

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Natural Resources and Environment

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	5%		8%	
102	Soil, Plant, Water, Nutrient Relationships	15%		22%	
103	Management of Saline and Sodic Soils and Salinity	0%		1%	
104	Protect Soil from Harmful Effects of Natural Elements	0%		4%	
111	Conservation and Efficient Use of Water	0%		7%	
112	Watershed Protection and Management	0%		6%	
121	Management of Range Resources	80%		11%	
131	Alternative Uses of Land	0%		2%	
132	Weather and Climate	0%		3%	
133	Pollution Prevention and Mitigation	0%		4%	
134	Outdoor Recreation	0%		5%	
135	Aquatic and Terrestrial Wildlife	0%		20%	
136	Conservation of Biological Diversity	0%		5%	
141	Air Resource Protection and Management	0%		2%	
	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
Actual Paid Professional	4.3	0.0	49.1	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
232071	0	597397	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
232071	0	510255	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Field and Lab Research
- Collaborate with Other States
- Partner with South Dakota Game, Fish and Parks
- Partner with the South Dakota Grassland Coalition
- Partner with Business Organizations
- Collaborate with Non-profit Organizations
- Participate with the South Dakota State Climate Office
- Participate with the United States Army Corps of Engineers
- Conduct Training for Concentrated Animal Feeding Operations
- Partner with the South Dakota Department of Environment and Natural Resources
- Partner with the Natural Resources Conservation Service

2. Brief description of the target audience

- Wildlife and Fisheries Managers
- Scientists
- Environmentalists
- Outdoor Enthusiasts
- Farmers, Ranchers and Producers
- General Public
- Operators of Concentrated Animal Feeding Operations

3. How was eXtension used?

eXtension is not part of this Planned Program.

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	2522	930155	382	2722

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	1	26	27

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Percentage of all Hatch Research Projects in Natural Resources and Environment

Year	Actual
2013	20

Output #2

Output Measure

- Conducted Field Experiments to Determine the Impact of Adaptive Management Techniques on Carbon Sequestration and Energy Efficiency

Year	Actual
2013	0

Output #3

Output Measure

- Increase Rancher's Knowledge of Grazing Techniques and Grassland Management

Year	Actual
2013	0

Output #4

Output Measure

- Number of CAFOs Participants

Year	Actual
2013	57

Output #5

Output Measure

- Number of Publications Posted on iGrow Website

Year	Actual
2013	26

Output #6

Output Measure

- Number of Articles Posted on iGrow Website

Year	Actual
2013	167

Output #7

Output Measure

- Number of Podcasts Posted on iGrow Website

Year	Actual
2013	1

Output #8

Output Measure

- Number of Radio Programs Posted on iGrow Website

Year	Actual
2013	47

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of Natural Resources and Environment Hatch Research Projects
2	Increased Knowledge Relative to Carbon and Residue Management
3	Number of Grazing School Participants
4	Number of CAFOs Training Sessions

Outcome #1

1. Outcome Measures

Number of Natural Resources and Environment Hatch Research Projects

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	26

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

South Dakota has a wide diversity of natural resources that depend on maintenance and good stewardship of the land. Too much grazing, urban sprawl, the creation of reservoirs, plant invasion, feedlot runoff, global warming, as well as the growing world economy all contribute to the degradation of our natural resources.

What has been done

Within the College of Agriculture and Biological Sciences, there are 26 Hatch projects that are categorized in the Planned Program of Natural Resources and Environment. The research activities in this program are primarily supported by our Department of Natural Resource Management. Projects include but are not limited to research studies in carbon sequestration, ecosystems, wildlife habitat, climate change, soil productivity, water quality, bioenergy, and pollution prevention.

Results

Through research, our Department of Natural Resource Management continues to build a scientific knowledge base to improve and understand the management of natural resources in South Dakota. In addition, graduate students gain valuable knowledge and skills while collaborating on research projects. Notes of interest on results:

Rehabilitated soil plots show a 10-50 percent yield increase; US Army Corps of Engineers adopted change in managing Missouri River; Choice between greater short-term grain yields or longer-term carbon storage potential; Loss of CRP grasslands influence the ecology of White-Tailed deer fawns; Grasslands ecology enhanced with patch grazing and patch-burn grazing; Updated index values for rangeland plants in soil productivity calculations; Better understanding of weather condition changes impacting agricultural productivity.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
103	Management of Saline and Sodic Soils and Salinity
104	Protect Soil from Harmful Effects of Natural Elements
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
121	Management of Range Resources
131	Alternative Uses of Land
132	Weather and Climate
133	Pollution Prevention and Mitigation
134	Outdoor Recreation
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
141	Air Resource Protection and Management

Outcome #2

1. Outcome Measures

Increased Knowledge Relative to Carbon and Residue Management

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Feeding the world's population in 2050 will require 70% more food than is produced today. This is complicated by the projected decrease in available key resources, which means producing more for less. Failing to meet the world's food needs will have catastrophic implications. The agricultural community must address the situation immediately.

What has been done

During this reporting period, training was provided to under-graduate and graduate students, faculty, and farmers. Accomplishments include: assessment of factors contributing to gradual yield increases, the development of educational materials to help producers overcome production barriers, data sets were designed to quantify the impacts of management on carbon turnover, draft documents were developed that identify production benchmarks, and field research designed to reduce the impact of agriculture on environmental quality and improve profitability was successfully completed. Research findings were shared with farmers and results have been distributed to the general public through news releases, radio interviews, the development of educational materials, the development of scientific papers, organized meetings, and informal discussions.

Results

As this research project continues, the long-term goals will help farmers and ranchers improve energy efficiencies, increase resilience, sustainability and adaptability of agricultural systems, provide information to document carbon and energy footprints, and increase yield potential and overcome production barriers. The results of the project are critical to helping the world adapt to a changing environment while maintaining and increasing productivity of Northern Great Plains agriculture.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships

Outcome #3

1. Outcome Measures

Number of Grazing School Participants

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	30

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Grazing lands of the Northern Plains are recognized as one of the most threatened ecosystems globally. As these lands are predominantly privately owned and managed, principally for livestock production, secure and profitable ranching is vital to conserving this vital resource. A stated objective of the SD Grazing School is successful and profitable grazing based enterprises maintained with excellent resource management.

What has been done

In cooperation with the South Dakota Grasslands Coalition and several other entities, SDSU Extension has partnered in grasslands management training to more than 265 ranchers for the last 10 years. An additional 30 participants were trained in 2013. Ranchers participated in classroom presentations as well as hands-on activities in the field.

Results

The SD Grazing School enabled SDSU Extension to reach new participants and increase their knowledge with many topics, including managing diversity on rangelands, pasture allocation, holistic management, soil health and infiltration, and concepts of grazing. Other topics also include planning your own place and planning for a forage shortage.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
121	Management of Range Resources

Outcome #4

1. Outcome Measures

Number of CAFOs Training Sessions

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Large-scale livestock producers, known as Concentrated Animal Feeding Operations (CAFOs), create potential water and air quality conflicts for rural communities in South Dakota. There is a need for the development of these operations, but environmental laws must be followed and good will with neighbors is imperative for the sustainability of large operations. Any CAFO that is applying for a General Permit must attend the course.

What has been done

SDSU Extension, the South Dakota Department of Environment and Natural Resources, and the Natural Resources Conservation Service provide training three times a year for federal and state water pollution and control programs. The training sessions included topics on livestock production, manure management and land application practices. In addition, SDSU Extension Specialists discuss the management of nitrogen and phosphorus content of manure and air quality and odor.

Results

Approximately half of the participants were required to be at the training sessions and about half of them attended for the learning experience. We had a contingent of students from a local technical school also attend one of the session. The sessions represented approximately 17,945 animals in the beef industry, 6,260 animals in the dairy industry, and 157,700 animals in the swine industry. Survey results show a 17% to 35% increase in the overall understanding of the topics and an 82% overall satisfaction rate with the program. Seventy-seven percent of the participants who had not already adopted some of the practices demonstrated said they plan to adopt certain practices they learned.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Competing Programmatic Challenges

Brief Explanation

SDSU Extension and the SDSU Ag Experiment Station have met or exceeded its goals despite a decrease in state and federal resources. The reduction in funds however, has created challenges across the board with research and outreach. There are fewer faces to greet the customer, there are fewer hands-on projects, and cost recovery has taken the word free out of some programs. But while these challenges may initially seem troublesome, paradoxically they improve service to our stakeholders. Smart classrooms provide video conferencing, web-based learning is available all hours of the day, and new sponsorships create new partnerships. There will be more challenges, but SDSU Extension and the SDSU Ag Experiment Station continue their commitment to excellence and success.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Grazing Schools

Success of the SD Grazing School led SD NRCS administrators to require attendance at the school by livestock producers qualifying for Conservation Stewardship Program contracts for grazing lands they manage. Success of the SD Grazing School is also reflected in the inquiries received from other states by the SD Grasslands Coalition Board about how to conduct similar training events. As a result of the SD Grazing School over the last ten years, nearly 300 ranchers and managers have been trained, representing management influence on more than approaching one million acres of grazing land.

Concentrated Animal Feeding Operations

Pre and Post Surveys

43 of 57 Participant Responses

82% - Overall Participant Satisfaction with the Program

Understanding of the Topic before Program

62% - Water Quality 50% - Permit 59% - Land Application 54% - Worksheets 61% -

Conservation

85% - Nutrition 54% - Air Quality

Understanding of the Topic after Program

85% - Water Quality 84% - Permit 88% - Land Application 82% - Worksheets 87% -

Conservation

85% - Nutrition 84% - Air Quality

Participants that Have Already Adopted Practices

38% - Land Application 27% - Conservation 20% - Nutrition 17% - Air Quality

Percentage of Remaining Participants that Plan to Adopt Practices

87% - Land Application 85% - Conservation 69% - Nutrition 68% - Air Quality

Key Items of Evaluation

Grazing Schools

As a result of the South Dakota Grazing School, nearly 300 ranchers and managers during the last ten years have received training in grassland management, representing approximately one million acres.

Concentrated Animal Feeding Operations

In a before and after survey, the 43 participants that completed the survey had an average knowledge gain of 40%.