The University of Missouri Extension Dairy Team has a rich history of providing educational programming to the dairy industry. However, surveys suggest the majority of participants involved are male. Additionally, women dairy operators in Missouri have recently eroded. The 2012 census of Missouri Agriculture reflects a sharp decline of 39% of women dairy operators when compared with 2007. Women who have no off-farm income or women who work <99 d off farm have decreased at a slower rate, 9% and 2%, respectively. The establishment of the “Women in Dairy” program targets women as primary operators and/or active women participants on the farm to address this educational gap. The objectives of the program were to provide a non-confrontational learning environment for women operators to obtain best management practices (BMP). Program content delivered by University of Missouri extension specialists included topics selected by a producer panel: calf care, farm succession-planning, reproduction and stress management. Many women participants reported plans for implementing BMPs on the farm. Post-program surveys were collected at monthly events throughout the year. Sixty-one surveys were returned (48.4% response rate) and reflected a 57% increase in understanding of farm succession and a 94% increase in knowledge and skill for dealing with stress and stressful situations. Altered from traditional extension format of the program delivery, meetings deliberately engage interaction. Women participants reported to enjoy: “the ability to chat freely” and to “learn from one another.” The comradery of the group participants reported to enjoy: “the ability to chat freely” and to “learn from one another.” Women operators when compared with 2007. Women who have no off-farm income or women who work <99 d off farm have decreased at a slower rate, 9% and 2%, respectively. The establishment of the “Women in Dairy” program targets women as primary operators and/or active women participants on the farm to address this educational gap. The objectives of the program were to provide a non-confrontational learning environment for women operators to obtain best management practices (BMP). Program content delivered by University of Missouri extension specialists included topics selected by a producer panel: calf care, farm succession-planning, reproduction and stress management. Many women participants reported plans for implementing BMPs on the farm. Post-program surveys were collected at monthly events throughout the year. Sixty-one surveys were returned (48.4% response rate) and reflected a 57% increase in understanding of farm succession and a 94% increase in knowledge and skill for dealing with stress and stressful situations. Altered from traditional extension format of the program delivery, meetings deliberately engage interaction. Women participants reported to enjoy: “the ability to chat freely” and to “learn from one another.” The comradery of the group participants reported to enjoy: “the ability to chat freely” and to “learn from one another.”

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**Key Words:** women, underserved, extension

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M148 Development of the Dairy Focus SCC Calculator to analyze mastitis costs. R. T. Patenaude*, K. T. Ryan, and F. C. Cardoso, Department of Animal Sciences, University of Illinois, Urbana, IL.

In 2014, the National Animal Health Monitoring System reported that roughly 24.1% of all cows in the top 17 dairy producing states suffered from clinical or subclinical mastitis. Many milk processors award producers with bonus incentives for reaching higher milk quality. Most dairymen are aware of their bulk tank somatic cell count (SCC), however, what they lack is a way of determining how much monetary loss is incurred by not receiving a milk quality bonus. The Dairy Focus SCC Calculator (DFSSCC), which is an Excel-based program, allows producers to analyze their test day milk numbers and take appropriate action regarding SCC. The main goal of the DFSSCC is to assist dairy producers in making management decisions on an individual herd level, which will improve overall health and decrease economic losses due to mastitis. The DFSSCC allows producers to identify cows in the herd that are contributing the highest percentage to the bulk tank SCC. Also, the calculator identifies cows that have chronic or new cases of mastitis by sorting cows by highest current and previous test day SCC. The program also includes an ‘Economic Gains’ table which allows the user to view the differences between bulk tank values with and without high SCC cows. These values are influenced by the bulk tank milk amount, bulk tank SCC, current milk price, and milk quality bonuses per CWT if a SCC parameter is achieved once certain cows are removed. One case showed that if a producer removed one high SCC contributing cow from the bulk tank, that their pounds of milk shipped per month would be decreased by 1,905 kg, while the monetary value of the milk shipped increased by $10,370 per month. It is important to note that the high SCC milk that is no longer used in the bulk tank could be used for alternate purposes, such as calf feeding. The DFSSCC is very easy to operate and is free to download under the ‘Tools’ page at www.dairyfocus.illinois.edu. There are currently versions available for Dairy Comp 305 and PCDart, as well as a version for dairymen who prefer to enter data manually.

**Key Words:** SCC, mastitis, milk quality

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M147 Trade-off between farm profitability and greenhouse gas emission. D. Liang1, T. Rutherford2, B. Jones1, R. Shaver1, and V. Cabrera1, 1Department of Dairy Science, University of Wisconsin-Madison, Madison, WI, 2Department of Applied Agricultural Economics, University of Wisconsin-Madison, Madison, WI.

We developed a nonlinear programming model that selects the optimal cropping plan and diet ration to maximize farm income over feed cost (IOFC) or minimize greenhouse gas emission (GHG) in a representative 200-lactating cow, 100-ha south-central Wisconsin farm. Nutrition requirements for 6 cow-groups were formulated according to the 2001 Dairy NRC equations. In each of 25 weather scenarios, farm-produced feed, forage quality, and feed production costs were simulated with the Integrated Farm System Model using 25-year daily weather data (1986 to 2010). Feed prices, collected as the monthly market prices from the Understanding Dairy Market website during 2015 and 2016, were randomly assigned to each scenario. The model contained 3 sections: (1) Maximizing IOFC under a fixed or flexible cropping plan; (2) Minimizing farm GHG emissions under the fixed cropping plan; (3) Maximizing IOFC by constraining the GHG emissions. Farm IOFC included milk and surplus feed sale, feed production cost, and feed purchasing costs. Hedging decisions were included in the first section to compare the difference from contracting feed or milk prices with different cropping plans. The optimal solution maximized the total IOFC across 25 scenarios through the expected utility theory. Aggregated IOFC across 25 scenarios was $8.31/cow per d with the original cropping plan of 54.6 ha of corn and 45.4 ha of alfalfa while the GHG emission was 1.33 kg CO2eq. per kg of FPCM. The model chose to produce at the greatest production for all scenarios with the original cropping plan. Diet formulation and purchasing strategies changed for each weather scenario to maximize IOFC according to farm-grown feed condition. Flexible optimal cropping plans for each scenario improved IOFC slightly (0.2–0.4% depending on risk attitude and elasticity); however, incorporating both flexible cropping plans and commodity hedging improved farm IOFC by 16%. The minimum GHG emission was 1.20 kg CO2eq. per kg of FPCM with IOFC at $7.04/cow per d. The farm reduced milk production and changed the rations in some groups and scenarios to minimize GHG emission. By increasing the upper limit of GHG emission from the minimum emission in the third section, farm IOFC increased with a declining rate.

**Key Words:** whole-farm optimization, feed allocation, income over feed cost

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M146 Extension programming targeting women in the dairy industry. R. Blue1* and T. Probert, University of Missouri, Columbia, MO.

The University of Missouri Extension Dairy Team has a rich history of providing educational programming to the dairy industry. However, surveys suggest the majority of participants involved are male. Additionally, women dairy operators in Missouri have recently eroded. The 2012 census of Missouri Agriculture reflects a sharp decline of 39% of women dairy operators when compared with 2007. Women who have no off-farm income or women who work <99 d off farm have decreased at a slower rate, 9% and 2%, respectively. The establishment of the “Women in Dairy” program targets women as primary operators and/or active women participants on the farm to address this educational gap. The objectives of the program were to provide a non-confrontational learning environment for women operators to obtain best management practices (BMP). Program content delivered by University of Missouri extension specialists included topics selected by a producer panel: calf care, farm succession-planning, reproduction and stress management. Many women participants reported plans for implementing BMPs on the farm. Post-program surveys were collected at monthly events throughout the year. Sixty-one surveys were returned (48.4% response rate) and reflected a 57% increase in understanding of farm succession and a 94% increase in knowledge and skill for dealing with stress and stressful situations. Altered from traditional extension format of the program delivery, meetings deliberately engage interaction. Women participants reported to enjoy: “the ability to chat freely” and to “learn so much (while) meeting other dairy wives.” The comradery of the group is tangible, yet difficult to quantify. By educating a previously underserved audience, we anticipate increased productivity of Missouri dairy farms. Through education, women operators will become more effective contributors to their operations and therefore the families’ livelihood.

**Key Words:** women, underserved, extension
M149  Education and decision support strategy for farm-level economic and environmental assessment of dairy feed-focused best management practices. T. J. Beck2, R. C. Goodling1, M. M. Haan3, V. A. Ishler1, R. D. Weaver1, and H. A. Weeks2,4, 1The Pennsylvania State University, University Park, PA, 2Penn State Extension, Carlisle, PA, 3Penn State Extension, Leesport, PA, 4AgChoice Farm Credit, Mechanicsburg, PA.

The Penn State Extension dairy team has worked with 143 dairy operations consistently in the past 5 years to develop cash flow plans, monitor income over feed costs and cost of production. From this group, 50 farms were selected to test corn silage quality, fecal starch and milk urea nitrogen and evaluate its impact on farm profitability. Forty-four farms completed their actual cash flow plan for 2013 and sampled their corn silage in the fall of 2013 and spring of 2014. Producers responded to questions related to corn hybrids planted and feeding management practices. Additional farms were added for 2014–2015. The total number of farms completing the project was 56. Farms utilized between 1 to 13 different corn hybrids and the process for selection ranged from the cheapest seed to crop yields. Quality parameters such as neutral detergent fiber and starch digestibility did not routinely factor into the decision process. Farms incorporating best feeding and cropping management practices showed a 5.8-lb milk increase versus their counterparts. Over the 2-year period milk urea nitrogen and fecal starch levels consistently fell within recommended parameters and there was no association to forage quality or feeding management practices. Average changes in 7-h starch digestibility fall to spring tended to increase for farms that had the same corn hybrid and same structure during the seasonal sampling period (M = 6.5 SD = 5.01), which is expected and illustrated in controlled research studies. However, this trend was not observed for farms that had either hybrid blends or that changed hybrid and or structure during the sampling period (M = 1.8 SD = 4.85). They had more varied changes in starch digestibility and were different than the same farms F(1,50) = 7.135, P = 0.01. Forage quality and quantity are the foundation for developing successful and profitable rations. Producers benefit from advisors that understand cropping, feeding and economics to help them make smarter decisions. There are opportunities for producers to examine more closely hybrid selection decisions and evaluate how quality parameters affect animal production and cash surplus.

Key Words: forage quality, income over feed cost, feed practices

M150  Feed management practices and corn silage quality effects on income over feed cost. T. J. Beck2, R. C. Goodling1, M. M. Haan3, V. A. Ishler1, R. D. Weaver1, and H. A. Weeks2,4, 1The Pennsylvania State University, University Park, PA, 2Penn State Extension, Carlisle, PA, 3Penn State Extension, Leesport, PA, 4AgChoice Farm Credit, Mechanicsburg, PA.

Feeding and cropping management practices are critical to the profitability of a dairy business. In a 2015 cash flow plans summary, dairy farm breakeven milk price ranged from $12.23/cwt to $38.72/cwt (n = 107). Between 2013 and 2015, 60 farms were sampled 4 times over 2 years for corn silage, fecal starch, and milk urea nitrogen (MUN), and surveyed about best management practices. 44 of those farms provided actual income and expenses for their dairy enterprise for all 3 years. The objective of the project was to determine the affect corn silage quality and feed management practices on income over feed cost. Table 1 depicts the average, standard deviation, and range of gross milk price and total milk cow feed cost (purchased and home raised) per cwt for each year and the 3 year average. Gross milk price and total milk cow feed cost varied both within years and across years. There was greater variation in total milk cow feed cost among the 44 farms than in gross milk price. The next step was to evaluate the top and bottom 25% herds for income over feed cost and their feed management practices and corn silage quality. The top 25% had the highest percentage of implementation of feeding management practices as compared with the bottom 25%. The top 25% tended to have slightly better corn silage in terms of higher average dry matter percent, 7 h starch digestibility, and 30 h NDF digestibility both in the fall and spring sampling periods. During the next phase of this project, a more complete analysis of corn silage within rations will be analyzed with the addition of actual dry matter intakes and an analysis of the total mixed ration.

Key Words: feed cost, milk price, profitability

Table 1 (abstract M150). Average and range of gross milk price ($/cwt) and total milk cow feed cost ($/cwt) for 44 Pennsylvania dairies, 2013-2015

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>3-year average</th>
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</thead>
<tbody>
<tr>
<td>Gross milk price</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average (SD)</td>
<td>$21.24 (±1.00)</td>
<td>$25.05 (±1.30)</td>
<td>$18.13 (±0.88)</td>
<td>$21.47 (±3.03)</td>
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<tr>
<td>Range</td>
<td>$19.35 to $24.17</td>
<td>$20.83 to $27.48</td>
<td>$16.53 to $20.41</td>
<td>$16.53 to $27.48</td>
</tr>
<tr>
<td>Total milk cow feed cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average (SD)</td>
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<td>$9.90 (±1.94)</td>
<td>$8.48 (±1.49)</td>
<td>$9.41 (±2.11)</td>
</tr>
<tr>
<td>Range</td>
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<td>$6.70 to $14.82</td>
<td>$5.47 to $13.21</td>
<td>$3.29 to $15.75</td>
</tr>
</tbody>
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