. While these policies have been updated periodically and changed through Farm Bills, massive technology changes (both on the farm and at the processing and retailing levels) population and income changes, and a host of other dynamics cannot possibly be reflected in slowly changing legislation and administrative rulings.

**Current Economic Policies**

With that as background, consider the current dairy economic climate. The major issues from a dairy farm perspective are price volatility and frequent negative profit margins. The price volatility that has occurred in recent years in both farm milk and feed price is unprecedented. Unpredictable, large changes in milk price make it difficult for both producers and processors of milk to make appropriate managerial decisions. While the current set of dairy policies may not have been directly responsible for causing milk and feed price volatility the fact of the matter is that these policies did little to prevent or off-set the extended periods of very low prices in 2002-03 and again in 2009-10. The inelastic supply and demand associated with milk and dairy products means that small changes in quantity (either supplied or demanded) can have large impacts on milk price.

The biofuels policy as currently incarnated has in effect shoved the price volatility of the oil market into feed grains so that income over feed cost is an important metric of dairy profitability. Table 1 (page 22) uses nominal Michigan prices from 1985 through 2009 to illustrate the change in price level volatility. The time series was split at 1994 because of the increase in milk price variation that took place at that time. While average milk price—not adjusted for inflation—increased slightly in the 1995-2009 period relative to 1985-1994, milk price variation, as measured by the standard deviation, quadrupled. Coefficient of variation (CV) in Table 1 is the standard deviation divided by the mean. CV is a way to put the variation in perspective. All the price series saw a substantial increase in variation in recent years. For many years, milk price has driven variation in the MF (milk-to-feed price) while feed prices—especially corn prices—have been low and stable. However, in the past three years volatility in corn and soybean prices became major factors in driving MF variation.

The periods that have not been volatile in milk price have occurred when the milk price was very low. That is to say, when the milk price near support price it is not volatile but it is unprofitable. Other problems with the current dairy market relate to farm milk price discovery as the current milk marketing order pricing derived from wholesale product prices does not reflect the dynamic market (and cannot possibly be reflected in an administratively set pricing rule). This issue manifests itself in the divergence between farm and retail milk prices.

**Current Dairy Policy Proposals**

Historically, there have been many dairy industry factors that shape the policy debate. Among these factors are regionalism; changing farm,
Table 1: Michigan Milk and Feed Prices, 1985-2009

<table>
<thead>
<tr>
<th>Time Period</th>
<th>All Milk¹</th>
<th>Corn²</th>
<th>Soybeans²</th>
<th>Hay²</th>
<th>Milk-to-Feed³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$/cwt</td>
<td>$/bu</td>
<td>$/bu</td>
<td>$/ton</td>
<td>ratio</td>
</tr>
<tr>
<td>1985-2009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>14.09</td>
<td>2.46</td>
<td>6.28</td>
<td>88.40</td>
<td>2.98</td>
</tr>
<tr>
<td>St. Dev.⁴</td>
<td>1.94</td>
<td>0.72</td>
<td>6.28</td>
<td>88.40</td>
<td>2.98</td>
</tr>
<tr>
<td>Minimum</td>
<td>12.14</td>
<td>1.51</td>
<td>4.45</td>
<td>64.17</td>
<td>1.75</td>
</tr>
<tr>
<td>Maximum</td>
<td>19.68</td>
<td>4.81</td>
<td>11.07</td>
<td>154.58</td>
<td>4.06</td>
</tr>
<tr>
<td>CV⁴</td>
<td>0.14</td>
<td>0.29</td>
<td>0.25</td>
<td>0.27</td>
<td>0.17</td>
</tr>
</tbody>
</table>

| 1985-1994   |          |       |           |      |               |
| Average     | 13.03    | 2.19  | 5.78      | 74.54| 3.05          |
| St. Dev.⁴   | 0.54     | 0.29  | 0.69      | 7.93 | 0.27          |
| Minimum     | 12.41    | 1.51  | 4.92      | 64.17| 2.75          |
| Maximum     | 14.10    | 2.43  | 7.16      | 86.67| 3.74          |
| CV⁴         | 0.04     | 0.13  | 0.12      | 0.11 | 0.09          |

| 1995-2009   |          |       |           |      |               |
| Average     | 14.79    | 2.63  | 6.61      | 97.64| 2.93          |
| St. Dev.⁴   | 2.22     | 0.87  | 1.95      | 26.02| 0.63          |
| Minimum     | 12.14    | 1.85  | 4.45      | 68.75| 1.75          |
| Maximum     | 19.68    | 4.81  | 11.07     | 154.58| 4.06         |
| CV⁴         | 0.15     | 0.33  | 0.29      | 0.27 | 0.21          |

¹ All Milk price $/cwt (source: USDA).
² Corn ($/bu), soybeans ($/bu) and hay ($/ton) refer to prices received by farmers (source: USDA).
³ Milk-to-feed price ratio (MF) = (All Milk price)/(Feed price per cwt feed) where Feed cost ($/cwt feed) = ([(Price of corn($/bu)/56) x 51] + [(Price of soybeans($/bu)/60) x 8] + [(Price of alfalfa hay($/ton)/2000 x 41)].
⁴ “St. Dev.” is the standard deviation—a measure of variation and “CV” is the coefficient of variation calculated as: standard deviation/mean.

Supply Management
Propping up the farm milk price through some form of supply management is one theme of several plans currently discussed including the “Dairy Price Stabilization Plan” from the Holstein Association USA (in the Senate it was introduced as Dairy Market Stabilization Act by Sanders (VT), Murray (WA), and Leahy (VT)). This plan includes a market access fee payment for all dairy farms which is later divided up and paid out to farms that did not grow milk production. The fee would increase if a farm increased production over historic base level or if dairy economic conditions suggest a needed cut in milk supplied (e.g., the milk-feed price ratio or margin is below a trigger level). This program is essentially a form of supply control.

Economists generally are not proponents of supply control as it tends to protect inefficient production and lower economic welfare of some market participants. If a dairy producer is not planning to grow production—as would likely be the case where, for instance, bringing a future generation into the operation—then they might find it appealing to get paid by new entrants and growing dairy farms. In past years, we might have expected states with recent rapid milk production growth, like California, to oppose a supply control program but that is not the case this time around as there appears to be support for this program in California. Analyses by researchers from Cornell University and the Food and Agricultural Policy Research Institute (FAPRI) at the University of Missouri suggest that this program would indeed lower the milk price volatility but the potential negative effects also must be considered.

One important consideration in any supply control program is the potential for imports to increase market share. This plan may mean that the US will not be a significant player in the export market, either. Servicing contracts in the export market requires some degree of cooperative, processor, and retailer structure; and the trade situation and trade agreements. Even with all the size and regional issues, there seems to be greater consensus now than perhaps at any time in recent memory that dairy policy changes must be made. There is not, however, agreement on what those changes should be. There are three major types of proposals widely discussed—or even introduced as formal legislation at this point in time. The current proposals can be categorized broadly as: 1) managing milk supply through fees and rebates; 2) risk management programs to support the margin between milk and feed prices rather than the current price support programs; and, 3) reform to marketing order price discovery mechanisms. The “Foundation for the Future” plan of National Milk Producers Federation is a comprehensive plan that includes all three of the policy changes discussed above. Each is discussed and contrasted to alternatives below.
reliability which would likely be undermined by constrained supply with this program. On the flip side, the potential for maintaining high milk prices will almost certainly attract imports. Unless sufficient restrictions are in place, the US market might experience an increase in dairy product imports which pressure milk prices and prohibit domestic supply growth. The US has for the past few decades moved towards more free-trade agreements so these import restrictions might be a tough sell on Capitol Hill.

Risk Management
Recent volatility in grains means that margin over feed is a superior indication of dairy farm profitability rather than simply milk price. The dairy producer margin protection program supports the margin between milk and feed prices rather than milk price alone. The intention is to have a minimum margin protected at government expense with the option to increase the margin at a farmer’s expense. Past experience indicates that it is difficult to design and implement government insurance programs that do not entail large subsidies and potential production distortions. At the current time, producers could purchase margin insurance through dairy livestock gross margin (LGM) programs or put together their own margin protection using futures and options. Neither of these alternatives has been widely adopted to date. One pitfall of a margin protected at the government’s expense is a dulled market signal when supply is too large. To alleviate this concern NMPF’s Foundation for the Future plan also proposes a market access fee scheme to control supply.

The NMPF plan includes eliminating the DPPSP and MILC programs with the farm safety net instead held by a combination of margin protection and market access fees. As was discussed above, there are many issues with the current support program including being irrelevant to today’s milk market prices. The willingness of NMPF to “trade” this long-lived program away indicates the seriousness with which dairy policy reform is considered in this proposal.

Reform Price Discovery
A third type of policy solution is to change milk pricing under the Federal Milk Marketing Orders. This is the approach taken by the “Federal Milk Marketing Improvement Act” (sponsored by Senators Specter (PA) and Casey (PA)). This Act would define two classes of milk-fluid and manufacturing—rather than the four that currently exist in federal milk marketing orders. The new Class II milk price would be based on the average cost of producing all milk in the 48 contiguous states. Basing farm milk price on cost of production might alleviate one area of concern for many industry participants which is the use of the Chicago Mercantile Exchange (CME) prices to set farm milk prices.

The CME spot cheese market is thinly traded—which is to say that there are few trades representing a very small portion of production—but most cheese buyers and sellers look to the CME prices as a reference. The concern is that a thin market might be easily moved by large buyers or sellers to favor their position. A University of Wisconsin study in 1996 found some evidence of market manipulation at the National Cheese Exchange in Green Bay (which subsequently moved to the CME). A thin market is not evidence, per se, of anti-competitive behavior but a higher degree of participation in the market would provide more assurance that an accurate, competitive milk price is reached. However, this plan may be a challenge to effectively implement as cost of production is a difficult-to-define term (operating and owner-

ship costs, fixed and variable costs, accrual and allocation issues) and defining the pay cost at an inappropriate level (too high or too low) can have adverse consequences in the milk market.

The NMPF plan takes a different approach to reforming price discovery by basing Class III (milk for cheese) price on competitive pay price rather than wholesale prices. This is in many respects a “back to the future” move as the old Minnesota-Wisconsin (M-W) price series was the base for milk pricing for many years. It was a competitive price based on surveys of cheese plants purchasing Grade B milk. One concern with this approach is finding a significant enough unregulated milk market in 2011 to reflect a real competitive price. This concern was what drove policy makers away from the M-W in 1995.

What Happens Next?
Many of the aspects discussed above are in some form of legislation at the current time. For example, the Federal Milk Marketing Improvement Act and Dairy Market Stabilization Act are in the Senate Agriculture Committee. Keep in mind that there are three major underlying influences that shape agricultural policy in the US. First, people need to eat and US consumers are accustomed to safe, reliable and relatively inexpensive food. US consumers spend about ten percent of their income on food purchases which is one of the lowest levels in the world. Second, farmers must make a living. If we are to have a reliable supply of food, then sufficient income must be available in farming to maintain the management, labor and capital to produce it.

Finally, politicians desire to get re-elected and thus are quite interested in public opinion. These three influences will all play a role in any dairy policy changes which are likely to be contentious and unlikely to happen quickly.
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