

V(A). Planned Program (Summary)

Program # 11

1. Name of the Planned Program

Climate Change: Soil, Water, Waste and Air Management.

Reporting on this Program

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	10%		15%	
102	Soil, Plant, Water, Nutrient Relationships	10%		15%	
111	Conservation and Efficient Use of Water	10%		15%	
132	Weather and Climate	10%		10%	
133	Pollution Prevention and Mitigation	15%		5%	
205	Plant Management Systems	10%		10%	
307	Animal Management Systems	5%		10%	
312	External Parasites and Pests of Animals	0%		5%	
403	Waste Disposal, Recycling, and Reuse	15%		5%	
405	Drainage and Irrigation Systems and Facilities	10%		5%	
601	Economics of Agricultural Production and Farm Management	5%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	5.0	0.0	7.0	0.0
Actual Paid Professional	6.7	0.0	6.7	0.0
Actual Volunteer	0.0	0.0	0.0	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
281342	0	513479	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
281342	0	513479	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
246457	0	2504509	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The Soil, Water, Waste and Air Management team is highly integrated, participating in active projects to discover new knowledge, demonstrate and transfer new technologies, and work to understand local variants that impact resource-based enterprises and the environment. Research activities include comprehensive groundwater studies, field and greenhouse experiments to understand the effects of various compounds in dairy waste water on soils and crops, plant responses to organic nutrients, and composting of farm waste. This work has resulted in a variety of scientific journal publications and a book chapter, professional presentations and reports. New anaerobic digestion systems and biofilters have been developed and used for demonstrations during tours and field days. Field demonstrations help growers and other stakeholders understand local conditions related to nitrogen uptake and fertilizer efficiency, use of cover crops and green manures, water quality monitoring, on-farm composting, manure application, and recycling.

Public issues education about topics such as the Cooperative Conservation Initiative Program, water quality issues, zoning issues, and many others becomes the subject matter for Soil, Water, Waste, and Air team outreach. Applied activities have been shared through a host of workshops and classes and numerous field days and tours. Faculty have produced an array of refereed and Extension publications, web-based fertilizer guides and nutrient management resources. Much of the Extension faculty's work is made possible through collaborations and participation on various citizen and professional alliances concerned with environmental quality and agricultural sustainability.

Extension hosted the Idaho Nutrient Management Conference for the fifth consecutive year. Certified graduates of the master water stewards program "IDAH₂O" attained sufficient knowledge and skill to serve as volunteers in collaborative watershed-scale research projects, while gathering water quality information for their communities. ~

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2. Brief description of the target audience

- Producers and Processors provide input and feedback about programs, cooperate on demonstration trials and research, and participate in educational programs
- Professional Consultants provide input and feedback about programs, cooperate on demonstration

trials and research, and participate in educational programs.

- The public affected by Nutrient and Waste Management (NWM) issues provide input and feedback about programs and participate in educational programs.
- Local and/or state officials who either develop or implement rules and regulations related to nutrient management.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	7010	98330	1105	539

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

Patent Applications Submitted

Year: 2012
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	5	55	60

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Educational workshops, seminars and presentations to producer groups: number of events.

Year	Actual
2012	89

Output #2

Output Measure

- Applied and basic laboratory and field research experiments, number of projects

Year	Actual
2012	16

Output #3

Output Measure

- Newsletters distributed (number of issues) and number of articles submitted for other newsletters

Year	Actual
2012	23

Output #4

Output Measure

- Tours and Field Days

Year	Actual
2012	20

Output #5

Output Measure

- Research and demonstration projects

Year	Actual
2012	22

Output #6

Output Measure

- Professional development credits awarded for participation in courses

Year	Actual
2012	33

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Growers use best practices for water, pesticide, nutrient, or waste management. I: Number of program participants indicating adoption of recommended practices (follow-up survey data) or indicating intention to adopt recommended practices (post-program questionnaire)
2	Producers are aware of issues and knowledgeable of practices that affect the environmental and economic sustainability of crop production. I: Percent of participants reporting that their knowledge had been increased because of their participation in program.
3	Producers are better able to manage pests, nutrients, waste, irrigation systems while protecting water, air, and-or soil resources. I: Number of pest management, nutrient management, waste management, irrigation management plans written with producers.
4	Plant-Soil Feedbacks in Forested and Agricultural Ecosystems
5	Optimizing Biological Processes for Use in Remediation and Biotechnology

Outcome #1

1. Outcome Measures

Growers use best practices for water, pesticide, nutrient, or waste management. I: Number of program participants indicating adoption of recommended practices (follow-up survey data) or indicating intention to adopt recommended practices (post-program questionnaire)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	106

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Gooding County CAFO issue with sturgeon farm. Water quality and number of animal units. Permitted for 30,000 they want 200,000. Neighbors oppose because of WQ concerns. Planning and Zoning contacted University of Idaho to mediate between neighbors, fish farm and to write a report of recommendations.

What has been done

Several site visits were made to evaluate situation. Visit with all parties and P&Z. Produced and submitted report: Report of recommendations for improved water quality regarding modification of existing aquaculture CAFO at the Awalt Family Revocable Trust, Bliss Idaho. Answered questions at public hearing.

Results

Sturgeon farm gets permitted for 175,000 animal units. Required to implement waste management recommendations in UI report. Improved water quality will result. Economic impact of increased animal units from 30K to 175K: caviar = \$3,480,000; meat = \$199,400

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water

132	Weather and Climate
133	Pollution Prevention and Mitigation
205	Plant Management Systems
307	Animal Management Systems
403	Waste Disposal, Recycling, and Reuse
405	Drainage and Irrigation Systems and Facilities
601	Economics of Agricultural Production and Farm Management

Outcome #2

1. Outcome Measures

Producers are aware of issues and knowledgeable of practices that affect the environmental and economic sustainability of crop production. I: Percent of participants reporting that their knowledge had been increased because of their participation in program.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	276

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Pesticide applicators are required to attend 6-15 hours of continuing education to retain their certification and license. This audience is available to learn best management practices to protect human health and the environment from the use of pesticides. Pesticides remain a very important tool to sustainable food production.

What has been done

A variety of topics are presented at pesticide recertification classes to ensure the best and useful information is brought forward to current applicators. Topics such as understanding pesticide labels, environmental protection, personal safety, and best methods for pest control are presented.

Results

Post class evaluations were conducted for three pesticide recertification classes. From those programs 92% of class participants indicated their knowledge of pesticide use and safety

increased as a result of the class.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
132	Weather and Climate
133	Pollution Prevention and Mitigation
205	Plant Management Systems
307	Animal Management Systems
403	Waste Disposal, Recycling, and Reuse
405	Drainage and Irrigation Systems and Facilities
601	Economics of Agricultural Production and Farm Management

Outcome #3

1. Outcome Measures

Producers are better able to manage pests, nutrients, waste, irrigation systems while protecting water, air, and-or soil resources. I: Number of pest management, nutrient management, waste management, irrigation management plans written with producers.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Plant-Soil Feedbacks in Forested and Agricultural Ecosystems

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Invasive species pose a threat to the sustainability of agriculture and timber production in Idaho. This research focuses on gaining a better understanding of plant-soil feedbacks and how they may contribute to the success of invasive species and be utilized to design more sustainable agroecosystems.

What has been done

Changes in how vegetation have influenced soil macroinvertebrate communities and the influence of composted dairy manure on plant available nitrogen in eroded and non-eroded agricultural soils was investigated.

Results

Overall impacts include new knowledge available for land managers dealing with invasive species. The most important impact of this work is improved knowledge of how a common invasive fern may influence tree nutrition and growth.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

Outcome #5

1. Outcome Measures

Optimizing Biological Processes for Use in Remediation and Biotechnology

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Optimization of biological processes can produce economic advantage when applied to biotechnological processes such as waste treatment or remediation. The research examines biological process optimization through the use of several mathematical techniques including

random search, hill-climbing, local search and genetic algorithms.

What has been done

Methodologies were developed during this project and included: 1) A computer-based code for implementing Genetic Algorithms (GA) within the context of microbiological experiments, 2) A spectrophotometric high through-put method to analyze for perchlorate in aqueous solution, and 3) A general approach for optimizing microbiological systems to perform a specified function, e.g. bioremediation of xenobiotic contaminants.

Results

Adoption of such a methodology may prove cost effective when compared to other remediation schemes and ultimately save on environmental cleanup costs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
403	Waste Disposal, Recycling, and Reuse

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Public Policy changes
- Government Regulations
- Competing Programmatic Challenges

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}