

653 Evaluation of on-farm pasteurization systems. J. A. Elizondo-Salazar*^{1,2}, C. F. Vargas-Rodríguez², S. C. Donaldson¹, B. M. Jayarao¹, and A. J. Heinrichs¹, ¹The Pennsylvania State University, University Park, ²Estación Experimental Alfredo Volio Mata, Costa Rica.

Waste milk has been fed to calves for many years but concerns with bacteria contamination as well as possible transmission of diseases through feeding waste milk have discouraged many producers from feeding calves with this milk. Pasteurization of waste milk is one option to reduce management risk while utilizing a valuable, low cost liquid feed source for calves. However, many farms lack a protocol to adequately monitor the efficiency of their pasteurizing system. A study was carried out to evaluate on-farm pasteurization systems using 6 farms with different pasteurization systems, including both HTST and batch pasteurizers. Milk samples were taken pre- and post pasteurization and immediately frozen to -20°C for later bacterial culture. Samples were taken for a period of approximately 15 d, twice daily. All milk samples were examined for standard plate count (SPC), coagulase-negative staphylococci (CNS) count, environmental streptococci (ES) count, coliform (CC) count, gram-negative noncoliform (NC) count, *Streptococcus agalactiae* (SAG) count, and *Staphylococcus aureus* (SA) count. The SPC from all farms in the pre-pasteurized samples ranged from 7,415 to 250,822 CFU/mL while in the post-pasteurized samples ranged from 461 to 30,625 CFU/mL. Pasteurization reduced the SPC to < 10% of the original count in 81% (range 53 to 100%) of the samples. CNS count was reduced to < 10% of the original count in 86% (range 52 to 100%), meanwhile CC was reduced in 83% (range 52 to 97%) of the samples, meaning that pasteurization systems effectively reduced the bacteria counts of waste milk. However, 2 farms did not reduce the bacterial population in approximately 50% of the samples, suggesting that incomplete pasteurization may be a common problem and monitoring pasteurizer performance is an important step in assuring the quality of waste milk after pasteurization.

Key Words: Pasteurization, Waste Milk, Bacteria

654 Managing the newly created livestock gross margin for dairy (LGM-Dairy) insurance under seasonal climate variability. V. E. Cabrera*¹ and D. Solis², ¹New Mexico State University, Clovis, ²University of Miami, Tallahassee, FL.

By July 2008, dairy farmers in 35 states will be able to lock-in their margins through the new livestock gross margin for dairy insurance (LGM-Dairy). LGM-Dairy is a risk management tool that allows farmers to hedge against loss of gross margin (market value of milk minus feed costs). LGM-Dairy gives farmers a way to control volatility in feed costs and milk prices. Farmers will estimate the volume of milk to be sold and the amount of feed (equivalents to corn and soybean) to be bought each month. Then, the expected gross margin (EGM) will be calculated using the Chicago Mercantile Exchange Class III milk futures and the Chicago Board of Trade corn and soybean futures. Prices for milk and corn (not soybeans) will be adjusted monthly by state. If the EGM is greater than the actual gross margin, the farmer will be paid an indemnity according to a selected deductible. Seasonal climate variability (e.g., El Niño Southern Oscillation) may impact feed costs and milk prices as well as milk production and feed consumption. Consequently, advancements in

climate forecasting could play an important role in assisting farmers to decide on the most appropriate risk management strategy. The goal of this study is to offer an analytical tool to help farmers select the optimum level of LGM-Dairy when accounting for seasonal climatic variability. This paper (1) characterizes the historical climate impacts on dairy profit margins; (2) systematizes the indemnity calculation of LGM-Dairy; (3) introduces climate uncertainties to the optimal selection of a LGM-Dairy contract; and (4) explores the potential economic outcomes of locking-in margins under uncertain climatic conditions. Preliminary results indicate that seasonal climate variability impacts feed costs, milk production, feed consumption and milk price. Dairy producers could use climate forecasting to decide if it is convenient to purchase LGM-Dairy and at what EGM level. Under El Niño climate forecast, with expected above average feed costs, LGM-Dairy purchase with low or no deductible would be advisable, whereas during La Niña climate forecast a low premium or no LGM-Dairy would be a better option.

Key Words: Risk, Uncertainty, Economics

655 A stochastic simulation model for assessment of investments in Precision Dairy Farming technologies: Model enhancements and utility demonstration. J. M. Bewley*¹, M. D. Boehlje¹, A. W. Gray¹, H. Hogeveen², S. D. Eicher³, and M. M. Schutz¹, ¹Purdue University, West Lafayette, IN, ²Utrecht University, Utrecht, The Netherlands, ³USDA-ARS, West Lafayette, IN.

A previously described stochastic simulation model of a dairy enterprise was modified for improved robustness. This model was developed to evaluate investments in Precision Dairy Farming technologies and was constructed to embody the biological and economic complexities of a dairy farm system within a partial budgeting framework. The @Risk add-in (Palisade Corp., Ithaca, NY) for Microsoft Excel was utilized to account for the stochastic nature of key variables by Monte Carlo simulation. The model comprised a series of modules, which synergistically provide the required inputs for profitability analysis. Model enhancements included addition of a retention pay-off (RPO) module to calculate cost of culling, an average cow simulation module, a body condition score module, a herd size control algorithm, a best management practice adherence factor, a technology stage adjustment factor, and updated, literature-based estimates for disease impact. Technology benefits are appraised from changes in disease incidence, disease impact, and reproductive performance. The influence of stochastic input and output prices on RPO, days open (DO), and disease was examined with 5000 iterations of a simulation of an average 1000-cow US dairy herd. For example, during the first month of the first lactation, increasing replacement price, slaughter price, milk price, or feed cost by 1 SD changed RPO by +\$196.39, -\$80.08, -\$9.02, and -\$2.16, respectively. As slaughter price, feed cost, milk price, and replacement price increased by 1 SD, the cost of a DO changed by -\$0.24, -\$0.23, +\$0.20, and +\$0.20, respectively. Sensitivity for costs of displaced abomasum, dystocia, ketosis, mastitis, metritis, retained placenta, and milk fever were also investigated. The RPO, DO costs, and disease costs were highly sensitive to stochastic prices and deterministic inputs.

Key Words: Investment Analysis, Precision Dairy Farming, Stochastic Simulation