

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% | | 10% | |
| 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 | 10% | | 10% | |
| 205 | Plant Management Systems | 10% | | 15% | |
| 307 | Animal Management Systems | 10% | | 5% | |
| 312 | External Parasites and Pests of Animals | 0% | | 5% | |
| 403 | Waste Disposal, Recycling, and Reuse | 10% | | 5% | |
| 405 | Drainage and Irrigation Systems and Facilities | 10% | | 10% | |
| 601 | Economics of Agricultural Production and Farm Management | 10% | | 0% | |
| | Total | 100% | | 100% | |

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

| Year: 2013 | Extension | | Research | |
|--------------------------|-----------|------|----------|------|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 6.0 | 0.0 | 6.5 | 0.0 |
| Actual Paid Professional | 4.8 | 0.0 | 7.7 | 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 |
| 112828 | 0 | 396280 | 0 |
| 1862 Matching | 1890 Matching | 1862 Matching | 1890 Matching |
| 112828 | 0 | 396280 | 0 |
| 1862 All Other | 1890 All Other | 1862 All Other | 1890 All Other |
| 96171 | 0 | 3583451 | 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 irrigation efficiency, water use efficiency, cover crop and green manure, nitrogen release and mineralization rates, compost use and manure application studies. A wide variety of best practices are demonstrated on cooperator fields and are used for field days and tours. Field and greenhouse experiments help 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 led to the development of new anaerobic digestion systems and biofilters that are the focus for other field days and tours and have been communicated through professional journals.

Much of our educational effort relies on field demonstrations to 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. In addition, workshops, meetings, and classes provide education to youth and adult stakeholders on industry-critical topics as well as those topics that are relevant to communities and to individual stakeholders. Decision making tools such as fertilizer guides and calculators were created or revised during 2013.

The relatively new IDAH₂O program was delivered through a 10 workshops reaching about 80 stakeholders and resulted in a new cohort of IDAH₂O volunteers who are working with watershed-scale research and monitoring programs. Faculty participated in a range of multistate activities including the animal production climate change working group, and several efforts associated with the American Society of Agricultural and Biological Engineers. Extension hosted the Idaho Nutrient Management Conference for the fifth consecutive year.

2. Brief description of the target audience

- Producers, processors and professional consultants provide input and feedback about programs,

cooperate on demonstration trials and research, and participate in educational programs.

- The public affected by water and waste management 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 environmental quality.
- Homeowners
- Small landowners (including but not limited to: recreational properties, small tracts of forest land, seasonal lake homes, etc.)
- Natural Resource Professionals

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

| 2013 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---------------|------------------------|--------------------------|-----------------------|-------------------------|
| Actual | 10483 | 16490 | 1982 | 866 |

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

Patent Applications Submitted

Year: 2013
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

| 2013 | Extension | Research | Total |
|---------------|-----------|----------|-------|
| Actual | 10 | 6 | 16 |

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

| Year | Actual |
|-------------|---------------|
| 2013 | 45 |

Output #2

Output Measure

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

| Year | Actual |
|-------------|---------------|
| 2013 | 24 |

Output #3

Output Measure

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

| Year | Actual |
|-------------|---------------|
| 2013 | 35 |

Output #4

Output Measure

- Tours and Field Days

| Year | Actual |
|-------------|---------------|
| 2013 | 8 |

Output #5

Output Measure

- Professional development credits awarded for participation in courses

| Year | Actual |
|-------------|---------------|
| 2013 | 20 |

Output #6

Output Measure

- Professional presentations; number of invited and volunteer papers presented.

| Year | Actual |
|-------------|---------------|
|-------------|---------------|

2013

35

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|--------|---|
| 1 | Participants 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: Number 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 | 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. |

Outcome #1

1. Outcome Measures

Participants 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

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

| Year | Actual |
|-------------|---------------|
| 2013 | 67 |

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Due to more public pressure regarding pesticide use and water quality and endangered species impacts, producers want to learn what best management practices they can use, in their own situation, to reduce potential environmental impacts.

What has been done

One faculty member developed and presented a lesson at pesticide re-certification meetings that taught water quality BMPs for pesticide applicators. Elsewhere, Irrigation workshops were held teaching irrigation management & water relations. Knowledge gained and anticipated behavioral changes were measured in post-program questionnaires.

Results

An average of 50% of respondents indicated they would use at least one of the BMPs presented to protect water quality in their farming operation.

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: Number of participants reporting that their knowledge had been increased because of their participation in program.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

| Year | Actual |
|-------------|---------------|
| 2013 | 98 |

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. A variety of topics are presented at pesticide re-certification 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.

What has been done

Since applicators are required to attend these pesticide recertification classes, we utilize the opportunity to teach sustainable pesticide application practices, to protect the environment and human health. Post class evaluations were conducted at three classes.

Results

90 percent of attendees indicated in a post class evaluation, using turning point technology, that they learned a new idea to incorporate into their farming operation.

4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|----------------|-----------------------------|
| 101 | Appraisal of Soil Resources |

| | |
|-----|--|
| 102 | Soil, Plant, Water, Nutrient Relationships |
| 133 | Pollution Prevention and Mitigation |
| 205 | Plant Management Systems |
| 403 | Waste Disposal, Recycling, and Reuse |

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.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

| Year | Actual |
|-------------|---------------|
| 2013 | 104 |

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Soil fumigant management plans are now required by EPA regulations. The plans will help to protect the environment and bystanders from the effects of soil fumigant off-gassing and leaching.

What has been done

We collaborated with the State Department of Agriculture to develop and incorporate a soil fumigant management planner function into The OnePlan pesticide applicator record keeping program.

Results

Use of the fumigant module allows for electronic plans to be completed that fulfill the federal pesticide laws and regulations. It is assumed that an accurate and complete plan will help protect the environment and human health.

4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|----------------|--|
| 101 | Appraisal of Soil Resources |
| 102 | Soil, Plant, Water, Nutrient Relationships |
| 133 | Pollution Prevention and Mitigation |

| | |
|-----|--------------------------------------|
| 205 | Plant Management Systems |
| 403 | Waste Disposal, Recycling, and Reuse |

Outcome #4

1. Outcome Measures

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.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

| Year | Actual |
|------|--------|
| 2013 | 6 |

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

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 |
| 312 | External Parasites and Pests of Animals |
| 403 | Waste Disposal, Recycling, and Reuse |
| 405 | Drainage and Irrigation Systems and Facilities |

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Conducted a feed demonstration trial that evaluated alternative protein ingredients for trout diets. The plant-based and animal protein feed without fish meal supported survival, growth rates, and feed conversion ratios equivalent to the commercial control feed. This study demonstrated that fish meal protein is not necessary in trout feed, that fish meal levels in trout feeds can be reduced without impacting performance when suitable alternative protein ingredients are used, and that total protein can be reduced in trout feeds. A preliminary economic analysis suggests the experimental feeds are competitive compared to the commercial control feed. With the rapid rise in feed ingredient costs likely to continue for the foreseeable future and the finite source of fish meal, alternative ingredients have been identified as necessary to minimize feed cost.

Key Items of Evaluation