

## NC 1042: 2007- 2008 Station Report

- A. **PROJECT NAME:** Management Systems to Improve the Economic and Environmental Sustainability of Dairy Enterprises (Rev. NC-1119)
- B. **COOPERATING AGENCY and personnel:** UNIVERSITY OF WISCONSIN, Victor E. Cabrera
- C. **WORK PROGRESS AND PRINCIPAL ACCOMPLISHMENTS:**

### Under Objective 2 of Project:

#### *More efficient feeding strategies*

*We have developed a "prototype" decision support system to assess the income over feed cost and the optimal utilization of corn grain for entire lactations diets, which is available at: <http://www.uwex.edu/ces/dairymgt/feeding.cfm>. Preliminary results support largely the opportunity to decrease corn grain in the diet and increase the use of forage and grazing practices to improve net income over feed costs under multiple farm and current market situations.*

#### *Lactation benchmark curves*

*We have developed a tool to compare lactation curves to Wisconsin benchmark lactation curves according to defined herd rolling herd average (RHA) and parity, which is available at: <http://www.uwex.edu/ces/dairymgt/tools/index.cfm>. This tool calculates the difference on milk produced between a farm, cow, or group of cows and benchmark of about 3.6 million of records in the state of Wisconsin. This tool is helping producers and extension agents to (i) assess management problems that could be occurring during lactation and (ii) realize the opportunity of milk production that could have been gaining if management problems are identified and corrected.*

#### *Mastitis decision making*

*We are developing a decision tree tool to evaluate the economics of early post-partum mastitis test and treatment. To date, we have defined all test and treatment possibilities. We are working on collecting and parameterizing field data as well as defining the costs incurred because of mastitis problems.*

### Under Objective 3 of Project:

#### *Whole farm simulation model for dairy farm expansion*

*We are creating a stochastic whole farm model to forecast the outcomes of proposed dairy expansion alternatives. Dairy expansion presents a unique set of challenges for both producers and the agricultural lending agents who provide financing of capital projects, which we are hoping to assess with this tool. The decision aid will help producers plan and be successful in their expansion initiatives. To date, we have been able to secure funds for a two year project and hire a student, who is already searching the literature and collecting information. A Markov-chain herd model has been already defined, which will soon be parameterized with millions of DHI records.*

#### *Livestock Gross Margin for Dairy (LGM-Dairy)*

*We have worked extensively assessing the newly created insurance for dairy that protects the farm's gross margin (difference between milk value and feed costs). We have accumulated extensive information about LGM-Dairy that includes extension papers, brochures, presentations, among others. at: <http://www.uwex.edu/ces/dairymgt/dairy.cfm>. Also, a series of workshops and presentations are lined-up in late 2008 and early 2009 across Wisconsin and some neighboring states. We are in the process of creating a tool to evaluate (i) the convenience of this insurance*

*product over traditional milk puts and feed calls and (ii) the opportunity of using seasonal climate predictions to better hedge. We have submitted an integrated multidisciplinary USDA-Hatch to continue this work.*

### *Impact of Diseases*

*We have started a new project to study the impact of six major dairy herd diseases to the income over feed costs (IOFC). The diseases are: milk fever, retained placenta, displaced abomasum, lameness, clinical ketosis, and follicular and luteal cysts. The study will integrate on-farm research, DHI records, and financial records. We expect to find a correlation between incidence and prevalence of these diseases with the IOFC and be able to better understand the overall costs associated with each one of these diseases.*

### *Energy and environmental impact*

*As part of a large team, we are involved in creating a model to quantify the energy intensity and environmental impacts of integrating bio-fuels production systems, new technologies and management practices on the energy, green-house-gas (GHG) and nutrient balance of individual farms and the state of Wisconsin.*

## **D. USEFULNESS OF FINDINGS:**

*The above undertakings have been a response to dairy producers and to Extension agents requests as applied research to specific areas of need. Dairy producers and Extension agents are using constantly and permanently using our information for practical and real-life decision making.*

## **E. PUBLICATIONS:**

### **Peer-reviewed/ research and extension.**

Liu, J., Men, C., Men, C., Cabrera, V.E., Uryasev, S., Fraisse, C.W. Accepted. Optimizing crop insurance under climate variability. *Journal of Applied Meteorology and Climatology* 00, 00-00.

Cabrera, V.E., Hagevoort, R., Solis, D., Kirksey, R., Diemer, J.A. 2008. Economic Impact of Milk Production in the State of New Mexico. *Journal of Dairy Science* 91:2144-2150.

Cabrera, V.E., Mathis, C.P., Kirksey, R.E., Baker, T.T. 2008. Development of a seasonal prediction model for manure excretion by dairy cattle. *The Professional Animal Scientist* 24(2):175-183.

Cabrera, V.E., Breuer, N.E., Hildebrand, P.E. 2008. Participatory modeling in dairy farm systems: a method for building consensual environmental sustainability using seasonal climate forecasts. *Climatic Change* 89, 395-409.

Cabrera, V.E., S. Jagtap, and P.E. Hildebrand. 2007. Strategies to limit (minimize) nitrogen leaching on dairy farms driven by seasonal climate forecasts. *Agriculture, Ecosystems, and Environment* 122, 479-489.

Cabrera, V.E., Letson, D., Podesta, G. 2007. The value of the climate information when Farm Programs matter. *Agricultural Systems* 93, 25-42.

### **Non-peer reviewed (e.g., proceedings articles, abstracts, articles for client and lay audiences:**

Cabrera, V.E., Solis, D. 2008. Managing the newly created LGM-Dairy insurance under seasonal climate variability. *J. Dairy Sci.* 91 (Suppl. 1):557.

Valvekar, M., Cabrera, V.E., and Gould, B.W. 2008. LGM-Dairy: livestock gross margin for dairy, a new risk management tool available for Wisconsin dairy producers. Dairy Management White Paper August 2008.

Cabrera, V.E. 2008. Optimal corn grain feeding in Wisconsin dairy diets. Dairy Management White Paper August 2008.

Gould, B.W., Mitchell, P., and Cabrera, V.E. 2008. USDA's gross margin insurance program for dairy: what is it and can it be used for risk management? Marketing and Policy Briefing Paper 95, Aug. 2008.

**F. IMPACT STATEMENT** *(in lay language for government agencies and elected representatives)*

*Dairy producers in Wisconsin and elsewhere are always looking for cost-efficient and profitable management strategies to improve their bottom-line and guarantee their long-term economic and environmental sustainability. Increasing production costs because of feed prices and skyrocketing global energy costs together with uncertain milk prices are a permanent threat to the survival of dairy enterprises. Dairy producers have indicated that they need support in making complex planning decisions to improve their efficiency of production, profitability, and for the dairy industry to remain sustainable.*

*Management information systems are increasingly important for helping in the decision-making of dairy systems. Indeed, dairy farming is a decision-intensive enterprise where profitable decisions cannot be made without the use of decision aids. The dynamics of dairy farm systems warrants the utilization of sophisticated techniques to assess the impacts of management strategies to farm economics. Field research to test profitability of management strategies is not practical because it may be highly disruptive, costly, and it would yield results that are not repeatable. Simulation techniques help to overcome these shortcomings assessing cost-efficiency and profitability even under highly uncertain scenarios.*

*Our programs are committed to provide relevant, up-to-date, research based, and field tested decision aids to farmers and Extension agents. We estimate that thousands of people visit our webpage at: <http://www.uwex.edu/ces/dairymgt/> every month and use our information and tools on practical dairy farm decision-making.*

**G. LEVERAGE** *(dollars and other resources – because of your work in this project you've been able to leverage resources from what other sources, amounts?):*

**Awarded**

Cabrera, V.E. Development of a Dairy Economic Decision Support System for Wisconsin. 07/01/08-06/30/10. USDA Hatch. \$54,532.

**Pending**

Cabrera, V.E., Gould, B.W. Assessment of gross margin insurance versus traditional price risk management strategies. 10/01/09-09/30/11. Hatch Interdisciplinary Multistate. \$58,430.

Cabrera, V.E., Shaver, R., Jones, B. Improving dairy farm sustainability through strategic alternatives to corn grain feeding. 9/1/09-8/31/11. NCR-SARE. \$129,704.

Cabrera, V.E., Shaver, R., Jones, B. Improving dairy farm sustainability through strategic corn grain feeding. 01/01/09-12/31/09. UW-Madison Graduate School. \$46,807.

Gould, B.W., Cabrera, V.E. The Use of Gross Margin Insurance versus Traditional price risk management strategies by Wisconsin dairy farm operators: Development of web-based decision tools. 01/01/09-12/31/09. UW-Madison Graduate School. \$40,000.