

## **V (A). Planned Program (Summary)**

### **Program # 4**

#### **1. Name of the Planned Program**

Global Food Security and Hunger

#### **2. Brief summary about Planned Program**

AES will focus on fundamental and applied research in breeding, nutrition, physiology, behavior, integrated resource management systems, economics, health, and range/forage management. Extension outreach will span the breadth of the topics of research to assure that industry participants have practical knowledge in modern plant, beef, dairy, and sheep production systems, biosecurity, economic and risk management, and response to policy and consumer changes. Outreach to youth involved in livestock production and judging events will continue as part of experiential learning in 4-H, FFA, and college judging.

Extension currently has Work Teams in:

1. Small Ruminants
2. Sustaining Agriculture in Colorado
3. Agriculture and Business Management
4. Beef
5. Wheat Improvement

**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
201	Plant Genome, Genetics, and Genetic Mechanisms	1%		0%	
202	Plant Genetic Resources	1%		0%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	1%		0%	
204	Plant Product Quality and Utility (Preharvest)	25%		0%	
205	Plant Management Systems	1%		0%	
206	Basic Plant Biology	1%		0%	
211	Insects, Mites, and Other Arthropods Affecting Plants	1%		0%	
212	Pathogens and Nematodes Affecting Plants	1%		0%	
213	Weeds Affecting Plants	1%		0%	
215	Biological Control of Pests Affecting Plants	1%		0%	
216	Integrated Pest Management Systems	1%		0%	
301	Reproductive Performance of Animals	5%		10%	
302	Nutrient Utilization in Animals	5%		10%	
303	Genetic Improvement of Animals	0%		20%	
307	Animal Management Systems	25%		30%	
311	Animal Diseases	5%		10%	
315	Animal Welfare/Well-Being and Protection	10%		10%	
601	Economics of Agricultural Production and Farm Management	14%		10%	
702	Requirements and Function of Nutrients and Other Food Components	1%		0%	
	<b>Total</b>	100%		100%	

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

### 1. Situation and priorities

Animal agriculture is a major economic sector in the United States and the leading agricultural activity in Colorado. In 2007, live meat animal sales in Colorado were valued at \$4.787 billion and the value of dairy production was \$516 million. Livestock and livestock products accounted for 72% of crop and livestock sales in Colorado. Remaining competitive requires that the industry produce with the most technically sophisticated systems available while considering environmental and animal welfare dimensions to maintain confidence of the consuming public. Ruminant agriculture on range is the only significant agricultural enterprise which is ubiquitous in Colorado. In addition to novel and economic production practices, today's livestock producers must be knowledgeable of alternative supply chains to select a lucrative market, be aware of animal identification and trace-back requirements, understand the effects of emerging animal public health conditions, and understand the international and domestic

trade environment and trends and how to respond with risk management strategies.

As recommended by NIFA reviewers, this Planned Program assumes the previously-named Animal Production Systems Knowledge Areas (KAs) and also many of those of the now differently focused Planned Program, Plant Production Systems. Together, these efforts by AES and Extension will address the Global Food Security NIFA priority.

**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**

Animals: Research in beef production management systems and nutrition is conducted on owned facilities at the Agricultural Research, Development, and Education Center (ARDEC), Eastern Colorado Research Center, Southeastern Colorado Research Center, and the Rouse Ranch in Saratoga, Wyoming. An integrated "Beef Alliance" coordinates teaching, research, and outreach in beef across all facilities focused on value-added production systems. Strong relationships exist between animal scientists and agricultural management and marketing economists. ARDEC hosts seed stock herds for Angus and Hereford, as well as a ram test. The University has several significant assets, including the Western Center for Integrated Resource Management, the Center for Genetic Evaluation of Livestock, the Congressionally sponsored National Beef Cattle Evaluation Consortium and strength in research and graduate programs in beef nutrition and breeding. The San Juan Basin Research Center conducts research and outreach on cow-calf, forage and range management systems. Livestock industry outreach includes a team of campus specialists in livestock management systems, economics, trade, policy, manure management, meat science, alternative marketing chain participation, and animal identification systems.

Plants: Successful applied crop science, environmental science, and pest management do not occur in the absence of scientists actively involved in fundamental plant and pest sciences. Colorado State has created the Cancer Prevention Laboratory (CPL) imbedded among strong programs of plant breeding and crop production research to address interactions between crop composition and human health. Professional agriculturalists and agribusiness people will require much more education in the relationships of ecosystem variables.

**2. Ultimate goal(s) of this Program**

Adoption of improved crop production technologies, wheat cultivars and productive and sustainable agriculture systems will assure communities, families, and individuals have enough food to eat, and that hunger is not a factor in their well-being.

**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

Year	Extension		Research	
	1862	1890	1862	1890
2011	25.0	0.0	29.0	0.0
2012	25.0	0.0	29.0	0.0
2013	25.0	0.0	29.0	0.0
2014	25.0	0.0	29.0	0.0
2015	25.0	0.0	29.0	0.0

**V (F). Planned Program (Activity)**

**1. Activity for the Program**

- Develop improved animal production systems that are economical and environmentally sound including genetics and breeding, nutrition, and management components.
- Develop information and methods to improve reproductive efficiency including increasing pregnancy rate, decreasing embryonic mortality and decreasing prenatal mortality.
- Conduct extension and outreach programs to enhance animal agriculture in Colorado and the West.
- Molecular biology and genomics of crop plants and their pests, mechanisms of biological resistance to pests, mechanisms of invasion of weed species, and understand the molecular and cellular foundations for crop improvement and crop pest management.
- Research in genetic determinants of host plant resistance, fundamental mechanisms of biological invasions, and ecology, bio-informatics, genomics, and population genetics of pests.
- Extension will include applied research and education relevant to emerging issues of Colorado's agricultural industries, including bio-security, safe and effective pesticide use, and implementation of effective pest management strategies that do not rely on pesticides. •Evaluate new crop, range, and livestock systems in semi-arid environments including disciplinary and interdisciplinary work in crop and soil sciences, animal sciences, pest sciences, range science, wildlife biology and ecology, forest science, water sciences, economics, and landscape design and policy applicable to the state and region.
- Disseminate findings through extension educational programs aimed at changing practices to control pests.
- Proper diagnosis of plant problems, entomology related to plants and structures, weed control and recommendations of integrated pest management strategies.

- Workshops and educational classes for producers
- Demonstration plots and field days to showcase the results
- Individual counseling on producers specific problems
- Conduct basic and applied research on plants, livestock, primarily beef, dairy, sheep, and horses

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

Extension	
Direct Methods	Indirect Methods

- Education Class
- Workshop
- Group Discussion
- One-on-One Intervention
- Demonstrations
- Other 1 (Field Days)

- Public Service Announcement
- Newsletters
- Web sites

### 3. Description of targeted audience

Individual agricultural producers, commodity groups, agri-business partners

## 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	35000	5000	1000	1000
2012	35000	5000	1000	1000
2013	35000	5000	1000	1000
2014	35000	5000	1000	1000
2015	35000	5000	1000	1000

### 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	30	4	0
2012	30	4	0
2013	30	4	0
2014	30	4	0
2015	30	4	0

## **V (H). State Defined Outputs**

### **1. Output Target**

- Number of attendees at workshops/trainings/field days

**2011:5000      2012:5000      2013:5000      2014:5000      2015:5000**

- Amount of grant dollars garnered to support animal research and outreach programs

**2011:1500000      2012:1500000      2013:1500000      2014:1500000      2015:1500000**

- Number of workshops presented.

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

- Number of volunteers supporting this work

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

- Number of agencies partnering in this program effort.

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

**V (I). State Defined Outcome**

<b>O. No</b>	<b>Outcome Name</b>
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, reported in dollars.
4	Number of new technologies adopted to increase food production

## 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

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

### 3. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 307 - Animal Management Systems
- 311 - Animal Diseases
- 315 - Animal Welfare/Well-Being and Protection
- 601 - Economics of Agricultural Production and Farm Management

### 4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

## Outcome # 2

### 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)

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 307 - Animal Management Systems
- 311 - Animal Diseases
- 315 - Animal Welfare/Well-Being and Protection
- 601 - Economics of Agricultural Production and Farm Management

### 4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research



**Outcome # 3**

**1. Outcome Target**

Economic impact of the change in behavior reported, reported in dollars.

**2. Outcome Type :** Change in Condition Outcome Measure

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

**3. Associated Knowledge Area(s)**

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 307 - Animal Management Systems
- 311 - Animal Diseases
- 315 - Animal Welfare/Well-Being and Protection
- 601 - Economics of Agricultural Production and Farm Management

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 4**

**1. Outcome Target**

Number of new technologies adopted to increase food production

**2. Outcome Type :** Change in Action Outcome Measure

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

**3. Associated Knowledge Area(s)**

- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 213 - Weeds Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems
- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 307 - Animal Management Systems
- 315 - Animal Welfare/Well-Being and Protection
- 601 - Economics of Agricultural Production and Farm Management

- 702 - Requirements and Function of Nutrients and Other Food Components

#### **4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

### **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**

Individuals' ability to attend fee-for-service programs may be impacted by economic downturns. Extension's ability to provide programming and scholarships for these programs may be impacted if appropriations continue to decrease and staff is lost. Inclement weather may impact an individual producer's ability to remain viable. Government subsidy programs may impact the viability of an individual producer. Availability of funding for research programs will govern magnitude and scope of program.

The threat of impending farm crises including credit, land values, low commodity prices, weather (wind, temperatures, and rain), etc. may affect evaluation results.

### **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. NIFA reviewers' and stakeholders' request for longer-term evaluation strategies must be considered in light of the rigor required for such studies and the existence of multiple variables outside the scope of AES research and/or Extension activities.

#### **2. Data Collection Methods**

- Sampling
- Case Study

- Observation
- Tests

**Description**

Pre-post tests. Standard survey methods are the usual protocol for Extension evaluation.