V(A). Planned Program (Summary)

Program #6

1. Name of the Planned Program

Natural Resources and Environment

2. Brief summary about Planned Program

An increasing world population is placing greater demands on our natural resources.Public concern for a quality environment has increased as agriculture has become more complex and population pressures have increased.Natural resources must be conserved and their capacity maintained or improved in order to meet the needs of future generations.The long□term viability of agriculture and forestry production is tightly linked to proper use and protection of our soil, air and water resources. Impacts of urban horticulture on the environment are significant.

Extension has active work teams in:

•Sustainable landscapes •Water Resource Management

•Managing Agricultural and Natural Landscapes •Sustaining Agriculture in Colorado •Small Acreage Management

3. Program existence : Mature (More then 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 Sodic 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 agroecosystems.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

- Multistate Extension
- Multistate Research
- Integrated Research and Extension
- Multistate Integrated Research and Extension
- In-State Research
- In-State 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-ecosystem 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-ecosystem 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 dryland 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 dryland cropping extension agents, and the dryland 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

•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
2010	25.0	0.0	11.0	0.0
2011	25.0	0.0	11.0	0.0
2012	25.0	0.0	11.0	0.0
2013	25.0	0.0	11.0	0.0
2014	25.0	0.0	11.0	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.

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

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

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 methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2010	30000	200000	0	0
2011	30000	200000	0	0
2012	30000	200000	0	0
2013	30000	200000	0	0
2014	30000	200000	0	0

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

Expected Patent Applications

2010 :0 **2011 :**0 **2012 :** 0 **2013 :** 0 **2014 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	25	25	0
2011	25	25	0
2012	25	25	0
2013	25	25	0
2014	25	25	0

V(H). State Defined Outputs

1. Output Target

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

  2010 :15000 **2011 :**15000 **2012 :** 15000 **2013 :**15000 **2014 :**15000

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

  2010 :250000 **2011 :**250000 **2012 :** 250000 **2013 :**250000 **2014 :**250000

- Number of technical and refereed journal articles published.

  2010 :25 **2011 :**25 **2012 :** 25 **2013 :**25 **2014 :**25

- Number of Master Gardener and Wildlife Master volunteer hours

  2010 :55000 **2011 :**55000 **2012 :** 55000 **2013 :**55000 **2014 :**55000

- Value of volunteer time at $20/hr (nationally recognized value.)

  2010 :1000000 **2011 :**1000000 **2012 :** 1000000 **2013 :**1000000 **2014 :**1000000

- Number of volunteers supporting this program.

  2010 :2000 **2011 :**2000 **2012 :** 2000 **2013 :**2000 **2014 :**2000

- Number of partnering agencies supporting this program.

  2010 :100 **2011 :**100 **2012 :** 100 **2013 :**100 **2014 :**100

- Number of new technologies adopted by producers.

  2010 :10 **2011 :**10 **2012 :** 10 **2013 :**10 **2014 :**10

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

  2010 :40000 **2011 :**40000 **2012 :** 40000 **2013 :**40000 **2014 :**40000

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

2010 :5 **2011 :**5 **2012 :** 5 **2013 :**5 **2014 :**5

V(I). State Defined Outcome

O. No	Outcome Name
1	Percent of participants in workshops/trainings/field days indicating an increase in knowledge gained.
2	Percent of participants indicating change in behavior/best practices adopted.
3	Economic impact of the change in behavior reported.
4	Reducing cost of irrigation.
5	Impact of UV-B radiation on agriculture.
6	Small acreage management workshops.

Outcome #1

1. Outcome Target

Percent of participants in workshops/trainings/field days indicating an increase in knowledge gained.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
60	60	60	60	60

3. Associated Institute Type(s)

•1862 Extension

4. 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

Outcome #2

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
50	50	50	50	50

3. Associated Institute Type(s)

•1862 Extension
•1862 Research

4. 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

Outcome #3

1. Outcome Target

Economic impact of the change in behavior reported.

2. Outcome Type : Change in Condition Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
150000	150000	150000	150000	150000

3. Associated Institute Type(s)

•1862 Extension
•1862 Research

4. 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

Outcome #4

1. Outcome Target

Reducing cost of irrigation.

2. Outcome Type : Change in Condition Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
0	0	0	0	0

3. Associated Institute Type(s)

•1862 Extension
•1862 Research

4. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water

Outcome #5

1. Outcome Target

Impact of UV-B radiation on agriculture.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
0	0	0	0	0

3. Associated Institute Type(s)

•1862 Extension
•1862 Research

4. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 104 - Protect Soil from Harmful Effects of Natural Elements
- 132 - Weather and Climate

Outcome #6

1. Outcome Target

Small acreage management workshops.

2. Outcome Type : Change in Action Outcome Measure

2010 :5 **2011 :** 5 **2012 :** 5 **2013 :**5 **2014 :** 5

3. Associated Institute Type(s)

•1862 Extension
•1862 Research

4. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 104 - Protect Soil from Harmful Effects of Natural Elements
- 111 - Conservation and Efficient Use of Water
- 121 - Management of Range Resources
- 131 - Alternative Uses of Land

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

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

1. Evaluation Studies Planned

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

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

- Case Study
- Sampling
- Tests
- Observation

Description

Pre-post tests and standard survey methods.