

# 2017 Colorado State University Combined Research and Extension Plan of Work

**Status: Accepted**

**Date Accepted: 06/22/2016**

## I. Plan Overview

### 1. Brief Summary about Plan Of Work

The Agricultural Experiment Station (AES) and Extension at Colorado State University (CSU) are committed to excellence in basic and applied research and translation of this research through Extension programs to crop (including ornamental) and animal (including equine) agriculture. Extension will continue to emphasize non-formal education and transfer of knowledge to audiences throughout the state, based on research information from the AES, the colleges of Agricultural Sciences, Health & Human Sciences, Engineering, Veterinary Medicine and Natural Resources. Programs will emphasize best management practices in addressing issues that affect Coloradans.

#### **4-H Youth Development**

**Program Goals:** 4-H Youth Development empowers youth to reach their full potential by working and learning in partnership with caring adults. 4-H affects positive change in life skills (including leadership, citizenship, decision making, and communication) and in STEM (including interest, knowledge, and application of science process skills) for youth ages 5 to 18.

**Extension, AES, or Integrated:** Extension

**New Programs, and/or Addressing NIFA Priorities:** STEM priority will benefit from available and promised content and resource support from National 4-H Headquarters, Colorado State University, Extension, and county partners.

**Ongoing, Consistent, and/or Successful Programs:** Colorado State University Extension reaches Colorado's K-12 youth through 4-H youth development programs in 4-H clubs, after-school and school enrichment. Development of volunteers who provide much of the leadership for 4-H, and private fund-raising are associated activities. 4-H Youth Development emphasizes personal growth of young people through experiential learning with well-designed curricula and projects.

**Cross-cutting or Cross-disciplinary Initiatives:** Most 4-H Youth Development programs, while focusing on youth development, are built around content that may be supported by one or more college-based specialists.

#### **Community Development**

**Program Goals:** Community Development outreach works with municipal, county, state, and federal agencies, nongovernmental organizations, and citizens to create dynamic processes that address local and regional needs/issues. Our efforts focus on facilitating community planning processes that engage all stakeholders affected by an issue in ways that lead to better informed decisions and help communities understand and deal with change. It includes providing information and resource connections, which might include community impact analysis of economic activity or evaluation of the drivers of local economies. This work encourages collaboration to build regional economies and create entrepreneur/business friendly communities. Innovative and collaborative leadership activities/trainings are provided to engage new diverse leaders and strengthen community organizations.

**Extension, AES, or Integrated:** Integrated

**New Programs, and/or Addressing NIFA Priorities:** Community Development is highlighted by the Vice President for Engagement and Director of Extension.

Ongoing, Consistent, and/or Successful Programs: Colorado communities are changing rapidly as a result of many factors, including loss of agricultural water, influx of retirement populations, development of gas and oil industries, incidence of military deployment, and changes in cultural composition of residents. Communities struggle to develop and maintain resources: human, financial, physical, social, environmental, and political. They also are challenged to provide the organizational capacity to assess, plan, and implement activities to address resource development and management. These issues especially are acute in smaller rural communities. Colorado's rural communities are relatively unique in terms of sparse populations, a high natural amenity and public lands base, a transitory population, and relatively low public service provision. Communities require knowledge to evaluate their resource base, their economic and social service alternatives, and their futures.

Cross-cutting or Cross-disciplinary Initiatives: Technologies will be provided through training and technical assistance to Extension agents, as the system views CD as a process rather than an issue. The goal is to intentionally integrate CD into all issues work.

### **Crop Management Systems**

Program Goals: It is the goal of this Planning & Reporting Unit (PRU) for the producers of Colorado crops to adopt and implement improved, productive, and sustainable agricultural systems that will lead to the success of farms. Furthermore, these producer actions will improve the ability of farm operations to persist and thrive through successive generations of operators. Individuals, families, and communities will all benefit by having a safe, secure and sufficient food supply. Colorado crop producers will accommodate to the growth of demand for local and world crop production without compromising the natural resources upon which agriculture depends.

Extension, AES, or Integrated: Integrated

New Programs, and/or Addressing NIFA Priorities: Global Food Security and Hunger

Ongoing, Consistent, and/or Successful Programs: Molecular biology and genomics of crop plants and their pests; Integrated Pest Management.; Wheat breeding, bean breeding and potato breeding programs; Production systems in semi-arid environments with limited water availability. Communicate results through demonstration plots and field days;

Cross-cutting or Cross-disciplinary Initiatives: This is a well-organized and highly-functioning Extension unit that will maintain its structure and contribute to the NIFA priority goal of global food security.

### **Energy**

Program Goals: (1) Empower Coloradans to make well-informed energy decisions; and (2) Promote a broad, unbiased understanding of energy issues. Promoting a broad, unbiased understanding of energy issues may result in well-informed energy decisions in the long-term. In the short-term, it may simply uplift the quality of energy dialogue in Colorado.

Extension, AES, or Integrated: Integrated

New Programs, and/or Addressing NIFA Priorities: Clean Energy

Ongoing, Consistent, and/or Successful Programs: Energy Masters, Center for Agricultural Energy (CAE)

Cross-cutting or Cross-disciplinary Initiatives: Home & Farm, K-12

### **Environmental Horticulture**

Program Goals: The outreach efforts of the Environmental Horticulture Planning & Reporting Unit (PRU) will provide education and services to encourage the adoption of research-based best management practices (design, plant selection, establishment, and management practices) and diagnostic techniques/services by green industry professionals and the home gardener. Our goal is that professional and lay practitioners will use reasonable inputs of labor, water, fertilizers and pesticides to produce attractive, functional, cost-effective and sustainable ornamental landscapes.

Extension, AES, or Integrated: Integrated

New Programs, and/or Addressing NIFA Priorities: None

Ongoing, Consistent, and/or Successful Programs: The primary issues addressed by Environmental

Horticulture Extension include: ornamental landscapes, diagnostic services, and volunteer engagement.

Emerging issues for consideration include:

- Sustainable landscaping
- "Green" gardening
- Organic/natural landscape management
- Composting/recycling
- Water-wise/water smart gardens
- Youth Gardening
- Wildlife gardening (birds, butterflies)
- Home greenhouses
- Spanish speaking audiences

Cross-cutting or Cross-disciplinary Initiatives: Adult and youth audiences.

### **Family & Financial Stability**

Program Goals: Financial, mental, physical, emotional and relational health are key components of well-being. Stable and successful individuals, families, and communities are important to the growth, development and health of our society. When people are in a state of financial and relational wellness, they are in control, confident and focused. They have greater balance and stability so they can concentrate on the most important tasks at hand such a weathering difficulties and making progress toward their goals. Family and financial stability education creates strong communities.

Extension, AES, or Integrated: Extension

New Programs, and/or Addressing NIFA Priorities: Renewed engagement with CSU Department of Human Development and Family Studies provides opportunities for new programs engaging field and campus colleagues.

Ongoing, Consistent, and/or Successful Programs: Family and Financial Stability (FAFS) programs seek to provide applied research and Extension education in a coordinated set of programs related to family and financial economic stability. Financial stability of families has been the area of focus for non-nutrition FCS programming. Colorado families' financial instability includes increasing rates of bankruptcy, economic crises and loss of jobs. Family stability is important to the growth, development, and health of our society.

Cross-cutting or Cross-disciplinary Initiatives: Consumer economics and human development and family studies are vehicles that can assist 4-H in reaching positive youth development and STEM targets.

### **Food Systems**

Program Goals: Improved technical assistance for agricultural and food producers exploring new marketing channels and alternative business approaches. Also, CSU will provide facilitation of community discussions around the interface between food and agricultural issues and broader social issues including public health, food safety, the environment and community development.

Extension, AES, or Integrated: Integrated

New Programs, and/or Addressing NIFA Priorities: This team was formed and issues were framed based on a couple of key assumptions that arose among team members as they saw the requests they received from community members change and evolve:

- a. Current work teams do not address all the system-oriented issues in which agriculture and food production play a role.
- b. There is a need for more marketing, policy and community development activities directed at food systems that vary from the conventional system used to handle high volume commodity foods.
- c. Extension is being asked to play a more significant role in food system planning, including facilitating discussions between consumers, producers and organizations interested in ag and food issues.

Ongoing, Consistent, and/or Successful Programs: The Food Systems team has come together, drawing from a diverse set of personnel with backgrounds in agriculture, horticulture, food safety, nutrition, community development, and youth education. This team will work to increase literacy on food and ag issues, facilitate community discussions and assessments on ag and food issues, provide technical

assistance to an increasingly diverse set of food producers and support new market opportunities. Cross-cutting or Cross-disciplinary Initiatives: To formalize and coordinate activities that require interdisciplinary approaches related to emerging issues, a new resource team on Food Systems seems warranted.

### **Livestock & Range**

Program Goals: The Livestock and Range (L&R) Planning & Reporting Unit (PRU) strives for rangeland health, improved animal health and production, industry policy and regulation awareness, and economic sustainability using a broad array of methodologies that provides information, skills, and technology to producers and L&R Unit members. This PRU is designed for Extension Programming for livestock producers, ranchers, and rangeland managers who have, or are striving for, a significant portion of their personal income coming from the farm/ranch. These may be small farms/ranches or larger scale operations. Livestock producers may also integrate cropping production systems into their operation.

Extension, AES, or Integrated: Integrated

New Programs, and/or Addressing NIFA Priorities: Global Food Security and Hunger

Ongoing, Consistent, and/or Successful Programs: Extension outreach will span the breadth of the topics of research to assure that industry participants have practical knowledge in modern 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. Producers will realize increased prices and lower cost of production. Consumers will benefit from higher human nutritional values of food. AES will lead research on animal production systems and reproductive efficiency.

Cross-cutting or Cross-disciplinary Initiatives: Reorganization of Planned Programs pulls apart animal production systems and plant production systems. The work will integrate Extension education in disseminating research results. CSU Extension will:

- Deliver workshops and educational classes for producers;
- Provide individual counseling for producers and clientele on specific animal production problems.

Cross-cutting or Cross-disciplinary Initiatives: Research on animal production systems and reproductive efficiency.

### **Natural Resources**

Program Goals: The Natural Resources Planning & Reporting Unit (PRU) members will work together to develop and implement high quality educational programs and tools to ensure a high quality of life for Colorado citizens.

Extension, AES, or Integrated: Integrated

New Programs, and/or Addressing NIFA Priorities: The Natural Resources PRU is focused on how to best manage our landscapes from the perspective of plants, animals, soils, water, and pests. Our goal is to protect these resources through our programming efforts, with special emphasis on native species.

Ongoing, Consistent, and/or Successful Programs: 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;
- Enhancing international competitiveness.

Cross-cutting or Cross-disciplinary Initiatives: Nutrient management and odor and dust control.

### **Nutrition, Food Safety & Health**

Program Goals: The goal of this PRU is to promote adoption of healthful eating and activity patterns and ensure an abundant and safe food supply for all. Adoption of healthful eating and activity patterns can enhance the overall health and wellbeing of children, youth, adults, and the growing senior population. Adoption of food safety knowledge and safe food handling practices will ultimately reduce the incidence of

foodborne disease in Colorado, especially among the most vulnerable populations (infants, young children and individuals who are immuno-compromised through aging, medical intervention, and illness). Through various programs, CSU Extension contributes to the statewide efforts to increase fruit and vegetable consumption, increase physical activity, and decrease overweight/obesity risk in Colorado.

Extension, AES, or Integrated: Integrated

New Programs, and/or Addressing NIFA Priorities: Planned Programs are reorganized to again combine Nutrition and Food Safety work in this category.

Ongoing, Consistent, and/or Successful Programs:

\*Food safety training for food service managers and employees

\*Food safety education for high risk audiences, their caregivers, and health care professionals

\*Food safety information for consumers including Farmers' Market vendors and their customers.

\*Nutrition and Health Promotion programs provide research-based nutrition and health education to a variety of audiences across Colorado in an effort to promote healthful nutrition, activity and lifestyle behaviors.

Cross-cutting or Cross-disciplinary Initiatives: AES food safety research emphasizes pre-harvest management of livestock to prevent transmission of human pathogens in livestock production and handling and post-harvest detection and management systems to prevent contamination of meat and plant products with human pathogens.

**Estimated Number of Professional FTEs/SYs total in the State.**

Year	Extension		Research	
	1862	1890	1862	1890
2017	150.0	0.0	50.0	0.0
2018	150.0	0.0	50.0	0.0
2019	150.0	0.0	50.0	0.0
2020	150.0	0.0	50.0	0.0
2021	0.0	0.0	0.0	0.0

**II. Merit Review Process**

**1. The Merit Review Process that will be Employed during the 5-Year POW Cycle**

- Internal University Panel
- External Non-University Panel
- Combined External and Internal University External Non-University Panel

**2. Brief Explanation**

All projects conducted by the AES and Extension are subjected to a peer review process. Each college at Colorado State University has adopted a process for conducting a peer review on all AES and Extension projects submitted for support by state and federal funds. Criteria, as requested by NIFA reviewers, include alignment with college priorities, resource allocation, and

meeting needs of Coloradoans.

As of January, 2014, Extension specialists and agents team together ten Planning and Reporting Units (PRUs), jointly lead by a specialist and an agent. Each PRU has completed a Logic Model, including providing a situation statement, assumptions, identification of inputs, outputs and outcomes (including learning, action, and condition), and an evaluation plan. The Plans of Work (POW) were submitted for entry into the online Colorado Planning and Reporting System (CPRS) early in 2014.

At the county level, all county Extension programs are required at a minimum to have an Extension Advisory Committee composed of constituents, partner agencies (such as the school districts, councils on aging, county health and human services, commodity groups, etc.). In addition, many counties have multiple program advisory groups that guide the county staff in identification of specific programs of emphasis. In the most recent survey of these committees, 59 Extension county programs had a total of 112 advisory committees involving close to 2,000 individuals in the program review process. County programs are reviewed and evaluated by these county advisory groups. The primary criteria is meeting needs in the county.

### **III. Evaluation of Multis & Joint Activities**

#### **1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?**

The AES and Extension are active participants in meetings of Advisory Committees consisting of state, county, and organizational leaders. AES and Extension programs are discussed and input is solicited on future priorities for research activities. In addition, the AES regularly participates in meetings held by CSU Extension where current and future program needs are discussed. A variety of joint research programs are conducted with USDA-ARS programs in Fort Collins, Akron, and other locations as well as collaborative programs with USDA-FS, USDA-NRCS and USDA-NASS. Numerous programs are also conducted in cooperation with individuals.

Regional listening sessions lead by the AES and Extension are held in the various regions of the state. Both AES and Extension programs are modified to reflect the input received where appropriate and feasible.

All sessions are open to the public and advertised in the local media prior to the meeting.

Critical issues addressed by multi-state and integrated activities include the following: 1) invasive plants; 2) obesity; 3) animal and municipal waste management; 4) food safety; 5) community development; 6) water quality and environmental issues; and the emerging area of bioenergy.

#### **2. How will the planned programs address the needs of under-served and under-represented populations of the State(s)?**

For CSU Extension, county needs determine programming direction. These include addressing the needs of under-served and under-represented populations. Extension participated in the first cohort of CSREES-funded Change Agents States. We have maintained the system changes implemented during the initiative, as well as the Diversity Catalyst Team (DCT). Goals for Extension diversity include increasing: diversity of employees; diversity of audiences served; and cultural competency of current Extension employees. DCT seeks to support "widening our circle" to include audiences currently under-served and/or under-represented.

#### **3. How will the planned programs describe the expected outcomes and impacts?**

A variety of measures will be used based on the goals of each planned program. Data on outcomes in the Logic Model that are typically collectible by Extension and AES include: increase in knowledge and/or attitude (learning), and change in behavior (action, including

intent to change behavior). Each Planning & Reporting Unit (PRU) has a completed Logic Model with identified outputs and outcomes for the respective program areas. However, documenting long term results (changes in condition), as requested by NIFA reviewers, remains problematic. The rigor that is required by such program evaluation and the presence of multiple extrinsic factors are often beyond the capability of field staff to manage. Specialists may have the knowledge and experience for such research design, but with fewer state-wide programs underway, there are complexities in aggregating data to demonstrate impact.

#### **4. How will the planned programs result in improved program effectiveness and/or**

Plans of Work (POW) are updated and reviewed annually, assuring necessary changes are made as suggested through the review process, or as indicated by the evaluations conducted on specific programs. Formative evaluations conducted at programs' conclusions provide feedback to improve quality and efficacy. These are not often reported, as requested by NIFA reviewers, as they do not address outcomes but rather the success of outputs. AES and Extension are exploring options that will more clearly link program to performance as we seek to focus our planned programs and collect data that we can aggregate and that will be impactful in presenting the value of both AES and Extension's work to stakeholders. The goal is continual evaluation and strengthening of program efforts, including changes that will increase effectiveness and efficiency.

All projects conducted by the AES are subjected to a peer review process. Each college at Colorado State University has adopted a process for conducting a peer review on all AES projects submitted for support by state and federal funds. The peer review process involves the Dean/Department Head soliciting reviews from faculty on the research approach and methodology followed by incorporation of suggested changes by the investigator.

### **IV. Stakeholder Input**

#### **1. Actions taken to seek stakeholder input that encourages their participation**

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey of the general public
- Survey specifically with non-traditional groups
- Survey specifically with non-traditional individuals
- Survey of selected individuals from the general public
- Other (Survey of County Commissioners regarding Extension Programs in their county.)

#### **Brief explanation.**

The AES and Extension annually utilize multiple means of obtaining stakeholder input on programs conducted and solicit input on changes in program direction. The AES and Extension support programs in seven of the eight colleges on the Colorado State University campus as well as at nine off-campus research centers, 52 individual county offices and four area programs serving 62 of Colorado's 64 counties.

AES: Each year, the off-campus research centers hold a public meeting where research results are presented and proposed programs are discussed. Public input is solicited on all proposed programs. It should be noted that many of the programs discussed involve faculty and staff located on the Fort Collins campus as well as at the off-campus research centers and Extension county or area offices.

CE: Each County/Area Extension program is required to have a stakeholder advisory committee, representing all programmatic and geographic areas, as well as the diversity found in the county. Evidence of the advisory committee must be documented in performance appraisals, as well as during the regularly scheduled affirmative action reviews. These advisory committees are expected to meet on a regular basis and provide guidance on programming and target audiences. Finally, a Colorado Extension Advisory Committee (CEAC), representing program recipient groups and programmatic collaborators provides oversight and input at the state level. Extension administration pays travel expenses to two meetings each year, to encourage participation. Yearly the county advisory committees review the county plans of work which are then incorporated into the statewide work team plans. These plans are reviewed by the CEAC for additional input and acceptance. There is an open call for additional Planning & Reporting Units (PRUs) so that emerging priority areas may be identified and state-wide focus provided, when appropriate. Diversity among stakeholders is expected, but as NIFA reviewers have noted, it is not documented.

**2(A). A brief statement of the process that will be used by the recipient institution to identify individuals and groups stakeholders and to collect input from them**

**1. Method to identify individuals and groups**

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Use Surveys
- Other (Council for Agricultural Research, Extension, and Teaching)

**Brief explanation.**

We identify stakeholder groups through input from county staff and advisory committee members. We engage community partners in the process and request feedback on appropriate individuals and groups to be included in the stakeholder input process. Both AES and Extension meet regularly with advisory committees to solicit feedback on programs and also invite the general public to participate in listening sessions.

**2(B). A brief statement of the process that will be used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them**

**1. Methods for collecting Stakeholder Input**

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting specifically with non-traditional groups
- Meeting specifically with non-traditional individuals



- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public
- Other (Review of county Web sites to discern priorities)

**Brief explanation.**

AES and Extension conduct regular meetings with advisory committees and other stakeholders to solicit input on program direction, focus, implementation and success. There is an annual satisfaction survey of county commissioners regarding the Extension program in their county that provides valuable information on county needs and the impact/success of Extension programs. <http://www.ext.colostate.edu/staffres/Commissioner-report.pdf>.

**3. A statement of how the input will be considered**

- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities

**Brief explanation.**

- Regular meetings with advisory committees and other stakeholders to solicit input on program direction, focus, implementation and success.
- Yearly satisfaction survey of county commissioners regarding the Extension program in their county provides valuable information on county needs and the impact/success of Extension programs. <http://www.ext.colostate.edu/staffres/Commissioner-report.pdf>.
- AES utilizes one-time funds to conduct research on emerging issues in Colorado such as a disease outbreak or disaster.

## V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	4-H Youth Development
2	Family and Financial Security
3	Nutrition, Food Safety & Health
4	Livestock & Range
5	Cropping Systems
6	Natural Resources
7	Community Development
8	Energy
9	Environmental Horticulture
10	Food Systems

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

**Program # 1**

**1. Name of the Planned Program**

4-H Youth Development

**2. Brief summary about Planned Program**

Colorado 4-H Mission: 4-H empowers youth to reach their full potential by working and learning in partnership with caring adults. Positive Youth Development.

**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
806	Youth Development	100%		0%	
	<b>Total</b>	100%		0%	

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

**1. Situation and priorities**

Communities in Colorado depend on quality, contributing members of society. Fostering productive community members begins with our young people. 4-H is Colorado State University's premier youth development program. Positive youth development addresses broader developmental needs of youth, in contrast to deficit-based models which focus solely on youth problems. Positive youth development occurs from an intentional process that promotes outcomes for young people by providing opportunities and relationships and externally, through the delivery of projects and curriculum designed according to the best practices of youth development.

Therefore, in order to be prepared to succeed in a quickly changing world, our young people need a sense of competence, usefulness, belonging, and power. Studies have shown that youth who have developed these senses are involved in positive group settings and become productive citizens and successful young adults. Also, adolescents who have developed these characteristics appear to be more likely than others to engage in pro-social behavior. 4-H targets critical skills (life skills) that help cultivate these senses.

In order for youth in Colorado to cultivate critical life skills, the 4-H Youth Development work team will strive to incorporate the three mission mandates from National 4-H Council which are Science, Engineering and Technology (SET), Healthy Living, and Citizenship.

Program delivery is via one of six different delivery methods 1) Organized clubs, 2) School enrichment, 3) Short term/special interest, 4) School-age child care, 5) After school programs, 6) Camping.

Total enrollment in the Colorado 4-H program for the 2013-14 4-H program year was 110,000 with a strong cadre of adult volunteers totaling 12,855.

**2. Scope of the Program**

- In-State Extension
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

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

**1. Assumptions made for the Program**

- 4-H Youth Development is a well-respected and effective youth development program in Colorado.
- A successful 4-H youth development program is dependent on adequate numbers of competent and well trained volunteers.
- Colorado 4-H Youth Development staff collaborates with other CSU Extension staff and community partners to accomplish desired impacts.
- The Colorado 4-H Youth Development Program provides youth a unique and inclusive setting for individual life skill development and mastery of subject matter competencies through the interactions with caring adults (paid and volunteer).
- 4-H youth development staff has the ability to recognize and understand the needs of individuals in communities, and to facilitate educational opportunities in response to those needs.

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

4-H empowers youth to reach their full potential by working and learning in partnership with caring adults. Positive Youth Development.

**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
2017	50.0	0.0	0.0	0.0
2018	50.0	0.0	0.0	0.0
2019	50.0	0.0	0.0	0.0
2020	50.0	0.0	0.0	0.0
2021	50.0	0.0	0.0	0.0

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

**1. Activity for the Program**

- Support traditional club programs by recruiting and establishing new clubs;
- Conduct after school and school enrichment programs that provide curriculum in Science, Technology, Engineering and Math (STEM), leadership, citizenship and life skills development;
- Develop new curriculum in response to new audience needs;
- Strengthen the volunteer management system needed to implement the 4-H Youth Development program by: conducting agent trainings to develop volunteer management skills; developing tools to support volunteer management system; delivering volunteer leader training;
- Develop new funding support through individual and group solicitation, grant applications and fee-for-service programs.

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

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>• Education Class</li> <li>• Workshop</li> <li>• Group Discussion</li> <li>• One-on-One Intervention</li> <li>• Demonstrations</li> <li>• Other 1 (eXtension)</li> <li>• Other 2 (phone calls &amp; e-mail)</li> </ul>	<ul style="list-style-type: none"> <li>• Public Service Announcement</li> <li>• Newsletters</li> <li>• Web sites other than eXtension</li> <li>• Other 1 (Newspaper column)</li> <li>• Other 2 (Public meetings)</li> </ul>

**3. Description of targeted audience**

Youth - 5-19  
 Adult Volunteers 19+

## V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

## V(H). State Defined Outputs

### 1. Output Measure

- 1.Number of group educational events: classes, trainings, workshops, demonstrations, field days, providing content expertise, fairs, shows, booths, and/or other group events.
- 2.Individual Education: one-on-one direct client contacts by site visit, office drop-in, e-mail, telephone, Ask an eXpert, etc.
- 3.Number of meetings convened and/or facilitated; includes strategic participation that contributes to program development.
- 4.Number of kits or similar resources loaned or provided.
- 5.Number of Extension-related research and assessment projects. External funding proposals, including local, state, federal.
  
- 7.Number of educational media releases: indirect contacts through media releases, appearances, newsletters, blog posts, other non-peer reviewed publications, kit development, non-peer reviewed curriculum, PowerPoints or videos.
- 8.Number of online posts: Web posts, hits.

- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

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

O. No	Outcome Name
1	4H 1.1: Volunteers apply skills developed through Extension-provided training, supervision, and support to increase their effectiveness in influencing positive youth development for the audience(s) with which they work.
2	4H 2.1: 4-H Youth Development volunteers develop capacity and have a positive influence on the well-being of their communities. Indicators include:4H 2.1: Volunteers increase leadership capacity in their communities. 4H 2.2: Volunteers foster life skill development in the youth in their communities. ?Indicator: 4H 2.3: Volunteers increase effectiveness of Extension programs. 4H 2.4: Volunteers contribute to increased public service in their communities.4H 2.5: Volunteers generate a sense of goodwill and social well-being in their communities.4H 2.6: Volunteers increase the social, emotional, and learning skills in diverse audiences with which they work.
3	4H 3.0: Youth become caring and contributing members of society through life skill development attained in the 4-H program. Indicators include: 4H 3.1: Youth contribute to community improvement; 4H 3.2: Youth develop goal-setting skills; 4H 3.3: Youth develop decision-making skills; 4H 3.4: Youth develop record keeping skills; 4H 3.5: Youth develop public speaking skills; 4H 3.6: Youth develop leadership skills; 4H 3.7: Youth develop responsibility.
4	4H 4.1: Colorado youth apply STEM knowledge and skills in club, community and academic projects and programs.
5	4H 5.1: Colorado K-12 youth apply content knowledge from 4-H in academic and community settings.
6	4H 6.0: 4-H Youth will become more aware and engaging in their community and community issues through the appreciation of cultural diversity and understanding in the democratic process. Indicators include: 4H 6.1: Youth will read or view news regularly and identify important issues. (8th grade only) 4H 6.2: Youth will engage in discussion with others and be critical consumers of information (8th graders only).4H 6.3: Youth will demonstrate value and respect for other cultures. 4H 6.4: Youth will engage in civic involvement. 4H 6.5: Youth participate in community service and volunteer.4H 6.6: Youth will demonstrate leadership efficacy. 4H 6.7: Youth will maintain future intentions for civic engagement. 4H 6.8: Youth demonstrate their ability to work effectively in teams. 4H 6.9: Youth will improve their knowledge of parliamentary procedure. 4H 6.10: Youth will increase their interactions with local, state, and national government. 4H 6.11: Youth will intend to vote.



**Outcome # 1**

**1. Outcome Target**

4H 1.1: Volunteers apply skills developed through Extension-provided training, supervision, and support to increase their effectiveness in influencing positive youth development for the audience(s) with which they work.

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

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

- 806 - Youth Development

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

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

4H 2.1: 4-H Youth Development volunteers develop capacity and have a positive influence on the well-being of their communities. Indicators include:4H 2.1: Volunteers increase leadership capacity in their communities.

4H 2.2: Volunteers foster life skill development in the youth in their communities.

?Indicator:

4H 2.3: Volunteers increase effectiveness of Extension programs. 4H 2.4: Volunteers contribute to increased public service in their communities.4H 2.5: Volunteers generate a sense of goodwill and social well-being in their communities.4H 2.6: Volunteers increase the social, emotional, and learning skills in diverse audiences with which they work.

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

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

- 806 - Youth Development

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

- 1862 Extension

**Outcome # 3**

**1. Outcome Target**

4H 3.0: Youth become caring and contributing members of society through life skill development attained in the 4-H program. Indicators include:

4H 3.1: Youth contribute to community improvement;

- 4H 3.2: Youth develop goal-setting skills;
- 4H 3.3: Youth develop decision-making skills;
- 4H 3.4: Youth develop record keeping skills;
- 4H 3.5: Youth develop public speaking skills;
- 4H 3.6: Youth develop leadership skills;
- 4H 3.7: Youth develop responsibility.

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

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

- 806 - Youth Development

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

- 1862 Extension
- 1862 Research

**Outcome # 4**

**1. Outcome Target**

4H 4.1: Colorado youth apply STEM knowledge and skills in club, community and academic projects and programs.

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

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

- 806 - Youth Development

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

- 1862 Extension

**Outcome # 5**

**1. Outcome Target**

4H 5.1: Colorado K-12 youth apply content knowledge from 4-H in academic and community settings.

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

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

- 806 - Youth Development

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

- 1862 Extension

#### **Outcome # 6**

##### **1. Outcome Target**

4H 6.0: 4-H Youth will become more aware and engaging in their community and community issues through the appreciation of cultural diversity and understanding in the democratic process. Indicators include: 4H 6.1: Youth will read or view news regularly and identify important issues. (8th grade only) 4H 6.2: Youth will engage in discussion with others and be critical consumers of information (8th graders only). 4H 6.3: Youth will demonstrate value and respect for other cultures. 4H 6.4: Youth will engage in civic involvement. 4H 6.5: Youth participate in community service and volunteer. 4H 6.6: Youth will demonstrate leadership efficacy. 4H 6.7: Youth will maintain future intentions for civic engagement. 4H 6.8: Youth demonstrate their ability to work effectively in teams. 4H 6.9: Youth will improve their knowledge of parliamentary procedure. 4H 6.10: Youth will increase their interactions with local, state, and national government. 4H 6.11: Youth will intend to vote.

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

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

- 806 - Youth Development

##### **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 Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (competing family priorities)

##### **Description**

Participation in 4-H Youth Development programs does not come without cost. If funding is not sufficient, scholarship help for families may not be available and individuals may be forced to not participate. Families have the opportunity to choose from many different activities for youth. 4-H may lose membership to other youth activities. At the same time, population shifts to urban sites could increase 4-H Youth Development participation if 4-H is able to establish and maintain relevant programs in non-rural environments.

## **V(K). Planned Program - Planned Evaluation Studies**

### **Description of Planned Evaluation Studies**

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

Survey instrument to measure the volunteers' learning outcomes can be found at:  
[http://www.colorado4h.org/research\\_impact/surveys/VolunteerKnowledgeAndSkillSurvey.pdf](http://www.colorado4h.org/research_impact/surveys/VolunteerKnowledgeAndSkillSurvey.pdf)

Survey instrument to measure changes in volunteers' action outcomes can be found at:  
[at:http://www.colorado4h.org/research\\_impact/surveys/Survey-VolunteerImpactOnCommunities.pdf](http://www.colorado4h.org/research_impact/surveys/Survey-VolunteerImpactOnCommunities.pdf)

Survey instrument to measure participants' changes in action outcomes can be found at:  
[http://www.colorado4h.org/research\\_impact/surveys/MemberLifeSkillSurvey.pdf](http://www.colorado4h.org/research_impact/surveys/MemberLifeSkillSurvey.pdf)

Survey instrument to measure STEM outcomes can be found at:  
[http://www.colorado4h.org/research\\_impact/surveys/STEM.pdf](http://www.colorado4h.org/research_impact/surveys/STEM.pdf).

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

**Program # 2**

**1. Name of the Planned Program**

Family and Financial Security

**2. Brief summary about Planned Program**

Financial, mental, physical, emotional and relational health are key components of well-being. Stable and successful individuals, families, and communities are important to the growth, development and health of our society. When people are in a state of financial and relational wellness, they are in control, confident and focused. They have greater balance and stability so they can concentrate on the most important tasks at hand such a weathering difficulties and making progress toward their goals. Family and financial stability education creates strong communities.

**3. Program existence :** Intermediate (One to 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
801	Individual and Family Resource Management	65%		0%	
802	Human Development and Family Well-Being	35%		0%	
	<b>Total</b>	100%		0%	

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

**1. Situation and priorities**

The FINRA Investor Education Foundation's 2012 National Financial Capability Study(<http://www.usfinancialcapability.org/geo.php?id=Colorado>), study focused on four key components of the financial capability of adults in Colorado:

**1. Making Ends Meet. 18%** of Coloradans (compared to 19% nationwide) reported that over the past year, their household spent more than their income. Individuals who report spending more than their household income (not including the purchase of a new home, car, or other big investment) are not saving. In addition, individuals who spend about the same as their income are breaking even. Only those who spend less than their household income are able to save. Individuals who are not balancing monthly income and expenses may find themselves struggling to make ends meet.

**2. Planning Ahead. 54%** Coloradans (compared to 56% nationwide) lack a "rainy day" to cover expenses for three months, in case of emergencies such as sickness, job loss, or economic downturn. Individuals who have a "rainy day" fund demonstrate that they are planning ahead for their financial future. Individuals without this emergency savings lack a buffer against unexpected financial shocks, threatening

their personal financial stability, as well as decreasing stability of the economy as a whole.

**3. Managing Financial Products.** 31% of Coloradans (compared to 30% nationwide) reported using one or more non-bank borrowing methods in the past five years. Numerous Americans have engaged in non-bank borrowing within the past five years, such as taking out an auto title loan or a payday loan, getting an advance on a tax refund or using a pawn shop or rent-to-own store. Non-bank borrowing methods are likely to come with high interest rates, and often attract individuals with poor credit histories, lack of access to more traditional sources of credit, or both. Sound borrowing practices and management of financial products are crucial to financial capability.

**4. Financial Knowledge and Decision-Making.** On average, Coloradans answered 3 out of five financial literacy questions correctly. In addition, 61% of Coloradans said that, when obtaining their most recent credit card, they did not collect and compare information about cards from more than one company. Study participants were asked five questions covering concepts of economics and finance expressed in everyday life. Results were tabulated according to average number participants answered correctly, incorrectly, or "don't know." "Don't know" responses suggest limited financial literacy may impede participants' ability to even attempt to answer quiz questions. In addition, most Americans do not comparison shop for credit cards, indicating a gap in the application of financial decision-making skills to real life situations. Individuals need at least a fundamental level of financial knowledge. This knowledge, paired with financial decision-making skills, can best ensure an individual's financial capability.

2011 U. S. Census Bureau data establishes the following data for Colorado:

- **Median household income:\$57,685 (a decrease since 2011)**
- **Poverty rate:12.5% (an increase since 2011)**
- **Unemployment:5.2%**

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- **Unemployment:5.2%**

The 2013 Women's Foundation of Colorado report "The Status of Women & Girls in Colorado" research report notes that:

- Women suffered substantial losses during the recent economic recession and have faced an especially slow recovery, more so than men.
- In Colorado, families headed by single mothers have the lowest median annual income of all family types at \$26,705. The median annual income of families headed by single mothers is 63 percent of the median income of single-father families and just 31 percent of the median income of married-couple families with dependent children.
- In 2011, three in ten women (30 percent) aged 18 and older in Colorado had family incomes below or near the federal poverty line. Approximately one in eight (13 percent) had incomes below poverty, and 17 percent had incomes between 100 and 200 percent of the poverty line.
- The income of families headed by single mothers in Colorado falls well below the self-sufficiency standard, or the amount of money needed to support a family without public or private assistance.
  - In Colorado, poverty status varies considerably among women from the large

## **2. Scope of the Program**

- In-State Extension

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

### **1. Assumptions made for the Program**

1. When people are in a state of "financial wellness," they are in control. They are confident and focused. They have greater balance and stability so they can concentrate on the most important tasks at hand such as weathering financial difficulties and making progress toward their financial goals.
2. Financial management is a learned skill. Education and good role modeling contribute to the development of this life-long skill.
3. Financial management, including financial decision making, is a skill that must be practiced daily throughout life.
4. Extension Family and Consumer Science professionals are trustworthy sources of financial and human development and family studies education due to their training, experience, and objectivity.
5. There is public value in providing financial education and education in human development and family studies.
6. Stable and successful individuals, families, and communities are important to the growth, development and health of our society.
7. Financial, mental, physical, emotional and relational health are key components of well-being.

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

Coloradans will have current and future 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
2017	4.0	0.0	0.0	0.0
2018	5.0	0.0	0.0	0.0
2019	5.0	0.0	0.0	0.0
2020	5.0	0.0	0.0	0.0
2021	4.0	0.0	0.0	0.0

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

**1. Activity for the Program**

Educational activities include adoption of curriculum, training for agents and other service providers, educational programs on financial and family management for individuals and families.

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

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>● Education Class</li> <li>● Workshop</li> <li>● Group Discussion</li> <li>● One-on-One Intervention</li> <li>● Demonstrations</li> </ul>	<ul style="list-style-type: none"> <li>● Public Service Announcement</li> <li>● Newsletters</li> <li>● Web sites other than eXtension</li> </ul>

**3. Description of targeted audience**

Colorado families, including diverse and difficult- to-reach populations.



## V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

## V(H). State Defined Outputs

### 1. Output Measure

- 1.Number of group educational events: classes, trainings, workshops, demonstrations, field days, providing content expertise, fairs, shows, booths, and/or other group events.
- 2.Individual Education: one-on-one direct client contacts by site visit, office drop-in, e-mail, telephone, Ask an eXpert, etc.
- 3.Number of meetings convened and/or facilitated; includes strategic participation that contributes to program development.
- 7.Number of educational media releases: indirect contacts through media releases, appearances, newsletters, blog posts, other non-peer reviewed publications, kit development, non-peer reviewed curriculum, PowerPoints or videos.
- 8.Number of online posts: Web posts, hits.

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

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

O. No	Outcome Name
1	FAFS 1.1: Participants across the lifecycle will apply financial best practices.
2	FAFS 1.1.1 Participants will plan to apply financial best practices.
3	FAFS 1.2: Participants will implement best practices of healthy development and relationships across the life cycle.
4	FAFS 1.2.1 Participants will plan to implement best practices of healthy development and relationships across the life cycle.

**Outcome # 1**

**1. Outcome Target**

FAFS 1.1: Participants across the lifecycle will apply financial best practices.

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

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

- 801 - Individual and Family Resource Management

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

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

FAFS 1.1.1 Participants will plan to apply financial best practices.

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

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

- 801 - Individual and Family Resource Management

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

- 1862 Extension

**Outcome # 3**

**1. Outcome Target**

FAFS 1.2: Participants will implement best practices of healthy development and relationships across the life cycle.

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

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

- 802 - Human Development and Family Well-Being

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

- 1862 Extension

#### Outcome # 4

##### 1. Outcome Target

FAFS 1.2.1 Participants will plan to implement best practices of healthy development and relationships across the life cycle.

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

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

- 802 - Human Development and Family Well-Being

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

- 1862 Extension

### V(J). Planned Program (External Factors)

#### 1. External Factors which may affect Outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

#### Description

Public policies, local, county, state, and federal initiatives, economic conditions, profound advances in HDFS and financial capability research, public perceptions, personal values and sentiments about public issues, Extension staff changes, availability of funding, changes with stakeholders and partners will affect outcomes. Most of the program efforts are multi-year activities and cumulative rather than episodic in nature.

### V(K). Planned Program - Planned Evaluation Studies

#### Description of Planned Evaluation Studies

For this PRU, evaluation will be performed by distributing written or email surveys to program participants.

- Surveys will be done as pre- and post-tests, retrospective surveys, and for some programs, a follow-up survey.

- Surveyors will ask questions focused on the objectives of the class or program.
- Surveys will help us measure the percentage of program participants who increased their knowledge on topics covered, intent to utilize the information or new skills obtained, and for some programs, application of information and skills gained.
- Results of the surveys will be distributed to or will be used for impact reports and other reports to key stakeholders.

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

**Program # 3**

**1. Name of the Planned Program**

Nutrition, Food Safety & Health

**2. Brief summary about Planned Program**

Nutrition, Food Safety and Health Promotion programming provides research-based education to a variety of audiences across Colorado in an effort to promote safe and healthful eating habits and a physically active lifestyle. Adoption of these behaviors may reduce the incidence of foodborne disease as well as chronic diseases, such as diabetes, heart disease, obesity and cancer.

**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
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	0%		10%	
503	Quality Maintenance in Storing and Marketing Food Products	0%		10%	
701	Nutrient Composition of Food	0%		30%	
703	Nutrition Education and Behavior	30%		0%	
704	Nutrition and Hunger in the Population	5%		0%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	5%		10%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	30%		30%	
724	Healthy Lifestyle	30%		10%	
	<b>Total</b>	100%		100%	

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

**1. Situation and priorities**

## **Nutrition and Health Promotion Situation and Priorities**

### **Chronic Disease in Colorado**

In Colorado and across the United States, chronic diseases are the biggest threat to health and wellness. Heart disease, diabetes, cancer, lung disease and other chronic conditions continue over a long period of time, limit everyday activities and lead to increased disability. They are also the leading causes of death.

- Nearly half of all Americans suffer from at least one chronic disease.
- More than 80% of all deaths in Colorado in 2005 were due to chronic disease.
- In general, rates of illness and death from chronic diseases are higher among racial and ethnic minorities, persons with low income, and persons who live in rural or frontier areas of the state, although this may vary by disease.

Chronic diseases burden the health care system because they require ongoing medical care.

- Average health care costs for people with at least one chronic disease are two and a half times higher than for people with no chronic conditions.
- More than 80% of all health care spending is for persons with chronic disease.

Fortunately, chronic diseases are among the most preventable of all health problems.

· Most chronic diseases are linked to obesity, poor nutrition, lack of exercise, and tobacco use. Reducing these behaviors among Coloradans can lead to lower rates of chronic disease and fewer complications.

### **Adult Overweight and Obesity**

Being overweight or obese increases the risk for multiple chronic diseases, including heart disease, stroke, hypertension, type 2 diabetes, osteoarthritis and certain cancers. An appropriate amount, intensity and duration of regular physical activity and decreased caloric intake, especially fat, might reduce a person's body mass index (BMI). Although Colorado is one of the leanest states in the nation, the prevalence of obesity is increasing. From 1995 through 2008 the prevalence of adult obesity in Colorado increased from 10.1 to 19.1%. More than half of the adults in Colorado are overweight or obese. In 2013 the number of adult Coloradans who were overweight (BMI)  $\geq 25 \text{ kg/m}^2$  was 35.1% and 21.3% were obese (BMI)  $\geq 30 \text{ kg/m}^2$ ; 57.1% were either overweight or obese. Overweight and obesity prevalence are higher among minorities, lower educated adults, and those with the lowest incomes.

### **Childhood Obesity**

While Colorado is considered the leanest state in the nation for adults, that is not true for children. Colorado ranks 23<sup>rd</sup> for childhood obesity for children aged 2-14 years. Currently, 14.8% of children aged 2-14 years in Colorado are considered obese, and 27.4% categorized as overweight or obese. Colorado ranks 5<sup>th</sup> nationally for childhood obesity for children aged 10-17 years, with 10.9% considered as obese. Efforts to address childhood obesity have increased in recent years, and in particular with First Lady Michelle Obama's 'Let's Move' campaign. In the past several years obesity prevention programs and policies have increased exponentially in number, strength and breadth. A recent poll shows that 80% of Americans recognize that obesity is a significant and growing challenge for the country. Furthermore, 50% of Americans believe that childhood obesity carries such importance that more should be invested immediately to prevent it.

### **Cardiovascular Disease (CVD)**

CVD is a leading cause of death in Colorado, accounting for about 30% of all deaths. On average one Coloradan dies every hour due to CVD. Modifiable risk factors for CVD include lifestyle behaviors (e.g., tobacco use, physical inactivity and improper nutrition), health status (e.g., hypertension, hyperlipidemia, overweight or diabetes) and policies (e.g., smoking policies in restaurants and worksites). Substantial differences in CVD death rates exist by race, age, sex, place of residence and other demographic factors.

Elevated levels of serum cholesterol can lead to development of atherosclerosis. Approximately 30% to 40% of coronary heart disease and 10% to 20% of strokes in the United States are attributable to elevated serum cholesterol. Elevated cholesterol has been associated with physical inactivity, high fat intake,

tobacco use, diabetes and obesity. Lifestyle changes can reduce cholesterol and prevent heart disease among persons with elevated serum cholesterol.

Approximately 20% to 30% of coronary heart disease and 20% to 50% of strokes in the United States are attributable to uncontrolled hypertension. Blood pressure-related cardiovascular complications can occur before the onset of established hypertension. Lifestyle risk factors for hypertension include high sodium intake, excessive caloric intake, physical inactivity, excessive alcohol consumption and deficient potassium intake. Lifestyle changes can reduce blood pressure.

### **Diabetes**

The burden of diabetes in the United States has grown with the increasing prevalence of obesity. Diabetes affected about one in 13 Colorado adults (or 7.4% of the adult population) in 2012 impacting their quality of life and ability to work. Prevalence was highest among African Americans (10.9%), Hispanics (11.1%), those with less than a high school degree (12.3%), and those with annual incomes less than \$25,000 (10.4%). While Colorado death rates for diabetes consistently have been lower than those nationally since 1994, it remains one of the top ten leading causes of death in the state. Obesity contributes greatly to the onset of diabetes in children, adolescents and adults.

### **Healthy Lifestyles**

Approximately 400,000 deaths each year in the United States are attributable to physical inactivity and poor nutrition. Fruit and vegetable consumption and physical activity are all lifestyle behaviors that contribute to overall good health. The Nutrition and Health Promotion work team will focus programming on healthy eating, specifically fruit and vegetable consumption, physical activity, and lifestyle behaviors.

### **Fruit and Vegetable Consumption**

Dietary intake of five or more servings of fruits and vegetables per day is associated with reduced risk of coronary heart disease and certain types of cancer including cancer of the colon, rectum, oral cavity, pharynx, stomach and esophagus. In 2009, approximately one in four adults (24.8%) in Colorado and in the United States (23.5%) consumed five or more servings of fruit and vegetables daily. In 2013, approximately 18.8% of children in Colorado aged 1to 14 consumed five or more servings of fruit and vegetables daily.

Between 1994 and 2005 approximately one in four adults (25.4%) in Colorado consumed five or more servings of fruit and vegetables daily, and consumption of fruits and vegetables varied among demographic groups:

- A higher proportion of women consumed the recommended amount than men (30% vs. 18.9%);
- Of those aged 55 and older 30.8% consumed the recommended amount compared to 22.2% of those younger than 55 years of age;
- A lower proportion of Hispanics (19.6%) and African-Americans (17.9%) consumed five or more servings compared to non-Hispanic Whites (25.7%);
- The number of college graduates who consumed five or more servings 29.4% compared to 21.4% of those without a college degree;
- A statistically higher proportion of adults earning \$25,000 or more per year (25.3%) consumed five or more servings daily compared to adults earning less than \$25,000 per year (19.3%).

## **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**

Lifestyle factors, such as poor diet, physical inactivity and tobacco use, account for approximately 51% of one's health status. The impact of improved nutrition and physical activity behaviors on chronic diseases can be quite significant. Extension has the potential to improve the health of Colorado citizens by offering programming in Nutrition and Health Promotion which improves knowledge of chronic disease risk, enhances positive dietary and physical activity behaviors, and encourages environmental changes conducive to living a healthy lifestyle. The potential long-term impact of Extension programming includes decreased prevalence of chronic diseases.

CDC reports that foodborne illness rates are not decreasing and there continues to be a decline in basic consumer food safety practices such as washing hands with soap and water (89% in 2010 vs. 92 % in 2008). Food safety education can decrease the risk of contamination and foodborne illness. At Colorado's Land Grant university and only university with a food science/food safety curriculum supported by AES, CSU Extension's food safety educators, anchored in the Department of Food Science and Human Nutrition (FSHN), provide valuable research-based information, expertise, and training opportunities for consumers of various ages, retail food workers, health care professionals, agricultural food producers, and food safety educators. Extension has the potential long-term impact to help reduce incidence and risk of foodborne illness among Colorado citizens through food safety education programming efforts, aimed at improving knowledge of and intent to adopt these food safety principles in all aspects of safe food from farm to table.

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

The goal of this PRU is to promote adoption of healthful eating and activity patterns and ensure an abundant and safe food supply for all. Adoption of healthful eating and activity patterns can enhance the overall health and wellbeing of children, youth, adults, and the growing senior population. Through various programs, CSU AES and Extension contributes to statewide efforts to increase fruit and vegetable consumption, increase physical activity, and decrease overweight/obesity risk in Colorado. Adoption of food safety knowledge and safe food handling practices will ultimately reduce the incidence of foodborne disease in Colorado, especially among the most vulnerable populations (infants, young children and individuals who are immuno-compromised through aging, medical intervention, and illness). CSU AES and Extension contributes to statewide efforts in decreasing incidence of foodborne illness through direct and indirect education of consumers, food managers and workers, food growers, farmers' market managers, cottage food entrepreneurs, health professionals, caretakers and others.

**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

2017	45.0	0.0	2.0	0.0
2018	45.0	0.0	2.0	0.0
2019	45.0	0.0	2.0	0.0
2020	45.0	0.0	2.0	0.0
2021	45.0	0.0	2.0	0.0

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

**1. Activity for the Program**

Conduct basic and applied research on nutrition and wellness.

HEALTH PROMOTION & DISEASE PREVENTION (NH) programs include:

- Strong Women, Strong Bones
- Heart Disease Awareness & Prevention
- Diabetes Awareness, Prevention and Management
- Nutrition Education for Low-income Audiences
- Nutrition and Wellness
- Multi-lesson series: Dining with Diabetes, Small Changes Make a Big Difference, Strong Women-Strong Bones, Moving Toward a Healthier You, Healthy Heart, Smart-START for a Healthy Heart
- Self-paced program - Self-Care for a Healthy Heart
- Single lessons - Workable Wellness (work site wellness).
- Youth programs: Food Friends-Making New Foods Fun for Kids, Eating Right Is Basic, Chef Combo's Fantastic Adventures in Tasting and Nutrition, Professor Popcorn

FOOD SAFETY (FSAFE) Education

- Food Safety training for consumers, high risk audiences and their caregivers.(Eat Well for Less, La Cocina Saludable, Work site Wellness, Safe Home Food Preparation and Preservation, Promotion at Farmers Markets.)
- Food Safety Training for Food Service Managers and Workers (Food Safety Works, ServSafe, Food Safety for Food Bank Workers).Some of these programs are fee-based.

Promoting Food Security

- Multi-lesson series programs-Eat Well for Less, La Cocina Saludable]
  - Single event programs targeting limited resource families
  - Newsletters-Senior Nutrition News
- Research
- Development of new technologies for improving food safety
  - Determine important relationships between diet, food composition, and health

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

**Extension**

<b>Direct Methods</b>	<b>Indirect Methods</b>
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<ul style="list-style-type: none"><li>● Education Class</li><li>● Workshop</li><li>● Group Discussion</li><li>● One-on-One Intervention</li><li>● Demonstrations</li><li>● Other 1 (Public Meetings)</li></ul>	<ul style="list-style-type: none"><li>● Public Service Announcement</li><li>● Newsletters</li><li>● Web sites other than eXtension</li><li>● Other 1 (Newspaper columns &amp; News release)</li></ul>
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### 3. Description of targeted audience

Targeted audiences include preschool children, youth preK-12, adults of all ages, limited resource families, pregnant women, seniors and caretakers responsible for the health and well-being of these specific audiences. Additional specific audiences include small food producers, food handlers, Colorado cottage food entrepreneurs and farmers' market managers and food vendors.

For Research: - Producers and processors of plant and animal agricultural products.

### V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

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

### **1. Output Measure**

- 1.Number of group educational events: classes, trainings, workshops, demonstrations, field days, providing content expertise, fairs, shows, booths, and/or other group events.
  - 2.Individual Education: one-on-one direct client contacts by site visit, office drop-in, e-mail, telephone, Ask an eXpert, etc.
  - 3.Number of meetings convened and/or facilitated; includes strategic participation that contributes to program development.
  - 4.Number of kits or similar resources loaned or provided.
  - 5.Number of Extension-related research and assessment projects. External funding proposals, including local, state, federal. NH 9) Newsletters - This is number of newsletters, not number mailed or number of Coloradans who received them, such as Family Matters & others.
  - 7.Number of educational media releases: indirect contacts through media releases, appearances, newsletters, blog posts, other non-peer reviewed publications, kit development, non-peer reviewed curriculum, PowerPoints or videos.
  - 8.Number of online posts: Web posts, hits.
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

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

O. No	Outcome Name
1	NFSH A1.1a Action Outcome (Intent to Change): NFSH A1.1a The number of Coloradans that reported an intention to eat more of healthy foods.
2	NFSH A1.1b Action Outcome (Behavior Change): NFSH A1.1b The number of Coloradans that reported eating more of healthy foods.
3	NFSH A1.2a The number of Coloradans that reported an intention to eat less of foods/food components which are commonly eaten in excess.
4	NFSH A1.2b The number of Coloradans that reported eating less of foods/food components which are commonly eaten in excess.
5	NFSH A2.1a The number of Coloradans that reported an intention to increase their physical activity and/or reducing sedentary time.
6	NFSH A2.1b The number of Coloradans that reported increasing their physical activity, reducing sedentary time, or meeting the recommended amount of physical activity.
7	NFSH A3.1a. Participants who report intent to adopt recommended food safety practices related to safe food production, processing, transport, preparation, preservation, consumption and/or food storage.
8	NFSH A3.2. Participants will adopt skills necessary to teach others about food safety practices that reduce risk of foodborne illness.
9	NFSH A3.1b. Action Outcome (Behavior Change): Participants who report adopting a learned food safety practice related to safe food production, processing, transport, preparation, preservation, consumption and/or food storage.
10	NFSH L4.1a. Learning Outcome (Knowledge Gained): Participants who gain knowledge necessary to apply food safety principles in a work-related setting and to teach these principles to others.

**Outcome # 1**

**1. Outcome Target**

NFSH A1.1a Action Outcome (Intent to Change):

NFSH A1.1a The number of Coloradans that reported an intention to eat more of healthy foods.

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

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

- 703 - Nutrition Education and Behavior

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

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

NFSH A1.1b Action Outcome (Behavior Change):

NFSH A1.1b The number of Coloradans that reported eating more of healthy foods.

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

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

- 703 - Nutrition Education and Behavior
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

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

- 1862 Extension

**Outcome # 3**

**1. Outcome Target**

NFSH A1.2a The number of Coloradans that reported an intention to eat less of foods/food components which are commonly eaten in excess.

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

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

- 703 - Nutrition Education and Behavior

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

- 1862 Extension

#### **Outcome # 4**

##### **1. Outcome Target**

NFSH A1.2b The number of Coloradans that reported eating less of foods/food components which are commonly eaten in excess.

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

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

- 703 - Nutrition Education and Behavior

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

- 1862 Extension

#### **Outcome # 5**

##### **1. Outcome Target**

NFSH A2.1a The number of Coloradans that reported an intention to increase their physical activity and/or reducing sedentary time.

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

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

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

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

- 1862 Extension

#### **Outcome # 6**

##### **1. Outcome Target**

NFSH A2.1b The number of Coloradans that reported increasing their physical activity, reducing sedentary time, or meeting the recommended amount of physical activity.

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

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

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

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

- 1862 Extension

**Outcome # 7**

**1. Outcome Target**

NFSH A3.1a. Participants who report intent to adopt recommended food safety practices related to safe food production, processing, transport, preparation, preservation, consumption and/or food storage.

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

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

- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 503 - Quality Maintenance in Storing and Marketing Food Products

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

- 1862 Extension

**Outcome # 8**

**1. Outcome Target**

NFSH A3.2. Participants will adopt skills necessary to teach others about food safety practices that reduce risk of foodborne illness.

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

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

- 503 - Quality Maintenance in Storing and Marketing Food Products
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins



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

- 1862 Extension

#### **Outcome # 9**

##### **1. Outcome Target**

NFSH A3.1b. Action Outcome (Behavior Change):  
Participants who report adopting a learned food safety practice related to safe food production, processing, transport, preparation, preservation, consumption and/or food storage.

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

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

- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 503 - Quality Maintenance in Storing and Marketing Food Products

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

- 1862 Extension

#### **Outcome # 10**

##### **1. Outcome Target**

NFSH L4.1a. Learning Outcome (Knowledge Gained):  
Participants who gain knowledge necessary to apply food safety principles in a work-related setting and to teach these principles to others.

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

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

- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 503 - Quality Maintenance in Storing and Marketing Food Products

##### **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 Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

### Description

#### Natural Disasters:

- Wild fires, power outages brought on by weather extremes (flooding, storms, tornados,) or other reasons creates the need for timely and effective food safety education during both the crisis and recovery period involving collaboration with public health and government agencies, the media, emergency response networks and others depending on the situation.
- An emergency may also result from loss of employment, therefore decreasing financial resources available to purchase foods. Whatever the situation, knowledge of food safety and storage is important.

#### Economy:

- Can affect food safety, nutrition and health, such as affordability and accessibility to safe and wholesome foods. Families with limited resources can benefit from information such as how to stretch food dollars to provide healthful and safe foods. Individuals seeking jobs need support with entrepreneurial efforts such as starting a Cottage Foods business.

#### Public policy changes:

- Can affect food safety, nutrition and health, such as affordability and accessibility to safe and wholesome foods. Examples may include changes to school wellness policies; training opportunities for school personnel and food service staff, increases in funding for childhood obesity in the state and communities.

#### Government regulations:

- Changes in FDA food code effect food safety training opportunities for retail food and school food service staff. Legislation changes regarding the cottage food industry may require focused effort by this PRU to develop and deliver targeted food safety education. Funding for SNAP-ED and EFNEP is provided through federal sources. Changes in funding or program guidelines are plausible. Additionally, legislation regarding the School Nutrition program and the Farm bill may influence Extension programming.

#### Competing Public priorities

- In today's economic climate, Extension staff and partner agencies are being asked to do more with less. Nutrition, food safety and health promotion programming may be a lower priority in some areas due to competing public priorities at both the local and state levels.

#### Population Changes:

- Increased numbers of Spanish speaking audiences requires greater accessibility to educational

materials translated into Spanish.

## **V(K). Planned Program - Planned Evaluation Studies**

### **Description of Planned Evaluation Studies**

For this PRU, evaluation will be performed by:

#### **In-State and Multi-State Extension:**

Distributing questionnaires to program participants:

- The questionnaires will be done both pre and post program, depending on the specific program.
- The questionnaires will ask questions focused primarily on changes in knowledge, intent to change behavior, and reported behavior change.
- The questionnaires will help us measure the percentage of program participants who increased their knowledge pertaining to the program topic.
- The results of the questionnaires will be used in writing impact statements or reports that highlight the efforts of this PRU.
- CSU Extension Website hits both State site and County sites, and other social media is used to disseminate information throughout the State.

#### **Integrated Research and Extension:**

Integrated research projects will use a variety of evaluation measures, as outlined in grant proposals. This includes direct observation and questionnaires for outcome measures. Process measures will also be measured using a variety of written and oral methods.

#### **Multi-state Research and Extension:**

Multi-state research projects will use a variety of evaluation measures, as outlined in grant proposals. This includes focus groups and community readiness conversations for assessment.

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

**Program # 4**

**1. Name of the Planned Program**

Livestock & Range

**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 beef, dairy, and sheep production systems, biosecurity, economic and risk management, and response to policy and consumer changes.

Extension's Livestock and Range (L&R) Reporting Unit strives for rangeland health, improved animal health and production, industry policy and regulation awareness, and economic sustainability using a broad array of methodologies that provide information, skills, and technology to producers and L&R Unit members. This PRU is designed for Extension Programming for livestock producers, ranchers, and rangeland managers who have, or are striving for, a significant portion of their personal income coming from the farm/ranch. These may be small farms/ranches or larger scale operations. Livestock producers may also integrate cropping production systems into their operation.

**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
121	Management of Range Resources	50%		0%	
301	Reproductive Performance of Animals	0%		10%	
302	Nutrient Utilization in Animals	0%		10%	
303	Genetic Improvement of Animals	0%		20%	
307	Animal Management Systems	50%		30%	
311	Animal Diseases	0%		10%	
315	Animal Welfare/Well-Being and Protection	0%		10%	
601	Economics of Agricultural Production and Farm Management	0%		10%	
	<b>Total</b>	100%		100%	

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

### **1. Situation and priorities**

In 2012, the National Ag Census ranked Colorado as 5<sup>th</sup> in the nation for value of cattle and calves (\$4.3 billion) which is over half of the total market value of agricultural products sold in Colorado. During the same period, Colorado ranked 3<sup>rd</sup> in the nation for sheep, goats, wool, mohair, and milk sales (\$87 million). As of January 2012, there were 2.75 million cattle and calves in the state. However, due primarily to drought in the state, cattle and calve numbers have dropped back to 2.48 million, as of January of 2014. The economic contribution from cattle is greater than 3 times that of grains, oilseeds, dry beans and dry peas (\$1.4 billion). Milk cows in the state, during 2013, were 135,000 head and average milk production per cow per year was 23,430 pounds. Total milk produced for the state was 3.16 billion pounds per year. The number of sheep estimated in the state in January of 2012 was 460,000 with that number declining to 365,000 in 2014, which is still near the average inventory for the last seven years. As of December of 2011, the total estimated number of horses and pigs in the state was 720,000. Overall, rangeland and livestock are among the most important agricultural resources in the state.

#### Background:

There are over 30,000 farms and ranches in Colorado consisting of over 30,000,000 acres of agricultural land (land in farms and ranches), 46% of the state's total land area of 66.3 million acres. Colorado's agricultural industry has lost nearly 2 million acres of agricultural land over the last ten years. Agricultural land in Colorado is being converted in three primary ways: urban and built up lands, low density non-agricultural rural land, and public open lands. As we continue to lose acres of agricultural land, we also continue to have fewer days spent working on the farm or ranch. 38.5% of operators worked 200 days or more off the farm or ranch.

Thirty-five percent of the land in Colorado used for agriculture is federally owned. Additionally, agriculture land represents more than 85% of the private, undeveloped land in Colorado. Over 60% of all of the land used in Colorado for agriculture is utilized as pastureland.

#### Sources:

<http://www.agcensus.usda.gov/>  
<http://www.nass.usda.gov>  
[http://www.nass.usda.gov/Statistics\\_by\\_State/Ag\\_Overview/AgOverview\\_CO.pdf](http://www.nass.usda.gov/Statistics_by_State/Ag_Overview/AgOverview_CO.pdf)  
<http://csfs.colostate.edu/pages/land-use-ownership.html>  
[http://www.nass.usda.gov/Statistics\\_by\\_State/Colorado/Publications/Annual\\_Statistical\\_Bulletin/Bulletin2014.pdf](http://www.nass.usda.gov/Statistics_by_State/Colorado/Publications/Annual_Statistical_Bulletin/Bulletin2014.pdf)

#### Priorities:

Rangeland health  
Improved animal health and production  
Improved industry policy and regulation awareness  
Economic sustainability

### **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**

Research in beef production management systems and nutrition is conducted on CSU owned facilities at the Agricultural Research, Development, and Education Center (ARDEC), Eastern 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 market economists. ARDEC hosts seed stock herds for Angus and Hereford. The University has several significant assets, including the Western Center for Integrated Resource Management, the Center for Genetic Evaluation of Livestock, and strength in research and graduate programs in beef nutrition and breeding. 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 system.

Members of the Livestock and Range PRU have demonstrated expertise and recognition in areas of livestock and range research and educational efforts. This expertise spans several departments, colleges and disciplines. For example, within the Animal Science Department production expertise in cattle nutrition, reproduction, genetics and meat science are all represented. In addition, members of the work team represent veterinary medicine, rangeland science as well as agricultural economics. The team also has broad representation from both on-campus and off-campus faculty.

Many of the team members have worked together in various efforts in the past and have demonstrated their ability to be effective.

**2. Ultimate goal(s) of this 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

The Livestock and Range (L&R) Reporting Unit strives for rangeland health, improved animal health and production, industry policy and regulation awareness, and economic sustainability using a broad array of methodologies that provide information, skills, and technology to producers and L&R Unit members. This PRU is designed for Extension Programming for livestock producers, ranchers, and rangeland managers who have, or are striving for, a significant portion of their personal income coming from the farm/ranch. These may be small farms/ranches or larger scale operations. Livestock producers may also integrate cropping production systems into their operation.

**V(E). Planned Program (Inputs)**

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

Year	Extension		Research	
		1862	1890	1862

2017	13.0	0.0	6.0	0.0
2018	13.0	0.0	7.0	0.0
2019	13.0	0.0	8.0	0.0
2020	13.0	0.0	8.0	0.0
2021	13.0	0.0	8.0	0.0

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

**1. Activity for the Program**

- Workshops and educational classes for producers
- Demonstration field days to showcase the results
- Individual counseling on producers' specific problems
- Conduct basic and applied research on 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
<ul style="list-style-type: none"> <li>• Education Class</li> <li>• Workshop</li> <li>• Group Discussion</li> <li>• One-on-One Intervention</li> <li>• Demonstrations</li> <li>• Other 1 (Field Days)</li> <li>• Other 2 (Workshop)</li> </ul>	<ul style="list-style-type: none"> <li>• Public Service Announcement</li> <li>• Newsletters</li> <li>• Web sites other than eXtension</li> </ul>

**3. Description of targeted audience**

Youth and adult livestock producers as well rangeland managers and ranchers.

## V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

## V(H). State Defined Outputs

### 1. Output Measure

- 1.Number of group educational events: classes, trainings, workshops, demonstrations, field days, providing content expertise, fairs, shows, booths, and/or other group events.
- 2.Individual Education: one-on-one direct client contacts by site visit, office drop-in, e-mail, telephone, Ask an eXpert, etc.
- 3.Number of meetings convened and/or facilitated; includes strategic participation that contributes to program development.
- 4.Number of kits or similar resources loaned or provided.
- 5.Number of Extension-related research and assessment projects. External funding proposals, including local, state, federal.
- 7.Number of media releases: indirect contacts through educational media releases, appearances, newsletters, blog posts, other non-peer reviewed publications, kit development, non-peer reviewed curriculum, PowerPoints or videos.
- 8.Number of online posts: Web posts, hits.

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.



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

O. No	Outcome Name
1	LR Action Outcome 1.1: Livestock and range land managers apply newly gained information, technology, or skills to improve animal health and/or animal production.
2	LR Action Outcome 1.2: Livestock and range land managers apply newly gained information, technology, or skills to improve range land health.
3	LR Action Outcome 1.3: Livestock and rangeland managers apply newly gained information, technology, or skills to improve economic sustainability.
4	LR Action Outcome 1.4: Livestock and rangeland managers develop/write a management plan (i.e. grazing plan, feeding plan, drought plan, business plan, etc.)
5	LR Action Outcome 1.5: Number of animals where health/production was affected/improved.
6	LR Action Outcome 1.6: Number of acres on which rangeland health was affected/improved.
7	LR Action Outcome 2.1: Livestock and range land managers apply newly gained information in their decision making process for following or developing new industry policies and regulations.
8	Evaluation of Genetic Beef Cattle

**Outcome # 1**

**1. Outcome Target**

LR Action Outcome 1.1: Livestock and range land managers apply newly gained information, technology, or skills to improve animal health and/or animal production.

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

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

- 307 - Animal Management Systems

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

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

LR Action Outcome 1.2: Livestock and range land managers apply newly gained information, technology, or skills to improve range land health.

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

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

- 121 - Management of Range Resources

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

- 1862 Extension

**Outcome # 3**

**1. Outcome Target**

LR Action Outcome 1.3: Livestock and rangeland managers apply newly gained information, technology, or skills to improve economic sustainability.

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

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

- 121 - Management of Range Resources
- 307 - Animal Management Systems

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

- 1862 Extension

#### **Outcome # 4**

##### **1. Outcome Target**

LR Action Outcome 1.4: Livestock and rangeland managers develop/write a management plan (i.e. grazing plan, feeding plan, drought plan, business plan, etc.)

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

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

- 121 - Management of Range Resources
- 307 - Animal Management Systems

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

- 1862 Extension

#### **Outcome # 5**

##### **1. Outcome Target**

LR Action Outcome 1.5: Number of animals where health/production was affected/improved.

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

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

- 307 - Animal Management Systems

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

- 1862 Extension

#### **Outcome # 6**

##### **1. Outcome Target**

LR Action Outcome 1.6: Number of acres on which rangeland health was affected/improved.

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

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

- 121 - Management of Range Resources

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

- 1862 Extension

**Outcome # 7**

**1. Outcome Target**

LR Action Outcome 2.1: Livestock and range land managers apply newly gained information in their decision making process for following or developing new industry policies and regulations.

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

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

- 121 - Management of Range Resources
- 307 - Animal Management Systems

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

- 1862 Extension

**Outcome # 8**

**1. Outcome Target**

Evaluation of Genetic Beef Cattle

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

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

- 303 - Genetic Improvement of Animals

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

- 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**

Livestock and range outcomes are dependent on public policies/regulations, climate, disease outbreaks for forages and livestock, and episodic natural disasters such as drought, flooding, blizzards, and wildfire. Additionally, changes in the stock market as well as increasing input costs (e.g. fuel costs) will affect livestock and range outcomes. These external factors will be addressed when possible in education and research efforts, but their influence on outcomes is likely to continue into the future.

## **V(K). Planned Program - Planned Evaluation Studies**

### **Description of Planned Evaluation Studies**

A statewide survey has been developed for all Livestock and Range PRU members to use. This survey is divided to represent the 4 quarters of the state, NE, SE, SW, NW allowing an overall summary and area-specific summary for all livestock and range programming needs. This survey also allows participants to list specific programming needs and delivery method. This survey will also allow the PRU to develop an entire statewide programming effort when needed.

Evaluations will occur immediately following the educational programs (short term).

Evaluations will occur 6-12 months following the program to determine if changes were incorporated (medium term).

Evaluations will be conducted 2-5 years following the program to determine the sustainability of the change and the economic return gained as a result of the change (long term).

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

### **Program # 5**

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

Cropping Systems

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

Plant biology linking basic science with applied science is important to bring the results of basic plant science toward a usable form for applied agricultural sciences. Molecular biology and genomics are opening many new pathways for crop plant improvement and pest management, which will enhance the economic development of agricultural regions, enhance human health through more nutritious and safer food products, and find fundamental solutions to societal issues through renewable and sustainable crop production and pest management. Successful applied crop science, environmental science, and pest management only occur through collaboration with scientists actively involved in fundamental plant and pest sciences

The Cropping Systems Extension Planning & Reporting Unit (PRU) strives for crop (grain, forage, vegetable, fruit, and specialty) and farm sustainability using a broad array of methodologies that provides education to producers and Team/Unit members. The concept of agricultural sustainability is multidimensional, as it applies to social, economic, and environmental dimensions simultaneously. This PRU is designed for Extension Programming for Crop & Produce producers who have, or are striving for, a significant portion of their personal income coming from the farm. These may be small farm or specialty crop producers or larger scale - primarily commodity crop - producers. They may also integrate plant and animal production systems.

**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

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
102	Soil, Plant, Water, Nutrient Relationships	58%		0%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		10%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		10%	
205	Plant Management Systems	0%		15%	
206	Basic Plant Biology	0%		10%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		10%	
212	Diseases and Nematodes Affecting Plants	0%		10%	
213	Weeds Affecting Plants	0%		10%	
215	Biological Control of Pests Affecting Plants	0%		10%	
216	Integrated Pest Management Systems	34%		10%	
601	Economics of Agricultural Production and Farm Management	8%		5%	
	<b>Total</b>	100%		100%	

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

## 1. Situation and priorities

Fundamental plant biology linking basic science with applied science is important to bring the results of basic plant science toward a usable form for applied agricultural sciences. Molecular biology and genomics are opening many new pathways for crop plant improvement and pest management, which will enhance the economic development of agricultural regions, enhance human health through more nutritious and safer food products, and find fundamental solutions to societal issues through renewable and sustainable crop production and pest management. Non-hybrid crop plants require public investment in genetic improvement to provide varieties of cultivars which improve yield, resist environmental and pest stresses, and serve the consuming public. Colorado State has a history of providing cultivar breeding for wheat, dry beans, and potatoes to serve the industries in climatic zones represented in Colorado.

Colorado crop producers generate over \$1.16 billion annually from the production of wheat, corn, and hay, according to the Colorado Department of Agriculture. Of crop production across the United States, Colorado ranks 6<sup>th</sup> in winter wheat (8<sup>th</sup> for all wheat), 15<sup>th</sup> in corn for grain, and 10<sup>th</sup> in alfalfa. Additionally, Colorado ranks 1<sup>st</sup> among all states in the production of proso millet and 7<sup>th</sup> in grain sorghum production. Colorado had just over 37,000 farms in 2007 accounting for 31,604,911 acres, 5.89 million acres of harvested cropland, and 2.9 million acres of irrigated land, according to the 2007 Census of Agriculture.

In 2011 Colorado produce growers sold \$250M worth of potatoes, \$204M worth of other vegetables, and \$32M worth of fruit (\$485M for all fruits and vegetables combined) according to the "Value Chain of

Colorado Ag", Graff, et al, 2013, CSU. Local food sales accounted for \$22M in direct sales and \$66M in intermediated sales (Ibid).

Of the 37,054 Colorado farms captured in the 2007 Census of Agriculture, 33,404 were in the economic class of small farms (annual receipts less than \$250,000). That equates to 90% of all farms in Colorado classified as "small farms".

Many of these small farm operators are beginning farmers (0 - 10 years of experience as defined by the USDA). Since 2007, over 300 beginning farmers throughout Colorado launched businesses in produce, specialty crops, and niche livestock after having participated in the CSU program Building Farmers in the West program (<http://buildingfarmers.colostate.edu/>). These new clientele view CSU as a go-to source for business planning and management education. We also offer advice, experiential learning opportunities (mentorships and internships), and advanced classes in business management, soil fertility, irrigation management, pest management, and other resources for direct market enterprises.

Diagnostics and management of endemic and invasive weeds, insect pests and plant pathogens, as well as abiotic stress effects, are some of the most costly inputs that clientele in agriculture must finance every year in Colorado. It is important for growers, to acquire skills to identify pests and implement new and proven pest management technologies into an integrated approach.

Members of the Planning & Reporting Unit (PRU) have demonstrated expertise and recognition in areas of crop production, pest management, irrigation management, research, beginning farmer development, and educational programming. This is especially true for the production and marketing of winter wheat. Colorado State University researchers and educators have historically worked closely with producers and commodity groups (local, state, and national) to produce and market winter wheat.

## **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**

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) embedded among strong programs of plant breeding and crop production research to address the interactions between crop composition and human health.

Crop production is very significant to not only Colorado's agricultural economy but the economy of the entire state. In the recent decade, Colorado farmers have experienced an increase in frequency of drought, crop input cost and market price volatility, and greater demands on irrigation water. CSU's researchers and Extension educators need to be pro-active in their research and educational programming



of pest control, seed varieties, irrigation water management, as well as additional production practices and marketing strategies.

- continued staffing of large & small farm & specialty crop Extension and research positions
- continued increase in population of Colorado

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

•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.

•Combine the knowledge of human nutrition and plant genetics to extend crop selection, germplasm screening, and crop improvement with the objective to build greater amounts of compounds relevant to improved human health and disease prevention into these crops.

•Research in plant selection and improvement, limited-irrigation landscape plant cultivation, and landscape policies, and outreach in landscape industry plant selection, cultivation management, and Master Gardener education and volunteer development.

•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.

For Extension:

It is the goal of this Planning & Reporting Unit (PRU) for the producers of Colorado crops to adopt and implement improved, productive, and sustainable agricultural systems that will lead to the success of farms. Furthermore, these producer actions will improve the ability of farm operations to persist and thrive through successive generations of operators. Individuals, families, and communities will all benefit by having a safe, secure and sufficient food supply. Colorado crop producers will accommodate to the growth of demand for local and world crop production without compromising the natural resources upon which agriculture depends.

**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
2017	15.0	0.0	26.0	0.0
2018	15.0	0.0	26.0	0.0

2019	15.0	0.0	26.0	0.0
2020	15.0	0.0	26.0	0.0
2021	15.0	0.0	26.0	0.0

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

**1. Activity for the Program**

- Conduct basic and applied research in plant productions systems.
- Workshops and educational classes for producers.
- Utilize demonstration plots and field days to communicate program results.
- Use individual counseling with producers and clientele on specific plant production problems.

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

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>• Education Class</li> <li>• Workshop</li> <li>• Group Discussion</li> <li>• One-on-One Intervention</li> <li>• Demonstrations</li> <li>• Other 1 (Field Days)</li> </ul>	<ul style="list-style-type: none"> <li>• Public Service Announcement</li> <li>• Newsletters</li> <li>• Web sites other than eXtension</li> <li>• Other 1 (Radio reports)</li> </ul>

**3. Description of targeted audience**

Individual agricultural producers, homeowners, agribusinesses, and commodity organizations.

## V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

## V(H). State Defined Outputs

### 1. Output Measure

- 1.Number of group educational events: classes, trainings, workshops, demonstrations, field days, providing content expertise, fairs, shows, booths, and/or other group events.
- 2.Individual Education: one-on-one direct client contacts by site visit, office drop-in, e-mail, telephone, Ask an eXpert, etc.
- 3.Number of meetings convened and/or facilitated; includes strategic participation that contributes to program development.
- 4.Number of kits or similar resources loaned or provided.
- 5.Number of Extension-related research and assessment projects. External funding proposals, including local, state, federal.
- 7.Number of media releases: indirect contacts through media releases, appearances, newsletters, blog posts, other non-peer reviewed publications, kit development, non-peer reviewed curriculum, PowerPoints or videos.
- 8.Number of online posts: Web posts, hits.

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

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

O. No	Outcome Name
1	CS Outcome 1.1: Participants apply research-based techniques for improving soil quality and productivity, protecting and making the best uses of water resources, managing crop nutrients, and/or enhancing plant yields and quality in their farm fields.
2	CS Outcome 1.2: Participants use research-based knowledge of integrated pest management systems for the crops and cropping systems in their farmed fields and/or their adjacent landscapes within their property and right-of-ways.
3	CS Outcome 1.4: Participants write estate & farm transition plans with the intent to transfer farm management & eventual ownership to subsequent generations inside or outside families.
4	Improvement of Quality and Performance of Colorado wheat
5	Colorado Potato Breeding Program

### **Outcome # 1**

#### **1. Outcome Target**

CS Outcome 1.1: Participants apply research-based techniques for improving soil quality and productivity, protecting and making the best uses of water resources, managing crop nutrients, and/or enhancing plant yields and quality in their farm fields.

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

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

- 102 - Soil, Plant, Water, Nutrient Relationships

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

- 1862 Extension
- 1862 Research

### **Outcome # 2**

#### **1. Outcome Target**

CS Outcome 1.2: Participants use research-based knowledge of integrated pest management systems for the crops and cropping systems in their farmed fields and/or their adjacent landscapes within their property and right-of-ways.

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

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

- 216 - Integrated Pest Management Systems

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

- 1862 Extension
- 1862 Research

### **Outcome # 3**

#### **1. Outcome Target**

CS Outcome 1.4: Participants write estate & farm transition plans with the intent to transfer farm management & eventual ownership to subsequent generations inside or outside families.

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

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

- 601 - Economics of Agricultural Production and Farm Management
- 211 - Insects, Mites, and Other Arthropods Affecting Plants

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

- 1862 Extension

**Outcome # 4**

**1. Outcome Target**

Improvement of Quality and Performance of Colorado wheat

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

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

- 206 - Basic Plant Biology
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 102 - Soil, Plant, Water, Nutrient Relationships

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

- 1862 Research

**Outcome # 5**

**1. Outcome Target**

Colorado Potato Breeding Program

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

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

- 212 - Diseases and Nematodes Affecting Plants
- 206 - Basic Plant Biology
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 205 - Plant Management Systems

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

- 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
- Populations changes (immigration, new cultural groupings, etc.)

#### Description

The external factors marked above would cause changes in programming and the time Extension Agents and Specialists could devote to a specific program or topic. A natural disaster, such as drought, would cause additional programming to provide the education and information producers would need for their businesses to survive. Decreases in appropriated budgets - county and/or state - would likely force agents to alter their work on cropping issues. Members of the Crops Team would change the topics presented in a workshop, change educational programming, and/or develop new or different technologies and strategies for crop producers if there were changes in government regulations.

## V(K). Planned Program - Planned Evaluation Studies

### Description of Planned Evaluation Studies

- For this Planned Program, evaluation criteria will be adapted from the National Roadmap for Crop Management and will be performed by distributing written surveys to all program participants.
- The surveys will be done **pre and post program**.
- The surveys will ask questions focused primarily on crop, pest, and marketing management.
- The surveys will help us measure the percentage of program participants who increased their knowledge.
- The results of the surveys will be distributed to or will be used for program prioritization and reporting by team members.

Survey Tools: the following sets of questions can help team members capture and report relevant information that quantifies the impact and behavior changes of Crop and Pest Management as well as Produce Marketing programs and products on stakeholders as measured by the following indicators, outcomes and outputs. It is recommended that 5 to 10 question surveys be adapted to the event or program, and presented as a printed or electronic form (e.g., PowerPoint, Clicker technology, etc.).

The following are examples of questions that have been used or modified for Survey Tools:

- Place a pest management value on CSU extension and research from which you have benefitted - a) \$0, b) 25, c) 50, d) 100, e) more than \$125 per acre
- Has your crop management and/or pest management and/or alternative marketing knowledge increased as a result of this program by: a) 0, b) 25, c) 50, d) 75, e) 100%
- As a result of this program, will you change your action, behavior, or recommendations regarding the topics covered: a) 0, b) 25, c) 50, d) 75, e) 100% probability
- My participation at this program resulted in a total cost (travel, lodging, registration, food, etc.) and investment to the county of: a) 10, b) 25, c) 50, d) 100, e) more than \$125
- Today's speaker provided management or marketing information that I can and will use: a) strongly agree, b) agree, c) neutral, d) disagree, e) strongly disagree
- What monetary value would you place on today's workshop: a) \$0, b) \$50, c) \$200, d) \$800, e)

\$2,000

- What value change have you gained by using farm & pest management or marketing knowledge learned from this and other CSU programs in [you add the crop of interest]: a) 0, b) 5, c) 10, d) 20, e) more than 25%
- Does CSU Extension and/or Research programs and services have a positive economic impact on the community in which you live: a) strongly agree, b) agree, c) neutral, d) disagree, e) strongly disagree
- Can you identify [you add the farm, crop, or pest management or marketing issue]: a) strongly agree, b) agree, c) neutral, d) disagree, e) strongly disagree.

CSU Extension Perceived Value Questionnaire(for use in programs when possible)

The intent of these following questions is to measure workshop participants' perceived value of Extension Programs so we can better serve you, improve our programs and better measure Extension program impacts. While not required of you, Extension would appreciate knowing your perception of our programs. We may also use the data we collect for research purposes. Please take a few minutes to answer the following questions. Please do not include your name.

1. Title of the workshop/program? \_\_\_\_\_
  - a. Date \_\_\_\_\_
  - b. Location \_\_\_\_\_
  
2. Based on the information presented today, will you change a behavior?  
Yes \_\_\_\_\_
  - a. What habit or practice will you begin or improve upon? \_\_\_\_\_
  - b. What practice you will no longer do or what habit will you limit or eliminate? \_\_\_\_\_  
No \_\_\_\_\_
  
3. Because of what you learned today what is your best estimate over the next year of
  - a. Money, if any, you will save \_\_\_\_\_
  - b. Amount your income will increase \_\_\_\_\_
  - c. Grow my business \_\_\_\_\_
  
4. Having participated in this educational event, are you more likely to attend trainings/workshops/classes or make use of Extension resources in the future?  
Yes \_\_\_\_\_ Unsure \_\_\_\_\_ No \_\_\_\_\_
  
5. Colorado State University Extension is funded cooperatively among Counties, the State of Colorado, and the United States Department of Agriculture (USDA). The program you just attended was made possible, in part, by using your tax dollars to host it. Do you support the use of your tax dollars to present this educational event?  
Yes \_\_\_\_\_ Unsure \_\_\_\_\_ No \_\_\_\_\_



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

**Program # 6**

**1. Name of the Planned Program**

Natural Resources

**2. Brief summary about Planned Program**

The Natural Resources PRU is focused on how to best manage our landscapes from the perspective of plants, animals, soils, water, and pests. Our goal is to protect these resources through our programming efforts, with special emphasis on native species.

**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

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
101	Appraisal of Soil Resources	0%		10%	
102	Soil, Plant, Water, Nutrient Relationships	20%		10%	
103	Management of Saline and Sodic Soils and Salinity	0%		10%	
111	Conservation and Efficient Use of Water	20%		10%	
112	Watershed Protection and Management	0%		10%	
121	Management of Range Resources	0%		10%	
123	Management and Sustainability of Forest Resources	0%		10%	
132	Weather and Climate	0%		10%	
205	Plant Management Systems	25%		0%	
216	Integrated Pest Management Systems	15%		0%	
307	Animal Management Systems	20%		0%	
403	Waste Disposal, Recycling, and Reuse	0%		10%	
605	Natural Resource and Environmental Economics	0%		10%	
	<b>Total</b>	100%		100%	

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

### **1. Situation and priorities**

Natural Resources cover a wide range of disciplines that are captured below.

Landowners/managers who own/manage one to 100 acres embrace the rural lifestyle but do not necessarily intend to derive income from the property. According to the USDA ERS (Economic Research Service) 2007 census data, 48.5% of Colorado farms are 1-99 acres in size. The number of small farms (1-99 acres in size) has increased by 7.7% since 1997.

The 2007 US Census of Agriculture classifies 36.4% of small farms (1-100 acres) as Residential/Lifestyle properties in which operators report major non-farming occupations. Placing rural agricultural land into the hands of many diverse owners has created a new educational challenge for Extension.

According to the American Farmland Trust, population growth in Colorado is transforming traditional agricultural landscapes into low-density residential development.

Landowners/managers have a significant impact on the conditions of soil, water, plants, animals, and other natural and man-made resources through their cumulative effects. Many of these homesteaders move from cities or other states and do not have the land management knowledge base which traditional agricultural landowners hold. Therefore, the demand for information and technical assistance is immense. Weed control, water use, and grazing management are prime examples of the land management skills which many small acreage landowners seek.

In landscapes where agriculture is prevalent, new technologies are available for better management of inputs such as water, pesticides, and nutrients. With these tools it is possible to reduce the use of inputs with similar, or potentially increase, yield. One of our goals is to introduce these technologies to producers and explain how to use them for a more sustainable and profitable crop production.

Enhancing sustainability of natural and built landscapes using native plant materials and mitigating threats to native ecosystems from alien invasive species have been identified as critical issues of national importance in the West and beyond. Observations of recent climatic changes including higher temperatures, more severe droughts and lower stream flows have resulted in increasing concerns about water availability and invasion of alien weeds (Overpeck et al., 2012).

According to the Colorado Climate Center, statewide average annual precipitation is only 17 inches, with many areas receiving much less. Sustainable landscapes using site-appropriate native plants can reduce the need for water and maintenance. A 2002 study in Colorado Springs compared water use between a traditional landscape and two landscapes developed using sustainable Xeriscape principles. The study found water savings ranging from 22% to 63% after implementing the rules and regulations set forth in the 1998 Colorado Springs Landscape Code and Design Manual.

Additionally, there are a number of trends in home landscapes and gardens which further underscore the need for native plant landscaping. These include: 1) the decrease in the amount of time, money and expertise that many households have to invest in properly planting and maintaining gardens; 2) the increasing cost of water, labor, fertilizers, and chemicals; and 3) the restriction or limiting of water use for garden and landscape purposes. (O'Brien, 1996).

Invasive, non-native weeds are a concern in many communities and threaten native ecosystems. Invading alien species in the United States cause major environmental damage and economic losses adding up to almost \$120 billion per year. There are approximately 50,000 foreign species in the U.S. and the number is increasing. About 42% of the species on the Threatened or Endangered species lists are at risk primarily because of alien-invasive species (Pimentel et al., 2005).

There is a long-term need for a comprehensive, high quality integrated pest management system encompassing the disciplines of entomology, plant pathology and weed science. A conservative loss

estimate of 5 to 10% production loss due to plant pests could cost Colorado producers in urban and rural settings 50 to 100 million dollars annually. Endemic and invasive pest activity and severity, as well as abiotic stresses, are dynamic and thus demand for pest diagnostics, management education and a systems approach will be ongoing. There is no other agency or organization that can assume the core applied research and outreach IPM program of Bioagricultural Sciences and Pest Management and IPM-disciplinary based extension and research personnel throughout the Colorado State University system.

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## 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**

- With the proper education, tools, and skills, landowners/managers will become better stewards of their properties. They will enhance the sustainability of their parcels as well as their neighbors.
- They will see themselves as an interrelated system instead of a stand-alone entity, and understand that land is best managed as a collective whole because of the residual benefits received by all involved.
- With the knowledge and tools to maintain and manage their land properly, landowners will save substantial time and money.
- These practices will help maintain, or increase property values; control noxious weed spread; conserve water, land, and air quality; and provide continuity of landscape management.
- Many residents are unfamiliar with our state's local environmental conditions such as water availability, soils and elevation. Residents may find it difficult to select plants such as natives that are suited to these conditions with minimal supplemental irrigation. Economic conditions have also created a strong demand for water-efficient plants such as natives that can save residents money.

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

The Natural Resources PRU members will work together to develop and implement high quality educational programs and tools to ensure a high quality of life for Colorado citizens.

**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
2017	12.0	0.0	11.0	0.0
2018	12.0	0.0	11.0	0.0
2019	12.0	0.0	11.0	0.0
2020	12.0	0.0	11.0	0.0
2021	12.0	0.0	11.0	0.0

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

**1. Activity for the Program**

- Conduct basic and applied research on environmental and natural resources issues.
- Colorado Master Gardener training and use of trained volunteers to increase capacity
- Colorado Native Plant Masters training and use of trained volunteers to increase capacity

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

Extension	
Direct Methods	Indirect Methods

<ul style="list-style-type: none"><li>● Education Class</li><li>● Workshop</li><li>● Group Discussion</li><li>● One-on-One Intervention</li><li>● Demonstrations</li><li>● Other 1 (Field Days)</li></ul>	<ul style="list-style-type: none"><li>● Public Service Announcement</li><li>● Newsletters</li><li>● Web sites other than eXtension</li><li>● Other 1 (Radio spots)</li></ul>
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### 3. Description of targeted audience

Landowners, including small acreage (1-100 acres) and ranchers/farmers in Colorado will be our primary audience. A secondary audience will focus on training volunteers, realtors, and other professionals who in turn will take this information and educate their clientele on Extension's behalf.

### V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

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

### **1. Output Measure**

- 1.Number of group educational events: classes, trainings, workshops, demonstrations, field days, providing content expertise, fairs, shows, booths, and/or other group events.
  - 2.Individual Education: one-on-one direct client contacts by site visit, office drop-in, e-mail, telephone, Ask an eXpert, etc.
  - 3.Number of meetings convened and/or facilitated; includes strategic participation that contributes to program development.
  - 4.Number of kits or similar resources loaned or provided.
  - 5.Number of Extension-related research and assessment projects. External funding proposals, including local, state, federal. Release or Column (number submitted)
  - 7.Number of educational media releases: indirect contacts through media releases, appearances, newsletters, blog posts, other non-peer reviewed publications, kit development, non-peer reviewed curriculum, PowerPoints or videos.
  - 8.Number of online posts: Web posts, hits.
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

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

O. No	Outcome Name
1	NR 1.1) Participants report implementation or intent to implement actions relating to water quality and quantity issues (such as well and septic system management, CO Water Law and regulations, water rights, best irrigation practices, stream quality issues, and/or drought tolerant landscaping.)
2	NR 1.2) Participants report implementation or intent to implement animal/wildlife-related conservation practices (such as improved manure management, livestock emergency preparedness, attracting pollinators, enhancing wildlife habitat, and/or deterring unwanted wildlife).
3	NR 1.3) Participants report implementation or intent to implement soil-related conservation practices (such as soil health, soil fertility, soil testing, erosion control, cover crops, composting, or soil compaction).
4	NR 1.4) Participants report implementation or intent to implement plant-related conservation practices (such as active weed management, pasture management techniques, grass stand establishment, planting windbreaks, planting native plants, and/or active forest management).
5	NR 1.5): Participants improve or intend to improve their practices, decisions and skills in action through timely access to pest management resources and/or pest identification and IPM implementation.
6	NR 1.6) The number of acres reported that are impacted (by weed management, planting natives, fire mitigation, pasture grasses, etc.
7	NR 1.7) Dollars saved by best management practices.
8	NR 1.8) Grant dollars awarded towards work in natural resources.
9	NR 1.9) User fees from programming.
10	Optimizing Colorado Agriculture's Water Footprint

**Outcome # 1**

**1. Outcome Target**

NR 1.1) Participants report implementation or intent to implement actions relating to water quality and quantity issues (such as well and septic system management, CO Water Law and regulations, water rights, best irrigation practices, stream quality issues, and/or drought tolerant landscaping.)

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

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

- 111 - Conservation and Efficient Use of Water
- 102 - Soil, Plant, Water, Nutrient Relationships

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

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

NR 1.2) Participants report implementation or intent to implement animal/wildlife-related conservation practices (such as improved manure management, livestock emergency preparedness, attracting pollinators, enhancing wildlife habitat, and/or deterring unwanted wildlife).

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

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

- 307 - Animal Management Systems
- 111 - Conservation and Efficient Use of Water

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

- 1862 Extension

**Outcome # 3**

**1. Outcome Target**

NR 1.3) Participants report implementation or intent to implement soil-related conservation practices (such as soil health, soil fertility, soil testing, erosion control, cover crops, composting, or soil compaction).

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

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



- 102 - Soil, Plant, Water, Nutrient Relationships

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

- 1862 Extension

**Outcome # 4**

**1. Outcome Target**

NR 1.4) Participants report implementation or intent to implement plant-related conservation practices (such as active weed management, pasture management techniques, grass stand establishment, planting windbreaks, planting native plants, and/or active forest management).

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

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

- 205 - Plant Management Systems

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

- 1862 Extension

**Outcome # 5**

**1. Outcome Target**

NR 1.5): Participants improve or intend to improve their practices, decisions and skills in action through timely access to pest management resources and/or pest identification and IPM implementation.

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

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

- 102 - Soil, Plant, Water, Nutrient Relationships
- 216 - Integrated Pest Management Systems

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

- 1862 Extension

**Outcome # 6**

**1. Outcome Target**

NR 1.6) The number of acres reported that are impacted (by weed management, planting natives, fire mitigation, pasture grasses, etc.

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

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

- 205 - Plant Management Systems

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

- 1862 Extension

**Outcome # 7**

**1. Outcome Target**

NR 1.7) Dollars saved by best management practices.

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

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

- 307 - Animal Management Systems
- 111 - Conservation and Efficient Use of Water
- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

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

- 1862 Extension

**Outcome # 8**

**1. Outcome Target**

NR 1.8) Grant dollars awarded towards work in natural resources.

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

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

- 111 - Conservation and Efficient Use of Water
- 216 - Integrated Pest Management Systems
- 205 - Plant Management Systems
- 102 - Soil, Plant, Water, Nutrient Relationships
- 307 - Animal Management Systems

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

- 1862 Extension

#### **Outcome # 9**

##### **1. Outcome Target**

NR 1.9) User fees from programming.

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

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

- 111 - Conservation and Efficient Use of Water
- 307 - Animal Management Systems
- 216 - Integrated Pest Management Systems
- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems

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

- 1862 Extension

#### **Outcome # 10**

##### **1. Outcome Target**

Optimizing Colorado Agriculture's Water Footprint

##### **2. Outcome Type : Change in Knowledge Outcome Measure**

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

- 132 - Weather and Climate
- 111 - Conservation and Efficient Use of Water
- 605 - Natural Resource and Environmental Economics
- 205 - Plant Management Systems
- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management

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

- 1862 Research

### **V(J). Planned Program (External Factors)**

#### **1. External Factors which may affect Outcomes**

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

#### **Description**

Natural Resource PRU outcomes are dependent on the needs and engagement levels of all landowners. Their needs and level of interest in change can be affected by weather, public policy, economy, and population changes. Also, what benefits one segment may impact another segment.

Weather conditions such as drought, flooding, hail, fires, moisture/temperature trends influencing pathogen and pest life cycles, in addition to abiotic stress effects, which will require short/medium/long term redirection of effort to accommodate program needs for pest diagnostics and management strategies

### **V(K). Planned Program - Planned Evaluation Studies**

#### **Description of Planned Evaluation Studies**

Evaluations are developed using the indicators listed in the Impacts/Outcomes Expected section, to survey program participants about program impacts and long term behavioral changes. Some programs will use a pre-post evaluation method while others will focus on post evaluation methods. With the expanded use of "clicker" technology, much more of the evaluation will be occurring real time. Regarding pest management and water resources, evaluation will be focused on results on the ground and adjustments made according to results.

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

**Program # 7**

**1. Name of the Planned Program**

Community Development

**2. Brief summary about Planned Program**

Community Development outreach works with municipal, county, state, and federal agencies, nongovernmental organizations, and citizens to create dynamic processes that address local and regional needs/issues. Our efforts focus on facilitating community planning processes that engage all stakeholders affected by an issue in ways that lead to better informed decisions and help communities understand and deal with change. It includes providing information and resource connections, which might include community impact analysis of economic activity or evaluation of the drivers of local economies. This work encourages collaboration to build regional economies and create entrepreneur/business friendly communities. Innovative and collaborative leadership activities/trainings are provided to engage new diverse leaders and strengthen community organizations.

**3. Program existence :** Intermediate (One to 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
601	Economics of Agricultural Production and Farm Management	0%		20%	
605	Natural Resource and Environmental Economics	0%		30%	
608	Community Resource Planning and Development	100%		20%	
610	Domestic Policy Analysis	0%		10%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	0%		20%	
	<b>Total</b>	100%		100%	

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

**1. Situation and priorities**

Colorado communities are changing rapidly as a result of many factors, including loss of agricultural water, influx of retirement populations, development of gas and oil industries, incidence of military deployment, and changes in cultural composition of residents. Colorado has some unique needs due

to: dense populations along the central area of the Front Range and more sparse populations throughout the remainder of the state, a high natural amenity base (and share of public lands), a more transitory population and relatively low public service provision. Communities and urban neighborhoods struggle to develop and maintain resources; human, financial, physical, social, environmental and political. They also are challenged to provide the organizational capacity to assess, plan and implement activities to address resource development and management. Knowledge to evaluate resource base of a community, their economic and social service alternatives, and their futures is also critical to Colorado communities. Many of these issues are especially acute in smaller rural communities where there is a sparse population, marginal internet access, and limited public funds and public transportation. More specifically, rural areas of the US and Colorado are facing challenges due to marked differences in economic, educational, health and social opportunities relative to more urban areas. People in rural areas tend to be older, more likely to be uninsured, and less educated than their urban counterparts. Youth in rural communities tend to leave the community for better educational and work opportunities and do not return, despite their stated desire to return to raise their families in their home town. Lack of good job opportunities in rural areas, continues the "brain-drain" of potential community members and future community leaders.

Communities must find ways to thrive in a diverse and rapidly changing economic environment. Over the past decade, 2000 - 2010, Colorado has experienced:

- Increased gap between population change, labor growth, and job creation.
- Unimpressive job growth that was mixed across regions with western slope showing greatest job growth while eastern region experienced losses.
- High unemployment in south central region, while the rates being the lowest in the western slope and eastern regions.
- Stagnation of household well-being and flat income/wage growth.
- Continued population growth despite mundane economic performance.

(Source: [http://outreach.colostate.edu/docs/state\\_economic\\_update](http://outreach.colostate.edu/docs/state_economic_update) Did the Great Recession Wipe Out a Decade of Economic Progress in Colorado? Assessing the State of the State's Economy. Shields, M. and Marturan, M. March 2011.)

Communities are increasingly confronted with complex, controversial issues. Issues such as economic development, taxes and public finance, land use, environmental issues, county health plans, local educational issues, to name just a few, are complex issues because there are no simple solutions. Many individuals, groups and organizations have a "stake" in the decision and, because the stakes are high, the issues can quickly become controversial. Conflicts emerge as stakeholders place different values on what is important and what the solution should be.

Too many times in community decision making and problem solving process we see the following emerge:

- Individuals who have much stronger skills for adversarial democracy rather than for deliberative democracy.
- Individuals lack judgment, decision-making, or critical-thinking skills.
- There is a lack of trust and understanding between perspectives.
- Organizations fight for financial support from the same governmental or philanthropic sources, thus a culture of competition rather than cooperation may dominate.
- There is a general lack of coordination and collaboration between organizations working on similar issues.
- Individual "silos" develop between organizations or issue efforts that severely limit the potential impact of combined efforts
- Individuals with a passion for a community issue may essentially reinvent the wheel rather than join with other likeminded individuals to make a broader impact.

(Source: The Goals & Consequences of Deliberation: Key Findings and Challenges for Deliberative Practitioners. Prepared for the Kettering Foundation. Carcasson, M. and Christopher, E. August, 2008)

Communities need high quality community participatory processes to overcome these challenges and engaging citizens by providing effective problem solving /decision making experiences.

Leadership is essential for communities to move forward because, without local citizens who have skills and feel confident they can make a difference, a community seldom will be successful. Many communities have residents who want to see positive outcomes in their communities but may lack the required skills or have a perception that they could not be successful planning and implementing community programs.

Efforts to enhance the leadership capacity for development of rural communities and underserved urban neighborhoods are especially important to the viability of limited resource communities. These communities often have unique challenges and barriers to engagement in formal traditional leadership development which in turn leaves a vacuum of leadership for the community. This lack of effective leadership development in rural and urban underserved areas also contributes to a deficit in the diversity of leadership that reflects the community/neighborhood.

**2. Scope of the Program**

- In-State Extension
- In-State Research
- Integrated Research and Extension

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

**1. Assumptions made for the Program**

- The competencies of CD have been around for a long time and are still appropriate.
- Program planning is not always a one-time process. What is developed will need constant monitoring and adjustment.
- CSU and Extension are experiencing financial and political stress that requires us to engage new and expanding audiences.
- Extension has the organizational capacity to facilitate team building, situation assessment, and prioritize applied research needs in communities of Colorado.

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

Develop and conduct educational programs/ research that contribute to healthy and vital communities.

**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
2017	1.0	0.0	3.0	0.0
2018	1.0	0.0	3.0	0.0

2019	1.0	0.0	3.0	0.0
2020	2.0	0.0	3.0	0.0
2021	2.0	0.0	3.0	0.0

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

**1. Activity for the Program**

- Training for Extension personnel in community mobilization, facilitation, economic development.
- Working with rural communities on a regional approach to small town tourism including making optimal use of environmental resources, respecting the socio-cultural authenticity of host communities while conserving their built and living cultural heritage and traditional values, and ensuring viable, long-term economic operations, including stable employment and income-earning opportunities.
  - Conducting basic and applied research in areas exploring the interface between agribusiness, rural development, and natural-resource-amenity-based opportunities.
  - Conducting workshops and other educational activities with Extension professionals and community stakeholders.

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

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>• Education Class</li> <li>• Workshop</li> <li>• Group Discussion</li> <li>• One-on-One Intervention</li> <li>• Other 1 (Tourism rallies)</li> </ul>	<ul style="list-style-type: none"> <li>• Public Service Announcement</li> <li>• Newsletters</li> <li>• Web sites other than eXtension</li> </ul>

**3. Description of targeted audience**

- Community members, general public, consumers, students, youth
- Communities and their formal and informal leaders in the public and private sector, businesses, entrepreneurs
  - Community organizations, government agencies, other agencies, potential and existing non-profits, staff, board members, and others affiliated with the organization
  - Emerging and existing adult and/or youth leaders reflecting community demographics and sectors, and underserved residents
  - Community steering committee, workshop participants, project team members, community volunteers



## V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

## V(H). State Defined Outputs

### 1. Output Measure

- 1.Number of group educational events: classes, trainings, workshops, demonstrations, field days, providing content expertise, fairs, shows, booths, and/or other group events..
- 2.Individual Education: one-on-one direct client contacts by site visit, office drop-in, e-mail, telephone, Ask an eXpert, etc.
- 3.Number of meetings convened and/or facilitated; includes strategic participation that contributes to program development.
- 5.Number of Extension-related research and assessment projects. External funding proposals, including local, state, federal.
- 7.Number of educational media releases: indirect contacts through media releases, appearances, newsletters, blog posts, other non-peer reviewed publications, kit development, non-peer reviewed curriculum, PowerPoints or videos.
- 8.Number of online posts: Web posts, hits.

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

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

O. No	Outcome Name
1	CD Outcome 1.1: Community members engage in community and economic development planning and action.
2	CD Outcome 1.2: Community plans are developed.
3	CD Outcome 1.3: Community plans are implemented.
4	CD Outcome 1.4: Entrepreneurs initiate new ventures (small business, invention, societal initiatives, community event/activity, etc. )
5	CD Outcome 1.5: Businesses, non-profits, agencies, community members increase links to resources and community assets.
6	CD Outcome: 1.6: Community members increase engagement in community and/or organization through new leadership opportunities.

**Outcome # 1**

**1. Outcome Target**

CD Outcome 1.1: Community members engage in community and economic development planning and action.

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

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

- 608 - Community Resource Planning and Development

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

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

CD Outcome 1.2: Community plans are developed.

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

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

- 608 - Community Resource Planning and Development

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

- 1862 Extension

**Outcome # 3**

**1. Outcome Target**

CD Outcome 1.3: Community plans are implemented.

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

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

- 608 - Community Resource Planning and Development

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

- 1862 Extension

#### **Outcome # 4**

##### **1. Outcome Target**

CD Outcome 1.4: Entrepreneurs initiate new ventures (small business, invention, societal initiatives, community event/activity, etc. )

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

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

- 608 - Community Resource Planning and Development

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

- 1862 Extension

#### **Outcome # 5**

##### **1. Outcome Target**

CD Outcome 1.5: Businesses, non-profits, agencies, community members increase links to resources and community assets.

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

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

- 608 - Community Resource Planning and Development

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

- 1862 Extension

#### **Outcome # 6**

##### **1. Outcome Target**

CD Outcome: 1.6: Community members increase engagement in community and/or organization through new leadership opportunities.

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

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

- 608 - Community Resource Planning and Development

#### **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 Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

#### **Description**

•With new emerging opportunities in communities, programs may shift in response to community need.

•Extension role in community development is emerging and it may take three to five years to establish strong programs with measurable outcomes.

### **V(K). Planned Program - Planned Evaluation Studies**

#### **Description of Planned Evaluation Studies**

Pre-assessment, focus groups, interviews, and surveys will be conducted to provide base line data. Metrics will be tracked for number of trainings, participants, consulting sessions, partnerships, grant \$, etc. Pre-and post-surveys of workshop participants will be conducted to capture immediate changes in knowledge, short-term changes based on identified indicators of this plan of work. A combination of case studies, community visits, and focus groups will be conducted to measure longer-term impacts.

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

**Program # 8**

**1. Name of the Planned Program**

Energy

**2. Brief summary about Planned Program**

The Energy PRU engages Coloradans in energy opportunities that bring about economic and environmental benefits. Much of this work will be executed by the new CSU Rural Energy Center. Rural Colorado communities are a primary target audience for the PRU in order to take advantage of Extension's historic strengths in rural communities and also because rural Colorado is at the forefront of major energy issues in the state. The PRU carries out assessments, outreach, and research to accomplish our goals.

**3. Program existence :** Intermediate (One to 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
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	100%		0%	
	<b>Total</b>	100%		0%	

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

**1. Situation and priorities**

Major emerging energy issues include: a revolutionary oil and gas boom in Colorado and the U.S. that has led to both economic growth and questions about impacts on human health and the environment; utility scale solar and wind projects becoming cost competitive with traditional utility scale energy sources; transmission and siting issues related to utility-scale wind and solar projects; new EPA rules affecting the viability of new and existing coal-fired power plants; the availability of new financing mechanisms that allow consumers to deploy solar PV at no upfront cost; and in Colorado a highly controversial increased Renewable Energy Standard (RES) affecting rural electric cooperatives (20% by 2020 up from 10%). While CSU Extension has done a thorough job developing resources and offering educational opportunities to help consumers make decisions related to energy efficiency and renewable energy technologies including solar leasing, we could do more to provide Coloradans with research-based, unbiased information on broader issues like oil and gas development and the rollout of the new RES for coops. This will serve our mission to "promote a broad, unbiased understanding of energy issues". Ultimately, fulfillment of this mission should lead to more respectful dialogue between energy

stakeholders and more informed decision-making by the public and policymakers.

Major emerging energy issues include: a revolutionary oil and gas boom in Colorado and the U.S. that has led to both economic growth and questions about impacts on human health and the environment; utility scale solar and wind projects becoming cost competitive with traditional utility scale energy sources; new EPA rules affecting the viability of new and existing coal-fired power plants; the availability of new financing mechanisms that allow consumers to deploy solar PV at no upfront cost; and in Colorado an increased Renewable Energy Standard (RES) affecting rural electric cooperatives (20% by 2020 up from 10%). Other emerging issues include the energy life cycle for local food systems, woody biomass utilization, energy efficiency for rural businesses and local governments, and energy as a tool for STEM education.

## **2. Scope of the Program**

- In-State Extension
- Integrated Research and Extension

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

### **1. Assumptions made for the Program**

An oft-cited statement that the average person spends 6 minutes per year thinking about energy may or may not be proven, but the larger point that many Coloradans are uninformed about energy issues is one of our assumptions. There has also been a plentiful amount of misleading information strewn about in both the oil and gas and RES debates of late. So we need to find ways to 1. captivate people for longer periods; and/or 2. deliver energy information in very short snippets.

We believe that the highly charged discussions around both oil and gas and the transformation of the electric power sector currently provide Extension with opportunities to provide solid energy education based in issues of above-average concern. We can use these issues as springboards to provide well-rounded education that not only helps Coloradans process these issues through an unbiased lens, but also helps them make sound energy decisions in their own lives.

We believe that a combination of in-depth workshops/classes/events based around these high profile issues and promotion and development of engaging, quick, low commitment educational resources - particularly online - will feed off of one another to make Extension's energy efforts more accessible and meaningful to Coloradans.

We also assume that rural Colorado communities have not taken advantage of plentiful funding, financing, and workforce development opportunities in energy efficiency and renewable energy. We believe that empowering small rural Colorado communities with a screening for these opportunities will add value and could generate economic activity.

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

Our ultimate goal is to engage Colorado in energy opportunities that bring about economic and environmental benefits. This could include everything from community energy assessments that illuminate funding, financing, and/or workforce development opportunities in energy efficiency and renewable energy to expanding our STEM energy work in schools to continuing our Colorado Energy Master program and associated volunteer projects.

## **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
2017	2.5	0.0	0.0	0.0
2018	2.5	0.0	0.0	0.0
2019	2.5	0.0	0.0	0.0
2020	2.5	0.0	0.0	0.0
2021	2.5	0.0	0.0	0.0

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

**1. Activity for the Program**

The PRU carries out assessments, outreach, and research to accomplish our goals.

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

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>● Education Class</li> <li>● Workshop</li> <li>● Group Discussion</li> <li>● One-on-One Intervention</li> <li>● Demonstrations</li> <li>● Other 1 (Loaning kits)</li> </ul>	<ul style="list-style-type: none"> <li>● Public Service Announcement</li> <li>● Newsletters</li> <li>● Web sites other than eXtension</li> </ul>

**3. Description of targeted audience**

Target audiences include homeowners, the general public, teachers, ag producers, rural Colorado communities, and, in some circumstances, policymakers.



## V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

## V(H). State Defined Outputs

### 1. Output Measure

- 1.Number of group educational events: classes, trainings, workshops, demonstrations, field days, providing content expertise, fairs, shows, booths, and/or other group events.
- 2.Individual Education: one-on-one direct client contacts by site visit, office drop-in, e-mail, telephone, Ask an eXpert, etc.
- 3.Number of meetings convened and/or facilitated; includes strategic participation that contributes to program development.
- 4.Number of kits or similar resources loaned or provided.
- 5.Number of Extension-related research and assessment projects. External funding proposals, including local, state, federal.
- 7.Number of educational media releases: indirect contacts through media releases, appearances, newsletters, blog posts, other non-peer reviewed publications, kit development, non-peer reviewed curriculum, PowerPoints or videos.
- 8.Number of online posts: Web posts, hits.

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

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

O. No	Outcome Name
1	Energy Outcome 1.1: Apply or intend to apply increased understanding of energy in personal and/or professional life (e.g. decide whether to move forward with an energy project, change behavior, have more informed discussions, etc.)
2	Energy Outcome 1.1a: Increased understanding of energy use, conservation, efficiency, and/or renewable energy in the home, school, business or community.
3	Energy Outcome 1.1b: Increased understanding of local, state, national, and/or global energy issues.

**Outcome # 1**

**1. Outcome Target**

Energy Outcome 1.1: Apply or intend to apply increased understanding of energy in personal and/or professional life (e.g. decide whether to move forward with an energy project, change behavior, have more informed discussions, etc.)

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

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

- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities

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

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

Energy Outcome 1.1a: Increased understanding of energy use, conservation, efficiency, and/or renewable energy in the home, school, business or community.

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

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

- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities

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

- 1862 Extension

**Outcome # 3**

**1. Outcome Target**

Energy Outcome 1.1b: Increased understanding of local, state, national, and/or global energy issues.

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

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

- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities

#### **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 Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

#### **Description**

Weather extremes may focus public attention on energy and climate change, the economy affects people's desire to spend and save money through energy measures, appropriations can lead to changes in energy programming capacity, public policy and government regulation can increase scrutiny of energy issues, competing priorities and programs may serve to decrease interest in energy issues, population changes can affect the level of interest in energy programming.

### **V(K). Planned Program - Planned Evaluation Studies**

#### **Description of Planned Evaluation Studies**

Most if not all energy evaluations will be conducted immediately post program, either via clickers or paper evaluations. They will be used both for internal program improvement as well as to report progress on indicators. It will be up to the presenters/organizers of educational events to decide how to word survey questions to best capture outcomes - they don't necessarily have to be worded exactly like the outcomes on this worksheet. The Energy Specialist is available to assist with the creation of evaluations and evaluation templates. Energy Master projects will be reported as outputs, not outcomes.

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

**Program # 9**

**1. Name of the Planned Program**

Environmental Horticulture

**2. Brief summary about Planned Program**

The outreach efforts of the Environmental Horticulture Planning & Reporting Unit (PRU) will provide education and services to encourage the adoption of research-based best management practices (design, plant selection, establishment, and management practices) and diagnostic techniques/services by green industry professionals and the home gardener. Our goal is that professional and lay practitioners will use reasonable inputs of labor, water, fertilizers and pesticides to produce attractive, functional, cost-effective and sustainable ornamental landscapes.

**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
102	Soil, Plant, Water, Nutrient Relationships	30%		0%	
111	Conservation and Efficient Use of Water	35%		0%	
216	Integrated Pest Management Systems	35%		0%	
	<b>Total</b>	100%		0%	

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

**1. Situation and priorities**

Professional landscape management and homeowner gardening activities contribute significantly to the economy of Colorado. According to a study conducted by Colorado State University (Thilmany et al., 2008; <http://www.greenco.org/downloadables/GreenCO-ExecSumFinal08.pdf>), entitled "The Economic Contribution of Colorado's Green Industry: A 2008 Update", Colorado household and business expenditures on garden, landscape and lawn products and services (including linkage industries such as irrigation systems, botanical gardens, lawn and garden equipment and maintenance services) have averaged almost 10% annual growth since 1993, for a 2007 total of \$1.8 billion. The \$1.8 billion directly contributed to the Colorado economy increases to \$3.3 billion when its impact on broader economic activity and employment generation in the Colorado economy is considered. The authors also found that, in 2007, the green industry provided Coloradoans with over 35,000 jobs, an increase of 12,000 jobs since 1994 (tripling in size in less than 15 years), with \$1.2 billion in payroll (up \$750 million from 1994). The average green industry wage earned in 2007 increased to an average of \$35,318 annually, up from

\$26,159 in 2001. It appears that the green industry has made an almost complete recovery from the drought restrictions and economic downturn in the early 2000s, but it is not yet clear how the industry will weather the current housing downturn. Colorado ranks 22nd of 50 states in its contribution to Gross Domestic Product (Hodges et al., 2011).

The quality of a landscape design and maintenance is a major factor in the home and property values. The average household in Colorado spends over \$1,000 annually on landscape care and gardening supplies (<http://www.greenco.org/images/downloadables/GreenCO-ExecSumFinal08.pdf> ). Landscaping yields an average of a 109% return on every dollar spent, much more so than other home improvements. (<http://ellisonchair.tamu.edu/emphasis-areas/marketing-economics/economic-benefits-of-plants/> ). The primary issues addressed by Environmental Horticulture Extension include: ornamental landscapes, diagnostic services, and volunteer engagement. Emerging issues for consideration include:

- Sustainable landscaping
- "Green" gardening
- Organic/natural landscape management
- Composting/recycling
- Water-wise/water smart gardens
- Youth Gardening
- Wildlife gardening (birds, butterflies)
- Home greenhouses
- Spanish speaking audiences

### **Ornamental Landscapes**

In recent decades, the Rocky Mountain region has become known for horticultural innovation. Plant Select® is a non-profit Colorado corporation administered by Colorado State University and the Denver Botanic Gardens in concert with horticulturists and nurseries throughout the Rocky Mountain region and beyond (<http://www.plantselect.org/> ). The purpose of Plant Select® is to seek out, identify and distribute the very best plants for landscapes and gardens from the intermountain region to the high plains. Several plants are chosen each year that thrive in the sunny, variable conditions of Rocky Mountain gardens. These can be plants that have grown here for years and have not yet attained the popularity they deserve, known as recommended plants. Introductions represent taxa that are discovered by our cooperators. Superior forms or hybrids carefully tested over time are known as originals. Plant Select® is at the vanguard of a bold, new plant palette that is revolutionizing the way the public gardens. These plants have the capacity to thrive in both our variable winters and our hot summers. They are helping forge a truly American style of horticulture. Agents, Specialists, volunteers, and industry members collaborate to discover, propagate, and evaluate new introductions and past selections for the Plant Select® Program. Over 2 million plants were sold in 2011.

The Environmental Horticulture Planning & Reporting Unit (PRU) puts statewide efforts into the Colorado Garden and Home Show. This event brings in Colorado residents from across the state and residents and vendors from 20+ states and Canada. The show's estimated annual economic impact on Denver is \$40 million in incremental spending by those attending (<http://www.gardeningcolorado.com> ). In 2013, attendance reached approximately 55,000 people, the highest-attended consumer show held at the Colorado Convention Center. Agents, specialists, and volunteers cooperate to design, install, and staff a CSU Extension educational garden and booth at the Colorado Garden and Home Show. Specialists also teach classes at this annual event.

PlantTalk Colorado™ provides reliable timely information on more than 500 horticultural topics (including over 400 translated into Spanish); it is sponsored by Colorado State University Extension, the Denver Botanical Gardens, and the Green Industries of Colorado. Information is provided in both English and Spanish in print and web-based formats. Agents, specialists, and volunteers collaborate to write, edit, and review these documents.

Demonstration gardens are a part of most county volunteer efforts as well as Agents and Specialists efforts. Twenty seven out of 59 offices of CSU Extension Offices are associated with some type of demonstration garden. Nearly 90 public gardens throughout the Rocky Mountains and High Plains area, including CSU Extension, libraries, fire stations, Xeriscape®, demonstration gardens, public parks, etc. have acquired Plant Select® plants over the past years to create a Plant Select® Demonstration Garden. These gardens are open to the public and allow visitors to view Plant Select® introduced and recommended plants in real-life situations.

### **Diagnostic Services and Integrated Pest Management (IPM)**

New pest outbreaks affecting horticultural plants have been occurring in Colorado with increasing frequency in recent years. Oak agrilus borer and Japanese beetle were detected 2003. Japanese beetle was eradicated in the Tri-River area in 2004, but reappeared in the Front Range in 2005 where it continues to be a growing problem. In 2013, emerald ash borer was detected in Boulder County; the presence of this insect presents the potential to cause millions of dollars of damage to the Front Range urban forest. Mountain pine beetle epidemics have occurred off and on since the 1950s and by 2011 had affected 752,000 acres of Colorado. (Results of the 2011 Aerial Detection Survey in Region 2, U.S. Forest Service, Rocky Mountain Region). Spotted wing drosophila was been reported in Fort Collins and the Denver metro area in 2013; this insect will be a significant problem for both commercial and home gardener small fruit production. Another important introduced insect, the brown marmorated stink bug, is likely to become a problematic Colorado pest in the near future. The impact of these invasive species has received increased attention from state and Federal governments and IPM programs are under development to mitigate their negative impacts. These programs need major enhancements to adequately protect human health, our food supplies, and the environment from the impact of pests and pest management tactics. Extension personnel have collaborated with other agencies in delimitation studies, public education, pest identification and research and developing management strategies. As pests are introduced or break out, extension personnel continue to devote time and effort towards them.

Lawn problems are the number one concern brought to Colo

## **2. Scope of the Program**

- In-State Extension
- 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 University Extension will collaborate with the entities making up the Green Industries of Colorado and professionals within the green industries, various state and federal government agencies and non-governmental organizations, and the gardening public in order to provide up-to-date, research based information for delivery horticultural programming for both rural and urban audiences.

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

The outreach efforts of the Environmental Horticulture Planning & Reporting Unit (PRU) will provide education and services to encourage the adoption of research-based best management practices (design, plant selection, establishment, and management practices) and diagnostic techniques/services by green

industry professionals and the home gardener. Our goal is that professional and lay practitioners will use reasonable inputs of labor, water, fertilizers and pesticides to produce attractive, functional, cost-effective and sustainable ornamental landscapes.

**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
2017	23.0	0.0	0.0	0.0
2018	23.0	0.0	0.0	0.0
2019	23.0	0.0	0.0	0.0
2020	23.0	0.0	0.0	0.0
2021	23.0	0.0	0.0	0.0

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

**1. Activity for the Program**

Provide up-to-date, research based information for delivery horticultural programming for both rural and urban audiences.

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

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>● Education Class</li> <li>● Workshop</li> <li>● Group Discussion</li> <li>● One-on-One Intervention</li> <li>● Demonstrations</li> <li>● Other 1 (training for volunteers)</li> </ul>	<ul style="list-style-type: none"> <li>● Public Service Announcement</li> <li>● Newsletters</li> <li>● eXtension web sites</li> <li>● Web sites other than eXtension</li> </ul>

**3. Description of targeted audience**

Home gardeners and professional green industry professionals (ages 19+) and youth gardeners (ages 5-18 ).



## V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

## V(H). State Defined Outputs

### 1. Output Measure

- 1.Number of group educational events: classes, trainings, workshops, demonstrations, field days, providing content expertise, fairs, shows, booths, and/or other group events.
- 2.Individual Education: one-on-one direct client contacts by site visit, office drop-in, e-mail, telephone, Ask an eXpert, etc.
- 3.Number of meetings convened and/or facilitated; includes strategic participation that contributes to program development.
- 4.Number of kits or similar resources loaned or provided.
- 5.Number of Extension-related research and assessment projects. External funding proposals, including local, state, federal.
- 7.Number of educational media releases: indirect contacts through media releases, appearances, newsletters, blog posts, other non-peer reviewed publications, kit development, non-peer reviewed curriculum, PowerPoints or videos.
- 8.Number of online posts: Web posts, hits.

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

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

O. No	Outcome Name
1	ENVHORT: Participants report using or intention to use new technologies and/or intention to adopt or adoption of best management practices and/or policies promoting best management practices in their landscapes, businesses and/or communities.
2	ENVHORT: Participants report intention to change or they have changed pest management strategies, intent to utilize or utilizing new technologies to assist with pest diagnosis and management, intent to adopt or adopting integrated pest management strategies and/or intention to adopt or adopting of policy promoting or utilizing integrated pest management strategies.
3	ENVHORT: As a result of Colorado Master Gardener (CMG) training and on-going support, CMGs report increased competence (confidence and proficiency/accuracy) in educating the public.

**Outcome # 1**

**1. Outcome Target**

ENVHORT: Participants report using or intention to use new technologies and/or intention to adopt or adoption of best management practices and/or policies promoting best management practices in their landscapes, businesses and/or communities.

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

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

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 216 - Integrated Pest Management Systems

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

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

ENVHORT: Participants report intention to change or they have changed pest management strategies, intent to utilize or utilizing new technologies to assist with pest diagnosis and management, intent to adopt or adopting integrated pest management strategies and/or intention to adopt or adopting of policy promoting or utilizing integrated pest management strategies.

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

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

- 216 - Integrated Pest Management Systems

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

- 1862 Extension

**Outcome # 3**

**1. Outcome Target**

ENVHORT: As a result of Colorado Master Gardener (CMG) training and on-going support, CMGs report increased competence (confidence and proficiency/accuracy) in educating the public.

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

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

- 111 - Conservation and Efficient Use of Water
- 102 - Soil, Plant, Water, Nutrient Relationships

#### 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
- Government Regulations
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

#### Description

**Natural Disasters** including invasive pest introduction, drought, flooding, hail, moisture/temperature trends can influence pest life cycles which will require redirection of effort to accommodate current needs.

**Economic problems** may lead more individuals to acquire/redirect their IPM strategies according to resource limitations or opportunity; more individuals may grow their own food crops, requiring redirection of programming efforts; individuals may spend less on landscape and turf, requiring redirection of programming efforts. Colorado Master Gardener volunteer numbers may be less due to increased costs associated with the program and personal economic situation.

**Government regulations** may alter pesticide, water and plant availability and use, redirecting efforts to alternative materials and methods.

**Population changes** may increase the demand on volunteer and staff time or may increase demands in specific areas such as food production. Increases in under-served populations may alter programming delivery methods.

### V(K). Planned Program - Planned Evaluation Studies

#### Description of Planned Evaluation Studies

- Surveys will be done pre- and post-program
- The surveys will ask questions focused primarily on knowledge gained by attending workshops/educational programs, and if they will adopt practices discussed in these programs
  - The surveys will help us measure the percentage of program participants who increased their knowledge on proper plant/cultivar selection (for landscape and food production), establishment practices, and plant, soil, water, and pest management practices.
  - The results of the surveys will be distributed to or will be used for the purposes of program evaluation and development of future programming.



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

**Program # 10**

**1. Name of the Planned Program**

Food Systems

**2. Brief summary about Planned Program**

The Food Systems team has come together, drawing from a diverse set of personnel with backgrounds in agriculture, horticulture, food safety, nutrition, community development, and youth education. This team will work to increase literacy on food and ag issues, facilitate community discussions and assessments on ag and food issues, provide technical assistance to an increasingly diverse set of food producers and support new market opportunities.

**3. Program existence :** Intermediate (One to 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
601	Economics of Agricultural Production and Farm Management	10%		30%	
604	Marketing and Distribution Practices	20%		30%	
608	Community Resource Planning and Development	20%		20%	
703	Nutrition Education and Behavior	10%		20%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	40%		0%	
	<b>Total</b>	100%		100%	

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

**1. Situation and priorities**

The agriculture and food issues, clientele and level of community engagement that Extension personnel are being asked to provide knowledge and assistance on, or facilitate discussions around, are changing. For example, a Northern Colorado Food Assessment showed that over 70% of those defined as farmers were not operating at a commercial level that could use conventional production, budgeting and marketing models Extension has readily available. A recent Colorado Food Systems Advisory Council issue brief also noted the increasing demand for Extension and technical assistance by those engaging in direct markets. Developing technical assistance programs for such audiences may need new educational

approaches and different types of applied research to share in the field. Another example of new clientele needs is the requests for Extension involvement in trainings and research on how new markets may influence food safety economics. Such efforts would benefit from expertise in agribusiness, community development, public health, water, land planning, environmental horticulture as well as crop, animal and specialty crop production. To complement more traditional efforts in agricultural operations, horticultural production, food and nutrition, CSU Extension, in collaboration with AES has facilitated several programs targeted at new clientele which draw from a broad set of disciplines (for example, Building Farmers, Regulatory Mapping for Farmers Markets). To formalize and coordinate activities that require interdisciplinary approaches related to emerging issues, a new resource team on Food Systems seems warranted.

## **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**

The agriculture and food issues, clientele and level of community engagement that Extension personnel are being asked to provide knowledge and assistance on, or facilitate discussions around, are changing. For example, a Northern Colorado Food Assessment showed that over 70% of those defined as farmers were not operating at a commercial level that could use conventional production, budgeting and marketing models Extension has readily available. A recent Colorado Food Systems Advisory Council issue brief also noted the increasing demand for Extension and technical assistance by those engaging in direct markets. Developing technical assistance programs for such audiences may need new educational approaches and different types of applied research to share in the field. Another example of new clientele needs is the requests for Extension involvement in trainings and research on how new markets may influence food safety economics. Such efforts would benefit from expertise in agribusiness, community development, public health, water, land planning, environmental horticulture as well as crop, animal and specialty crop production. To complement more traditional efforts in agricultural operations, horticultural production, food and nutrition, CSU Extension, in collaboration with AES has facilitated several programs targeted at new clientele which draw from a broad set of disciplines (for example, Building Farmers, Regulatory Mapping for Farmers Markets). To formalize and coordinate activities that require interdisciplinary approaches related to emerging issues, a new resource team on Food Systems seems warranted.

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

Improved technical assistance for agricultural and food producers exploring new marketing channels and alternative business approaches. Also, CSU will provide facilitation of community discussions around the interface between food and agricultural issues and broader social issues including public health, food safety, the environment and community development.

**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
2017	4.0	0.0	1.0	0.0
2018	4.0	0.0	1.0	0.0
2019	4.0	0.0	1.0	0.0
2020	4.0	0.0	1.0	0.0
2021	4.0	0.0	1.0	0.0

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

**1. Activity for the Program**

Improved technical assistance for agricultural and food producers exploring new marketing channels and alternative business approaches. Also, CSU will provide facilitation of community discussions around the interface between food and agricultural issues and broader social issues including public health, food safety, the environment and community development.

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

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>● Education Class</li> <li>● Workshop</li> <li>● Group Discussion</li> <li>● One-on-One Intervention</li> <li>● Demonstrations</li> </ul>	<ul style="list-style-type: none"> <li>● Public Service Announcement</li> <li>● Newsletters</li> <li>● eXtension web sites</li> <li>● Web sites other than eXtension</li> </ul>

**3. Description of targeted audience**

Youth and Adults who want to better understand the linkages between their food system and other community issues. Adults involved in specialty crop, vegetable, & fruit or integrated livestock production whose personal income is derived in large part from their farming activities.



## V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

## V(H). State Defined Outputs

### 1. Output Measure

- 1.Number of group educational events: classes, trainings, workshops, demonstrations, field days, providing content expertise, fairs, shows, booths, and/or other group events.
- 2.Individual Education: one-on-one direct client contacts by site visit, office drop-in, e-mail, telephone, Ask an eXpert, etc.
- 3.Number of meetings convened and/or facilitated; includes strategic participation that contributes to program development.
- 4.Number of kits or similar resources loaned or provided.
- 5.Number of Extension-related research and assessment projects. External funding proposals, including local, state, federal.
- 7.Number of educational media releases: indirect contacts through media releases, appearances, newsletters, blog posts, other non-peer reviewed publications, kit development, non-peer reviewed curriculum, PowerPoints or videos.
- 8.Number of online posts: Web posts, hits.

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

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

O. No	Outcome Name
1	Food Sys Outcome 1.1: Colorado communities and stakeholders become knowledgeable about and engage in civil public discourse on food and ag issues.
2	Food Sys Outcome 1.2: Colorado communities and stakeholders develop and conduct food and agricultural assessments, initiatives and planning efforts.
3	Food Sys Outcome 1.3: Food producers gain access to new market opportunities that foster food access, community development, environmental stewardship, and public health.

**Outcome # 1**

**1. Outcome Target**

Food Sys Outcome 1.1: Colorado communities and stakeholders become knowledgeable about and engage in civil public discourse on food and ag issues.

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

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

- 601 - Economics of Agricultural Production and Farm Management
- 608 - Community Resource Planning and Development
- 604 - Marketing and Distribution Practices
- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities

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

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

Food Sys Outcome 1.2: Colorado communities and stakeholders develop and conduct food and agricultural assessments, initiatives and planning efforts.

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

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

- 608 - Community Resource Planning and Development
- 604 - Marketing and Distribution Practices
- 703 - Nutrition Education and Behavior
- 601 - Economics of Agricultural Production and Farm Management

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

- 1862 Extension

**Outcome # 3**

**1. Outcome Target**

Food Sys Outcome 1.3: Food producers gain access to new market opportunities that foster food access, community development, environmental stewardship, and public health.

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

### 3. Associated Knowledge Area(s)

- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 703 - Nutrition Education and Behavior
- 604 - Marketing and Distribution Practices
- 601 - Economics of Agricultural Production and Farm Management
- 608 - Community Resource Planning and Development

### 4. Associated Institute Type(s)

- 1862 Extension

## V(J). Planned Program (External Factors)

### 1. External Factors which may affect Outcomes

- Economy
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

#### Description

USDA has Global Food Security as a National priority, and not all the activities needed to support such a goal are addressed through production-oriented teams. One consideration listed in national outcomes is the need for resiliency, and given current global market pressures, pest pressures, supply chain risks (food safety, transportation costs), it would suggest a more diverse set of food production models is needed.

USDA food security priorities also address natural resources and the long-term management of agricultural lands. Long term land conservation requires some new models of land transitions, since the average age of farmers is in the high 50's and increasing and this team addresses new models of agriculture which may lower barriers to entry into agricultural production.

## V(K). Planned Program - Planned Evaluation Studies

### Description of Planned Evaluation Studies

For this PRU, evaluation will be performed in several ways including:

- Post-program surveys will be done for one-time workshops and programs
- The surveys will ask questions focused primarily on changed awareness, attitudes and knowledge
- The results of the surveys will be distributed to speakers to help them gain insights on where they were most impactful in addressing learning outcomes.
- Pre- and post-program surveys will be done for longer-term programming activities, such as Building Farmers, food safety technical assistance and food system assessment processes.
- The surveys will ask questions focused primarily on initial resources and readiness, changed knowledge, behaviors and intentions to alter community or enterprise plans and perceptions of better

networks and cohesion within communities

- The results of the survey will be shared with participants so they have a sense of where they began and intend to grow relative to their peer group. The results of the surveys will also be distributed to speakers to help them gain insights on where they were most impactful in addressing learning and action outcomes.

For some Websites and technical assistance tools, evaluation will be done primarily through counts and measures of visitor numbers, page views and updated profiles (MarketMaker). If resources are available, surveys of users may be planned in the future.