CONSERVATION INNOVATION GRANTS
Final Report

Grantee Name: Maryland Department of Agriculture
Project Title: Demonstration of Management Intensive Grazing Systems for Dairy Production
Period Covered by Report: October, 2005 – September, 2010

Executive Summary:

The project's main objective was to demonstrate environmental benefits to water and soil quality and grassland health using management intensive grazing (MIG) systems for dairy production. Planned outcomes were to provide technical assistance to a total of eight (8) producers to assist them in transitioning to MIG during three years period in Frederick and Washington counties and utilize "cost of conversion" incentive payments in place of traditional per practice cost share to address the need for flexibility in the site specific design and adaptation of conservation components. Eligible conservation components funded with the cost of conversion incentive include pasture establishment and enhancement, fencing, and watering systems. Technical support was to be provided by a network of resource conservation staff and University of Maryland Extension staff. The project also included forage trials to analyze nutrition and nutrient uptake potential of different forage varieties to support continued improvement of forage nutrition and evaluation of nutrient management benefits of grazing systems.

Work Performed

At the initiation of the project a $200 per acre incentive was offered to producers interested in transitioning their dairy operations to grazing systems. Part-time technical assistance dedicated to targeting delivery of this project, MIG system design and technical assistance related management was central to the success of this project. The original project targeted two counties. Eligibility was expanded to a third county midway into the project. The project was extended from three years to five years and the per acre incentive increased to $300 from federal fiscal years 2008-2010.

Sixteen producers enrolled in the project, under eighteen contracts. The details are summarized in the chart below:

MIG Enrollment

MIG SUMMARY			
County	**Contracts**	**Acres**	**Funding**
Washington	8	303.4	$72,350
Frederick	6	278.3	$75,360
Carroll	4	207.0	$62,100
TOTAL	**18**	**788.7**	**$209,810**

Evaluation/Lessons Learned

Although the original concept was to fully convert eight operations, we found producers typically are not comfortable with commitments that require conversion of their entire operation to management intensive grazing. The majority of participants elected to convert a percentage of their acreage to grazing to try out the new management system. Two producers expanded their acreage to incrementally convert the remainder of their operations once becoming familiar and confident in the MIG system requirements and benefits.

An element of the project was to conduct surveys to better understand outcomes of MIG conversion and producer opinions about the advantages and issues. Evaluations were conducted after the MIG system was implemented and operational for 1-2 years. Results from all the completed evaluations were collated to examine patterns in outcomes.

On average, participants had 125 cows and approximately 60-70 heifers. There are 789 acres under MIG contract. On average contracts were for 44 acres. Most producers did not have cows on pasture prior to project participation. For those that previously utilized pasture, it was for an average of 5 days. The pasture area after participation averaged 3 acres and cows were rotated after 24 hours.

Participants rated improvements to animal health as significant based on decreased illnesses, veterinary visits for injury, veterinary expenditures, and expenditures on medication. Participants also noted reduced expenditures for feed and fertilizer. Most changed their forage species composition and noted improved pasture productivity and reduced erosion.

Farmers indicated that they would not have tried MIG without the incentive payment for cost of conversion. Cost share availability was also an important factor in decision to convert to MIG. Participants were pleased with the results, expressed an interest in continuation of the management system and said they would recommend MIG to other farmers.

Summary of conservation achieved

Carroll County	Acres Converted	Tons/Ac/Yr Soil Saved*	Total Tons Soil Saved/ Contract Year	Stream Fencing (LF.)	Heavy Use Area Protection (Ac.)	Permanent Watering Facilities	Permanent non-stream fencing (LF.)
Farm A	85.0	3	255	5200	0.2	3	9800
Farm B	58.0	3	174	0	0	0	9450
Farm C	27.0	4	108	3280	0	0	6650
Farm D	37.0	3	111	1500	1.2	0	11250
Frederic County	**Acres Converted**	**Tons/Ac/Yr Soil Saved***	**Total Tons Soil Saved/ Contract Year**	**Stream Fencing (LF.)**	**Heavy Use Area Protection (Ac.)**	**Permanent Watering Facilities**	**Permanent non-stream fencing (LF.)**
Farm E	24.0	4	96	0	0	0	0
Farm F	57.3	4	229.2	0	0	0	5388
Farm G	90.0	4	360	0	0.83	5	2355
Farm D	47.0	4	188	0	0	0	0
Farm F	30.0	8	240	0	0.53	1	5400
Farm G	30.0	4	120	1992	0	2	5400
Washington County	**Acres Converted**	**Tons/Ac/Yr Soil Saved***	**Total Tons Soil Saved/ Contract Year**	**Stream Fencing (LF.)**	**Heavy Use Area Protection (Ac.)**	**Permanent Watering Facilities**	**Permanent non-stream fencing (LF.)**
Farm H	20.7	1.4	28.98	1180	0	0	0
Farm H	18.0	1.4	25.2	0	0	0	0
Farm I	60.0	3.4	204	0	0	0	0
Farm J	31.0	1	31	0	0	0	0
Farm K	75.0	0.3	22.5	0	0.3	0	8900
Farm K	29.5	0.3	8.79	0	0	0	0
Farm L	23.4	1.3	30.42	0	0.2	1	3150
Farm M	46	2.3	105.8	0	0.3	0	0
Totals	788.7		2337.9	13152	3.6	12	67343
*Calculated using RUSLE2 both prior & after MIG conversion							

Economic comparison: confined and grazing dairy operations

Although not an element or deliverable of this project, University of Maryland Extension Regional Farm Management Specialist Dale Johnson has been providing farm expense summary information for the past 16 years. As per his most recent summary of 32 farms, there were 19 confinement farms and 13 grazing farms. Although not all our new farms are part of this analysis, it does provide a snapshot of the differences between grazing and confinement operations in the state. Participation in the survey is voluntary so the data may not reflect the entire dairy population. The most current summary reflects the market years 2007 through 2009. A rolling three year average is used to eliminate the fluctuations in milk prices from year to year. From 2007 to 2009, the grazing farms averaged 93 cows producing 13,200 pounds of milk per cow. This compares to 147 cows and 20,500 pounds of milk from the confinement herds. Total income per cow per year on the grazing farms was $1,255 less than the confinement herds. However, the grazing farms total expenses per cow were $1,387 less, resulting in a $452 and a $584 net profit per cow for the confinement and the grazing herds respectively or a $132 per cow advantage for the grazing operations.

Since the grazing operations ship less milk per cow, it is important to look at the income and expenses on a per hundredweight (cwt) basis as well as per cow. This allows for a better comparison of grazing and confinement operations. As with the per cow numbers, the grazing operations had the advantage on a cwt basis as well. Profit per cwt was $2.20 and $4.46 for the confinement and grazing farms respectively.

Outreach and Education

A broad array of activities and educational materials were included to promote the project and interest dairy farmers in MIG.

Twenty-eight (28) pasture walks were held on farms that had adopted MIG throughout the project period and in each of the counties. Attendance at each walk ranged from 20-55 producers. Producers came from Pennsylvania, West Virginia, Virginia and New York as well as Maryland

A factsheet was developed to promote the project and provide basic information about eligibility for the project and MIG benefits to the producer. This factsheet was regularly updated as new information was available and if project changes occurred. It was distributed through a number of channels including agri-businesses in Washington, Carroll & Frederick counties, Washington, Carroll & Frederick Soil Conservation Districts & NRCS offices, Washington, Carroll & Frederick county FSA offices and county committees, Washington, Carroll & Frederick Cooperative Extension office, Mid Atlantic Farm Credit and Hagerstown Livestock yards as well as during events.

During the latter years of project grazing group meetings were held in each of the three participating counties to allow participants to share information and learn from each other.

A display promoting the project and explaining benefits of MIG was developed and used throughout the project period at field days, pasture walks, county fairs and winter agricultural meetings.

Press releases and feature articles were also used to promote the successes of the project and MIG as an innovative conservation measure throughout the project period.

An informational booklet highlighting producers in the MIG program was developed and printed.

Additional presentations about MIG were made to visiting groups from other states and countries.

Forage Trials

The Maryland Cooperative Extension Dairy and Agriculture Agents in Frederick and Washington Counties have been conducting forage variety trial work on improved forage species since 1999. Annual and multi-year studies have been conducted depending on species.

The CIG project supported a new seeding of perennial plots which was established in September 2006. The plots consisted of 27 perennial varieties (eight fescue, six orchardgrass, one meadow fescue, five bromegrass, four perennial ryegrass, and three festulolium), and 20 annual varieties (seven Italian ryegrass, 10 annual ryegrass, and three small grain). These plots were planted at the Western Maryland Research and Education Center (WMREC) in a block design with four replications per variety. Plot area was three feet by 15 feet. Seeding was done into a tilled seedbed using a broadcast Carter Manufacturing cone unit planter with Brillion cultipacker rollers in front and behind the dropped seeds.

Soil tests were taken at the beginning and throughout the trial. Lime, phosphorous and potassium where not needed during the study period. Nitrogen was applied prior to seeding at a rate of 50 lbs. per acre. A nitrogen application of 200 lbs. per acre was be applied during each of the harvest seasons (2006-2009) in 50 lb. increments at approximately mid-March, early May, early June, and early September.

To simulate management intensive grazing (MIG), the grasses were harvested when six to eight inches tall. Each species was planted in a block to allow management of the grasses by species. A uniform cutting height of three inches was used for the annual ryegrass, cereal grains, fescue and orchardgrass. A cutting height of two inches was used for perennial ryegrass. A flail-type harvester with a 36-inch cutting width was used to harvest. The harvester was designed and built by the University of Wisconsin Experiment Station, and is powered by a John Deere F915 tractor. Plots were harvested as frequently as necessary to simulate an operating farm grazing schedule based on grass growth. Due to differences in moisture conditions each year, there were seven cuttings in 2007, six cuttings in 2008 and four cuttings in 2009.

The total wet grass sample from the 45 sq ft. harvest area was weighed in the field. A subsample of approximately 400 grams was collected from each sample and frozen. These subsamples were dried at 70°C for 72 hours at the Central Maryland Research and Education Center. Dry matter yields were calculated on a per acre basis. Samples were analyzed using wet chemistry for protein, fiber and minerals to determine the nutrient value as well as the nutrient uptake of each variety and specie.

Preliminary analysis of the orchardgrass data showed significant differences between varieties for many of the tested traits by year, but they were not consistent year to year. There were trends for yield by species with the traditional hay type species being higher than the new grazing varieties for two of the three years. Fiber digestibility was also consistent year to year. However, unlike the yield, the traditional hay-type orchardgrass species were mixed in their NDF30 levels with Haymaster being the most digestible and Pennlate being the least digestible each year. Phosphorus levels in the tested orchardgrass varieties showed differences between varieties, but the rankings differed by year. Haymaster tested consistently higher than any other variety for

potassium each year. The rankings of the calcium to phosphorus ratio was consistent year to year for each of the orchardgrass varieties tested. Preliminary analysis of the data of the tall fescue varieties showed significant differences for many of the tested traits each year but the rankings varied year to year.

Data will continue to be analyzed in more detail and the results will be reported at the National Association of County Agricultural Agents Annual Meeting and Professional Improvement Conference to be held in Overland Park, Kansas in August 2011. Extension Fact Sheets will also be developed for each of the tested species and made available to producers and interested parties via University of Maryland Extension web sites, during pasture walks, and other producer meetings.

Outcomes/Recommendations

Project success was a direct outcome of having a staff member dedicated to providing outreach and technical assistance to assure project outcomes were achieved.
Historically, the Conservation Partnership in Maryland (Local Soil Conservation Districts, Maryland Department of Agriculture, USDA, Natural Resource Conservation Service and University of Maryland, Extension) have taken the approach of utilizing their full complement of staff resources to impart information and provide assistance for an array of available programs and practices. There are efficiencies related to travel time and number of possible contacts to be gained from this approach and it addresses the reality of a limited number of positions available regardless of current programs requiring delivery. **This project affirms that promotion of a new program or management method is best achieved through targeting or dedicating specific staff to associated project goals.**

Adoption of new conservation practices and participation in new programs is accelerated or enhanced by broadening eligibility criteria and maintaining the flexibility to tailor the program to respond to producer objectives, site conditions and regional variations.
The demonstration was established to simplify adoption by utilizing a "cost of conversion" incentive payment in place of traditional per practice cost share to address the need for flexibility in the site specific design and adaptation of conservation components. Eligible conservation components funded with the cost of conversion incentive included pasture establishment and enhancement, fencing, and watering systems. Conversion payments were made available immediately, so producers did not have out of pocket expenses for these management elements necessitating re-imbursement from cost share after implementation was completed. The conversion payment also assisted in the costs associated with modifying herd composition. **This project justifies the use of a conversion payment for new or innovative conservation measures that require re-tooling of farm management systems.**

Establishing a system of mentors or peers who have utilized and adapted new or innovative conservation measures boosts success and confidence in new adopters.
Although not part of the CIG project, a complimentary demonstration project funded through the granting agency Chesapeake Bay Trust began in 2007. The purpose was to establish a network of mentors who had experience with management intensive grazing to answer questions and act as advisors to producers interesting in transitioning to MIG. These two projects provided a good

compliment to each other and amplified the success of both. **Demonstration projects may benefit from the use of early adopters as mentors and this element should be eligible as part of a CIG project.**