V (A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Natural Resources and Environment

2. Brief summary about Planned Program

The Census of Agriculture reports decreasing numbers of mid- and large-sized farms and a significant increase in the number of small farms. Small acreage owners/operators frequently may not possess much agricultural or business knowledge. AES and Extension will address the needs of small acreage producers and work with agricultural industry personnel and governmental agencies to assure that land managers and communities can evaluate a broad range of opportunities to enhance viability while respecting the environment.

AES and Extension programs address the growing competition for finite water, land, and air resources in a state with a growing human population by:
- educating agricultural and resource industry professionals;
- researching technical and economic issues related to improved resource utilization; and
- enhancing international competitiveness.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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	0%		10%	
102	Soil, Plant, Water, Nutrient Relationships	30%		10%	
103	Management of Saline and Sonic Soils and Salinity	0%		10%	
104	Protect Soil from Harmful Effects of Natural Elements	1%		0%	
111	Conservation and Efficient Use of Water	15%		15%	
112	Watershed Protection and Management	3%		10%	
121	Management of Range Resources	20%		10%	
122	Management and Control of Forest and Range Fires	2%		0%	
123	Management and Sustainability of Forest Resources	5%		10%	
124	Urban Forestry	5%		0%	
131	Alternative Uses of Land	13%		0%	
132	Weather and Climate	0%		10%	
134	Outdoor Recreation	1%		0%	
403	Waste Disposal, Recycling, and Reuse	0%		10%	
605	Natural Resource and Environmental Economics	5%		5%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Development of management practices that are compatible with a high quality environment requires new methods of study that involve entire agro-eco-systems. Quantitative relationships between agriculture, natural resource use, and environmental quality must be defined. This will require a more thorough understanding of basic biological/ecological processes, as well as computer-aided systems management research. Continuing to use natural resources to produce agricultural, range, and forestry products requires new multiple use strategies which are realistic in terms of biological, economic, social and environmental constraints. Transport and fate of pesticides, fertilizers, and other agricultural chemicals, as well as threatened and endangered species, biodiversity, habitat, wetlands, and water are all issues of concern. Knowledge must be developed to understand and evaluate competitive land use impacts and interactions on agricultural, range, and forest lands. This research provides the basis for developing agricultural and forestry management systems that are more compatible with conservation and environmental goals.

2. Scope of the Program

- In-State Extension
- In-State Research

- Multistate Research

- Multistate Extension

- Integrated Research and Extension

- Multistate Integrated Research and Extension

V (D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Colorado State is in the ideal geographic position to address irrigated agro-eco-system level issues. Colorado has a wide diversity of water supply/management regimes that include ground water, diverse surface water management in five river systems, and various diversions of West Slope water. Faculty have an international reputation in agro-eco-system modeling and soil carbon dynamics and associations with the NSF Long Term Ecological Research Short-Grass Prairie unit near Ault, the USDS-ARS Great Plains Systems Unit in Akron, a five-university dry-land agriculture research team, the modeling group at the Natural Resources Ecology Laboratory on campus, atmospheric sciences research programs at CU and CSU, the US Geological Survey, USDA-NRCS, USDA-ERS, a strong set of dry land cropping extension agents, and the dry land crops industries. Colorado State has field research laboratories at Walsh, Rocky Ford, Ft. Collins, Cortez, Center, Orchard Mesa, Rogers Mesa, and Fruita capable of experimentation on cropping systems. State and grant funding will continue at current levels to provide facilities and support required to conduct an applied, field based research and outreach program.

2. Ultimate goal(s) of this Program

Programs will sustain and/or improve the quality and quantity of Colorado's natural resources and environment. The following activities will help achieve this goal:
• Conduct natural resources research to develop agricultural and forestry management systems that are compatible with conservation and environmental goals and economically sustainable.
• Study the effects of climate and climate variation on plant, animal and microbial ecosystems to allow an assessment of the impacts of global change on agricultural and natural ecosystems.
• Develop and test technical, institutional, or social solutions to water quality and quantity problems in Colorado.
• Develop technologies for managing agricultural and municipal wastes.
• Provide educational programs for urbanites on horticultural practices and the environment resulting in less pollution and more efficient water use.
• Sustain local agriculture while lessening adverse impacts on the environment.

V (E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2011	30.0	0.0	11.0	0.0
2012	30.0	0.0	11.0	0.0
2013	30.0	0.0	11.0	0.0
2014	30.0	0.0	11.0	0.0

Year	Extension		Research	
	1862	**1890**	**1862**	**1890**
2015	30.0	0.0	0.0	0.0

V (F). Planned Program (Activity)

1. Activity for the Program

• Conduct workshops and educational classes for producers, landowners, and agency personnel.
• Establish demonstration plots and field days to share research and outreach results.
• Consult with individual producers and landowners to address local problems.
• Conduct basic and applied research on environmental and natural resources issues.
• Conduct natural resources research to develop agricultural and forestry management systems that are compatible with conservation and environmental goals and economically sustainable.
• Develop and test technical, institutional, or social solutions to water quality and quantity problems in Colorado.
• Develop technologies for managing agricultural and municipal wastes.
• Provide educational programs for urbanites on horticultural practices and the environment resulting in less pollution and more efficient water use.
• Sustain local agriculture while lessening adverse impacts on the environment.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class	● Public Service Announcement
● Workshop	● Newsletters
● Group Discussion	● Web sites
● One-on-One Intervention	● Other 1 (Radio spots)
● Demonstrations	
● Other 1 (Field Days)	

3. Description of targeted audience

Individual agricultural producers, landowners, commodity groups, regulatory agencies, agribusinesses, and local, state, and federal land management agencies.

V (G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2011	20000	2000000	2500	0

	Direct Contact Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2012	20000	2000000	2500	0
2013	20000	2000000	2500	0
2014	20000	2000000	2500	0
2015	20000	2000000	2500	0

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

2011:0 **2012:**0 **2013:**0 **2014:**0 **2015:**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2011	25	45	0
2012	25	45	0
2013	25	45	0
2014	25	45	0
2015	25	45	0

V (H). State Defined Outputs

1. Output Target

- Number of attendees at workshops/trainings/field days.

  2011:15000   **2012:**15000   **2013:**15000   **2014:**15000   **2015:**15000

- Amount of grant dollars garnered to support natural resources research and outreach.

  2011:1000000   **2012:**1000000   **2013:**1000000   **2014:**1000000   **2015:**1000000

- Number of Master Gardener and Wildlife Master volunteer hours

  2011:55000   **2012:**55000   **2013:**55000   **2014:**55000   **2015:**55000

- Value of volunteer time at $20.25/hr. (nationally recognized value.)

  2011:1000000   **2012:**1000000   **2013:**1000000   **2014:**1000000   **2015:**1000000

- Number of volunteers supporting this program.

  2011:2000   **2012:**2000   **2013:**2000   **2014:**2000   **2015:**2000

- Number of partnering agencies supporting this program.

  2011:200   **2012:**200   **2013:**200   **2014:**200   **2015:**2000

- Number of new technologies adopted by producers.

  2011:3   **2012:**3   **2013:**3   **2014:**3   **2015:**3

- Pounds of food donated to local food banks through Master Gardener efforts.

  2011:30000   **2012:**30000   **2013:**30000   **2014:**30000   **2015:**30000

- Number of curriculum pieces developed and/or reviewed in support of this planned program.

  2011:5   **2012:**5   **2013:**5   **2014:**5   **2015:**5

- Number of Small Acreage Workshops Delivered

  2011:6   **2012:**6   **2013:**6   **2014:**6   **2015:**6

- Number of Demonstration Plots established/maintained to share research and outreach results

  2011:25   **2012:**25   **2013:**25   **2014:**25   **2015:**25

- Number of field days conducted to share research and outreach results

  2011:5   **2012:**5   **2013:**5   **2014:**5   **2015:**5

- Number of individual producers and/or landowners receiving consultation to address local problems.

  2011:50   **2012:**50   **2013:**50   **2014:**50   **2015:**50

- Number of Native Plant Master Volunteer Hours

  2011:1000000   **2012:**1000000   **2013:**1000000   **2014:**1000000   **2015:**1000000

- Value of Native Plant Masters' volunteer time (at $20.25/hour)

  2011:55000   **2012:**55000   **2013:**55000   **2014:**55000   **2015:**55000

- User fees in dollars, collected through Natural Resources & Environment programming

  2011:100000   **2012:**100000   **2013:**100000   **2014:**100000   **2015:**100000

V (I). State Defined Outcome

O. No	Outcome Name
1	Percent of participants in workshops/trainings/field days indicating an increase in knowledge gained about agriculture/horticultural practices and the environment.
2	Percent of participants indicating change in behavior/best practices adopted.
3	Economic impact in dollars reported as a result of the change in behavior.
4	Percent of participants gaining knowledge to change irrigation practices in order to provide a cleaner environment.
5	Percent of participants indicating they changed behavior in order to have less pollution and more efficient water use.

<u>**Outcome #** 1</u>

1. Outcome Target

Percent of participants in workshops/trainings/field days indicating an increase in knowledge gained about agriculture/horticultural practices and the environment.

2. Outcome Type : Change in Knowledge Outcome Measure

2011:60 **2012:**60 **2013:**60 **2014:**60 **2015:**60

3. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 103 - Management of Saline and Sodic Soils and Salinity
- 111 - Conservation and Efficient Use of Water
- 121 - Management of Range Resources
- 123 - Management and Sustainability of Forest Resources
- 124 - Urban Forestry
- 131 - Alternative Uses of Land
- 132 - Weather and Climate
- 403 - Waste Disposal, Recycling, and Reuse
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension

<u>**Outcome #** 2</u>

1. Outcome Target

Percent of participants indicating change in behavior/best practices adopted.

2. Outcome Type : Change in Action Outcome Measure

2011:50 **2012:**50 **2013:**50 **2014:**50 **2015:**50

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 103 - Management of Saline and Sodic Soils and Salinity
- 111 - Conservation and Efficient Use of Water
- 121 - Management of Range Resources
- 123 - Management and Sustainability of Forest Resources
- 124 - Urban Forestry
- 131 - Alternative Uses of Land
- 132 - Weather and Climate
- 403 - Waste Disposal, Recycling, and Reuse

4. Associated Institute Type(s)

- 1862 Extension

- 1862 Research

Outcome # 3

1. Outcome Target

Economic impact in dollars reported as a result of the change in behavior.

2. Outcome Type : Change in Condition Outcome Measure

2011:150000 **2012:**150000 **2013:**150000 **2014:**150000 **2015:**150000

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 103 - Management of Saline and Sodic Soils and Salinity
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 123 - Management and Sustainability of Forest Resources
- 124 - Urban Forestry
- 131 - Alternative Uses of Land
- 403 - Waste Disposal, Recycling, and Reuse
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension

- 1862 Research

Outcome # 4

1. Outcome Target

Percent of participants gaining knowledge to change irrigation practices in order to provide a cleaner environment.

2. Outcome Type : Change in Condition Outcome Measure

2011:75 **2012:**75 **2013:**75 **2014:**75 **2015:**75

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

Percent of participants indicating they changed behavior in order to have less pollution and more efficient water use.

2. Outcome Type : Change in Knowledge Outcome Measure

| **2011:**40 | **2012:**40 | **2013:**40 | **2014:**40 | **2015:**40 |

3. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension

V (J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Programmatic Challenges

Description

      Local, state, and federal funding changes will impact ability to conduct programs. Significant changes in regulatory environment could dramatically alter the scope and goals of both research and extension programs. This is most notable in Colorado with respect to policies affecting use of public lands and both surface and ground water. Both water quantity and water quality are critical issues to the future of agriculture in the semi-arid west. More and more agricultural producers are operating in a market-oriented, individual-responsibility environment, with less reliance on price supports. Producers are moving toward differentiated, consumer-oriented products.

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

1. Evaluation Studies Planned

- After Only (post program)
- Before-After (before and after program)
- During (during program)
- Case Study

Description

Regular pre-post evaluations are used. Formative evaluations are often used during programs to adjust focus and direction. Case studies are used to clearly demonstrate impact.

2. Data Collection Methods

- Sampling
- Case Study
- Observation
- Tests

Description

Pre-post tests and standard survey methods.