Nutrient and Waste Management

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V(A). Planned Program (Summary)

1. Name of the Planned Program

Nutrient and Waste Management

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	20%		20%	
102	Soil, Plant, Water, Nutrient Relationships	15%		10%	
133	Pollution Prevention and Mitigation	20%		20%	
205	Plant Management Systems	15%		10%	
403	Waste Disposal, Recycling, and Reuse	30%		30%	
601	Economics of Agricultural Production and Farm Management	0%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	1.8	0.0	1.2	0.0
Actual	2.9	0.0	1.1	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
58337	0	52708	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
58337	0	52708	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
72149	0	359217	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The University of Idaho developed Extension Bulletin (CIS 1138) Dairy Ammonia Control Practices.Producers then selected which BMPs were installed or implemented on the farm and were subsequently reviewed for compliance by the Idaho Department of Agriculture.

In 2006 and 2007, the University of Idaho took leadership in presenting the Dairy Air Quality Symposiums, sponsored by the Western States Dairy Products Trade Association.

In cooperation with Iowa State University, University of Idaho, Purdue University, Michigan State University, University of Tennessee and the USDA- Natural Resources Conservation Service a comprehensive Nutrient Management Planning (CNMP) Training Curriculum was developed to educate NRCS personnel and private individuals interested in becoming USDA Technical Service Providers. As part of this comprehensive, multi-disciplinary educational program, two hour-long training curricula (Air Quality Issues and Air Quality Technologies) were developed, peer-reviewed and published to educate participants on the air quality issues and control technologies that are available to livestock operations across the country. During the 3-year project, over 500 technical service providers, and 300 NRCS personnel were trained representing all 50-states, and 5 countries. The curriculum has been published through the Midwest Plan Service for open dissemination to the state universities, livestock companies and the public.

In 2006, an NRI funded project entitled "Air Quality Extension and Education: Enhanced Learning Opportunities for Addressing Air Quality Issues in Animal Agriculture" was funded and initiated to develop a comprehensive extension and classroom educational curriculum. The curriculum, developed and peer-reviewed, by experts across the country, focuses on air quality issues, air quality monitoring and reporting, air quality modeling and air quality control technologies. The curriculum will be pilot tested in graduate classrooms at 5 universities across the country, including the University of Idaho, as well as used as part of extension programs across the Pacific Northwest.

In 2006 and 2007, the University of Idaho took leadership in presenting the Dairy Air Quality Symposiums, sponsored by the Western States Dairy Products Trade Association. In 2006, the Symposium brought together researchers, extension personnel, and dairymen from across the country who is investigating air quality issues on dairies. The Symposium allowed for networking and discussion on how to address many dynamic issues facing the dairy industry. In 2007, the Symposium was expanded to include state and federal regulators in the discussion. During the 2006 Symposium 110 people attended and in 2007 there were 150 participants. As a direct result of the collaborative intention of the Symposium, several research and extension programs have been initiated. In Idaho the Western SARE funded educational program ""Dairy Odor and Air Quality Educational Program" and the research program "Investigation of Area Source Measurement Techniques for Ammonia" has been initiated with cooperation from the University of Idaho, USDA-Agricultural Research Service, the Idaho Department of Environmental Quality, Utah State University - Civil Engineering and the Utah Space Dynamics Laboratory. The project will quantify the differences between various ammonia monitoring techniques conducted simultaneously at the same large scale dairy lagoon in south-central Idaho. This information will greatly assist engineers, scientists and regulators understand the inherent differences in open-space gaseous measurement on diaries.

Several additional funded research projects focused on optimal use of fertilizer applications and use of microbial communities for remediation of contaminants from the environment. These projects emphasized graduate student training and interdisciplinary research.

2. Brief description of the target audience

Producers and Processors
Professional Consultants
The public affected by NWM issues
Local and/or state officials
Basic and applied research scientists

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	500	750	20	20
2007	2713	0	760	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year	Target
Plan:	0
2007:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	13	3	16

V(F). State Defined Outputs

Output Target
Output #1

Output Measure
NWM Conference.

Year	Target	Actual
2007	0	0

Output #2

Output Measure
NM Field Day.

Year	Target	Actual
2007	1	0

Output #3

Output Measure
NWM Training and Recertification.

Year	Target	Actual
2007	40	0

Output #4

Output Measure
Odor Workshops.

Year	Target	Actual
2007	50	150

Output #5

Output Measure
CCA Credits, Online Testing.

Year	Target	Actual
2007	20	0

Output #6

Output Measure
Precision Ag Field Day.

Year	Target	Actual
2007	1	0

Output #7

Output Measure
CID Training.

Year	Target	Actual
2007	40	0

Output #8

Output Measure
Industrial and Municipal Land App. Training.

Year	Target	Actual
2007	100	0

Output #9

Output Measure
R&E Center Field Days.

Year	Target	Actual
2007	1	15

Output #10

Output Measure
Commodity Schools.

Year	Target	Actual
2007	700	561

Nutrient and Waste Management
Output #11

Output Measure

MiG Workshops.

Year	Target	Actual
2007	40	35

V(G). State Defined Outcomes

O No.	Outcome Name
1	O: Sufficient certified people to make irrigation designs that improve fertilization and irrigation efficiency.I: Number of People passing CID exam.
2	O: Sufficient certified people to make irrigation designs that improve fertilization and irrigation efficiency.I: Number of people attending teaching and review sessions.
3	O: Sufficient certified people to make irrigation designs that improve fertilization and irrigation efficiency.I: (Behavior) Number of approved plans by graduates.
4	O: More people with sufficient skill to write plans.I: Number of people certified.
5	O: Improve understanding of NMP principles.I: Percent adoption of NMP practices by course attendees.
6	O: Improve understanding of NMP principles.I: Reduced NMP violations from yearly survey.
7	O: Reduce risk of lagoon discharges.I: Reduced number of discharges or freeboard conditions based yearly survey.
8	O: Use of UI recommendations in NM Planning.I: Integration of UI nutrient recommendations into OnePlan Software.
9	O: Use of UI publications in planning and education.I: Number of publications downloaded/accessed.
10	O: Use of UI publications in planning and education.I: Number of publications developed.
11	O: Pasture managers will understand benefits of proper NM.I: Number of students attending workshop.
12	O: Pasture managers will understand benefits of proper NM.I: Number of students adopting soil testing (survey).
13	O: Pasture managers will understand benefits of proper NM.I: Number of students adopting MiG.
14	O: An increase in the number of trained graduate students prepared to enter the workforce. I: Number of M.S. and Ph.D. candidates relevant to this topic team.
15	O: Producers implementing Precision Ag technologies.I: Number of growers attending PA educational events.
16	O: Producers implementing Precision Ag technologies.I: Percent of growers using PA technologies (survey).
17	O: Producers implementing Precision Ag technologies.I: Percent of acres farmed using PA Technologies.
18	O: Improve application of odor and emissions control principles.I: Percent adoption of odor and emissions control practices by course attendees.
19	O: Improve access and convenience of online CCA Testing.I: Number of credits awarded.
20	O: Reduced nutrient levels in soil and water.I: Reduced average soil and water test values in sensitive areas.
21	O: Improve water and N use efficiency under reduced water conditions.I: Number of People attending UI extension classes at beet school.
22	O: Improve water and N use efficiency under reduced water conditions.I: Improvement in Water and N use efficency.
23	O: Improve odor control of lagoons.I: Reduce number of spring odor complaints.

Nutrient and Waste Management
Outcome #1

1. Outcome Measures

Not reporting on this Outcome for this Annual Report

2. Associated Institution Types

3a. Outcome Type:

3b. Quantitative Outcome

Year	Quantitative Target	Actual

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area

V(H). Planned Program (External Factors)

External factors which affected outcomes

Natural Disasters (drought,weather extremes,etc.)
Economy
Public Policy changes
Government Regulations
Competing Public priorities
Competing Programmatic Challenges
Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

The Nutrient and Waste Management Team experienced significant turn-over during 2007, including resignation of the team leader and hiring of several new faculty to participate on the team.The outcomes and indicators have been significantly restructured to allow for more collaborative reporting tthan was possible with the previous plan.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

After Only (post program)

Evaluation Results

During the 2006 Symposium 110 people attended and in 2007 there were 150 participants. As a direct result of the collaborative intention of the Symposium, several research and extension programs have been initiated. In Idaho the Western SARE funded educational program ""Dairy Odor and Air Quality Educational Program" and the research program "Investigation of Area Source Measurement Techniques for Ammonia" has been initiated with cooperation from the University of Idaho, USDA-Agricultural Research Service, the Idaho Department of Environmental Quality, Utah State University - Civil Engineering and the Utah Space Dynamics Laboratory.

Our first outcome was to raise onion growers' awareness of the benefits of using proper irrigation scheduling and fertility practices. We have made significant progress toward this outcome by employing field demonstrations, making presentations at commodity schools, writing publications, and visiting with growers and crop consultants.

There are several areas where we are seeing additional outcomes. We have seen increased water use efficiency (WUE), increased nitrogen use efficiency (NUE) and yield increases. Increased efficiencies mean more yield per unit of applied water and nitrogen. For example, in 2007 the drip irrigated onion field yielded 30.8 Cwt per inch of water per acre, while on the furrow irrigated field the average WUE value was 20.2. The yield response came from growers' awareness of when to irrigate to meet the onion crop's water needs which was made possible by using soil moisture monitoring and datalogging equipment.

Key Items of Evaluation

An ex post-facto review, conducted by the University of Idaho, of the first-year on-farm inspections found that 95% of all permitted dairies were in compliance with the Rule, with an average of 32.9±6.1 points of BMPs exceeding the 27 points required.Solid separation of manure, corral harrowing, low pressure irrigation, composting and rapid manure removal from outdoor lots were found to be the most common BMPs.Results of this study were presented to the Idaho Dairymen's Association, the DEQ and Idaho Department of Agriculture, at an international ammonia management conference in The Netherlands, and have been submitted for peer-review publication.