Project title: Management Systems to Improve the Economic and Environmental Sustainability of Dairy Enterprises (Rev. NC-119)

Period Covered: October 2006 through September 2007

1. Station Reporting:
New Mexico Cooperative Extension

2. Personnel reporting from experiment station: Names
Victor E. Cabrera

3. Accomplishments and Impacts under each Objective/ sub-objective.

Objective 1: Develop and integrate decision support systems to promote efficient, environmentally sound, and economically viable management systems for dairy young stock.

Sub-objective 1A. To enhance the understanding of nutrient requirements of young calves and growing dairy heifers and identify nutritional strategies that maximize the efficient use of dietary nutrients and reduce excretion into the environment.

Enter accomplishments and usefulness of findings here for this sub-objective:
Opportunities to improve nutrient management in grazing systems for young stock can be assessed through a computer application (N-Grazing) to balance N in young stock grazing systems. N-Grazing is a spreadsheet that uses standard book values and local information to determine carrying capacity and amount of N depleted in grazing systems. The application is available through http://dairy.nmsu.edu: Tools.

Enter IMPACTS here for this sub-objective (specific and quantified):
Environmental consultants that serve 75% of dairy producers in New Mexico are using the application for planning and reporting purposes. Some of these consultants are also using the application with clients in other states. The New Mexico Environment Department is still reluctant to endorse and promote the application, but accepts its predictions on farmer’s individual basis.

Objective 2: To develop strategies and systems to optimize utilization, economic returns, and environmental goals for management of dry, pregnant and lactating dairy cows.
Sub-objective 2B. To address environmental challenges of dairy production and determine strategies to achieve environmental goals.

Enter accomplishments and usefulness of findings here for this sub-objective:
Substantial seasonal variability on manure excretion for whole farm dairy farms systems has been found. Opportunities exist to better recycle nutrients and utilize manure through on-farm management practices. A dynamic, stochastic application has been created to assess seasonal manure excretion and test best management practices. This application is in addition a baseline model to build extra dairy modules to better assess economic and environmental impacts of dairy farm systems. The application is available through http://dairy.nmsu.edu: Tools.

Enter IMPACTS here for this sub-objective:
General assessment studies on manure utilization in the state of New Mexico have been accomplished using the application. Most of these analyses focus on the seasonal and spatial availability of manure for bioenergy purposes and the capacity of enhance New Mexico’s rangelands by manure application along with their economic implications.

Sub-objective 2C. To develop and expand financial, production, and management databases, perform financial analysis, and integrate data information into decision support systems to optimize efficiency of dairy management systems.

Enter accomplishments and usefulness of findings here for this sub-objective:
Adapted and developed a framework to create a decision support system to optimize dairy farm risk management strategies under uncertain conditions of price and production performance. Developed a framework to calibrate DSSAT crop simulation models and integrate them with other dairy farm system components to analyze whole dairy farm systems. Developed a framework to create a universal nutrient management plan for record keeping and reporting to state and federal agencies. Analyzed field experiments on irrigated alfalfa for New Mexico conditions. Results are compiled in a user-friendly application that predicts probabilistic alfalfa yields according to user defined parameters. The application is available through http://dairy.nmsu.edu: Tools.

Enter IMPACTS here for this sub-objective:
Dairy producers and their consultants are providing information and facilities to develop the frameworks outlined above, which are under consideration for competitive grant funding. The alfalfa yield predictor is being used by farm producers who provide hay to the dairy industry in New Mexico.

4. Publications and Software:
Enter All Publications and Software (2002-2007) associated with this project; everything that’s been produced whether peer-reviewed/refereed or not; include Extension outcomes, as well as research):

Refereed


Extension


Proceedings


Software


5. Leverage associated with NC-1119:

