2011 Colorado State University Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

The Agricultural Experiment Station (AES) and Extension at Colorado State University are committed to excellence in basic and applied research and translation of this research through Extension programs to clientele and others. Extension continues 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, Applied Human Sciences, Engineering, Veterinary Medicine and Natural Resources. Programs emphasize best management practices in addressing issues that affect Coloradans.

Data for this report were provided through the Extension "Colorado Planning and Reporting System (CPRS)." Plans of Work were submitted by Work Teams, and individuals linked to them in creating their own Plans to Invest. During the program year, individuals entered program data, and reports were generated during the first quarter of 2012. While every Planned Program has many, many knowledge (learning) outcomes, this report only documents behavior (action) outcomes. The previous POW listed planned outcomes as percentages of participants reporting change. The CPRS data are numbers of participants only. Therefore, many outcomes listed are marked "not reporting" for 2011 as no percentages are available.

An unintended consequence of the adoption of CPRS has resulted in differences in scope and reporting of program areas by the AES and Extension. These differences will be addressed in the updated Plan of Work and the 2012 Integrated Report.

4-H Youth Development

Extension Program Goals: 4-H affects positive change in life skills (including leadership, citizenship, decision making, and communication) and in science, technology, engineering and math (STEM) -- including interest, knowledge, and application of science process skills -- for youth ages 5 to 18.

New Programs, and/or Addressing NIFA Priorities: STEM priority benefits from available and developing 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.

Family Economic Stability

Extension Program Goals: Family Economic Stability programs affect positive change in participants' financial knowledge and skills, contributing to their ability to avoid bankruptcy, economic crisis, loss of jobs, and other money-related difficulties. AgrAbility programs help farmers avoid accidents and reduce the incidence of serious injury and disability.

New Programs, and/or Addressing NIFA Priorities: DollarWorks2

Ongoing, Consistent, and/or Successful Programs: Family and Consumer Science (FCS) programs are experiencing change, driven by a need to focus expertise and programs that are available to meet the needs of Coloradoans. CSU Extension programs now seek to provide applied research and Extension education in a coordinated set of programs related to nutrition and health, food safety, and family economic stability. Financial stability of families is the area of focus for non-nutrition FCS programming. Colorado families' financial instability includes increasing rates of bankruptcy, economic crises and loss of jobs. Working in partnership with state and nongovernmental agencies, agents deliver DollarWorks2 and other curricula relevant to individuals and families in difficult economic times. A content specialist started January 3, 2011, to support this work. Work teams in parenting and healthy homes have been suspended in order to keep attention on the three determined focus areas for programming. AgrAbility programming continues.

Cross-cutting or Cross-disciplinary Initiatives: Consumer economics is a vehicle that can assist 4-H in reaching STEM targets.

Food Safety

Extension Food Safety programs will reduce the economic burden and human suffering that can be caused by food-borne illness in the US.

New Programs, and/or Addressing NIFA Priorities: Food Safety is now structured as a stand-alone Extension Work Team in order to more fully address the NIFA priority. Food Safety education may be integrated into other Work Teams so that they are not limited to program delivery by FCS agents.

Ongoing, Consistent, and/or Successful Programs: These work team members participated in the FCS focusing activity in June, 2009, and have specific outcome targets and indicators by which they collect their statewide data. Food Safety indicators, including effective hand washing, safe food preservation, and proper food temperature, are addressed through these activities:

· 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.

Cross-cutting or Cross-disciplinary Initiatives: See AES Nutrition and Health for AES Food Safety program reporting.

Global Food Security and Hunger - Animal Production Systems

Extension Program Goals: Adoption of improved and productive and sustainable agriculture systems will assure communities, families, and individuals have enough food to eat, and that hunger is not a factor in their well-being.

New Programs, and/or Addressing NIFA Priorities:

Ongoing, Consistent, and/or Successful Programs: Extension outreach spans 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 continues as part of experiential learning in 4-H, FFA, and college judging. Producers realize increased prices and lower cost of production. Consumers benefit from higher human nutritional values of food.

Cross-cutting or Cross-disciplinary Initiatives: Global Food Security and Hunger work, of necessity, includes animal and plant production systems and integrates Extension education in disseminating research results. CSU Extension:

· Delivers workshops and educational classes for producers;
· Communicates results through demonstrations and field days;
· Provides individual counseling for producers and clientele on specific animal production problems.

Animal Production Systems

AES Research. AES focuses on basic and applied research in animal breeding, nutrition, physiology, health, behavior, and integrated resource management systems.

2011 Accomplishments:

One primary goal is to continue development and enhancement of a flexible, user-friendly decision support system that can be utilized by commercial and seedstock producers of beef cattle to improve profitability through improved selection of breeding animals and better design of mating systems. Breed associations who have agreed to contribute genetic information on potential sires represent over 170,000 registrations per year. Assuming half of these registrations are male calves and half of those are sold as breeding animals, the system has the potential to have a large influence on profitability of beef production with 40,000 bulls being used in breeding programs. Even when considering only changes in growth genetics, at $250 net per bull (under average historical pricing systems) this would translate into over $10 million annually in improved profitability. Considering that reproductive traits impact cow/calf profitability at much greater levels, the overall value of adoption would be considerably larger. The current model only considers animal production and sale of excess offspring through weaning, but as later segments of the industry are included, the overall effect to the industry is expect to further increase.
The Western Center for Integrated Resource Management graduate program has worked to make the IRM Graduate program available completely online. We offered five courses online during Fall 2011. Our enrollment in these two courses, which include our hallmark introductory course (AGRI 630) and one of our business training courses (AGRI 631), attracted thirteen and twenty-two students, respectively. This enrollment has been accomplished without marketing or promotion, mainly by student inquiry. Many students affirm that they find our program through online searches using terms like Master of Sustainable Agriculture and through word of mouth from previous students. Our Online Learning Program, along with our campus program, will continue to push us towards excellence by maintaining courses that are challenging and will equip students to obtain positions and stand out in their particular agricultural field.

Plant Production Systems

Integrated Program Goal: Adoption of improved crops through breeding, production systems and technologies and productive and sustainable agriculture systems will assure communities, families, and individuals have enough food to eat, and that hunger is not a factor in their well-being.

Molecular biology and genomics will open new pathways for crop plant improvement and pest management that support economic development, enhance human health through more nutritious and safer food products, and find fundamental solutions through renewable and sustainable crop production and pest management. Research in plant production systems will inform Extension activities and programs as CSU contributes to solving the dilemmas inherent in the Global Food Security & Hunger NIFA priority.

Ongoing, Consistent, and/or Successful Programs: Extension outreach spans the breadth of the topics of research to assure that industry participants have practical knowledge in modern plant, production systems, biosecurity, economic and risk management, and response to policy and consumer changes. Crop production in the state benefits from AES and Extension through improved crops which resist environmental and biological pests. Producers realize increased prices and lower cost of production. Consumers benefit from higher human nutritional values of food.

Cross-cutting or Cross-disciplinary Initiatives: Global Food Security and Hunger work, of necessity, includes animal and plant production systems and integrates Extension education in disseminating research results.

CSU Extension:

· Delivers workshops and educational classes for producers;
· Communicates results through demonstration plots and field days;
· Provides individual counseling for producers and clientele on specific plant production problems.

Cross-cutting or Cross-disciplinary Initiatives: As recommended by NIFA reviewers, CSU Extension's Work Teams for animal production and plant production systems maintain regular communication and may consider combining under the goal of global food security.

Extension accomplishments:

'Wheat Improvement' is a well-organized and highly-functioning Extension work team that maintains its structure and contributes to the NIFA priority goal of global food security.

2011 AES Accomplishments:
The second edition of the Intermountain Grass and Legume Production Manual was published. Numerous hard copies have been distributed to producers, Extension agents, NRCS field personnel, scientists, and agriculture consultants within Colorado as well as several western states.
In fall 2011, six wheat experimental lines were released as new cultivars. Three of these lines have been named as new cultivars - Byrd, Denali, Brawl CL Plus - and will be marketed primarily by the Colorado Wheat Research Foundation, either alone or in collaboration with other parties.

In Colorado trials, Byrd has shown very high grain yield, approximately 10% higher than the current leading variety Hatcher, and also shows good test weight and stripe rust resistance, and exceptional milling and bread baking quality. Brawl CL Plus carries a second gene for tolerance to imazamox herbicide and has shown grain yield comparable to other imazamox-tolerant varieties (Clearfield*), high test weight, good stripe rust resistance, and excellent milling and bread baking quality.

Since inception of the program, average wheat grain yields in Colorado have more than doubled with at least 50% of this increase attributed to improved cultivars. While the value of these yield increases varies according to production and market prices, estimates of economic returns in Colorado from CSU-developed wheat varieties were approximately $43 million for the 2011 crop alone. These estimates include yield increases resulting from improved CSU varieties ($29 million), marketing benefits resulting from CSU varieties with enhanced end-use quality ($9 million), and yield-protection resulting from adoption of CSU varieties carrying herbicide tolerance traits for winter annual grassy weed control ($5 million).

Chile peppers are an important specialty crop in the Arkansas Valley of Colorado. Plasticulture techniques employing drip irrigation and plastic mulch can dramatically improve fresh market yield of chile peppers. Gross returns from chile peppers grown for the fresh market have the potential to reach $10,000 per acre. These studies suggest that growing hybrid chile pepper varieties with black plastic mulch and drip irrigation increases fresh market yield and reduces the consumptive use of irrigation water.

The largest potato producer in Colorado and much of the Southwest has indicated that by following our management plan, his problems with powdery scab have diminished to the point that he no longer considers this a major disease threat to his production. For the past three years his farming operation has screened in excess of 50 fields for the presence of soil borne inoculum. He has utilized this information in his planting schemes when production of susceptible cultivars is necessary. In addition, he has used the soil screening program to assess his other field production practices such as the growth of certain green manure crops on the level of inoculum found in the field. The release and growth of several newer cultivars which are resistant or moderately resistant to the disease has resulted in the successful production of susceptible cultivars with few grade related problems due to powdery scab. This has generated an additional estimated 480,000 cwt of clean, marketable potatoes with a fair market value in excess of $7.2 million, due to the nature of the high prices received for specialty type potatoes.

Natural Resources and the Environment

Program Goals: Programs sustain and/or improve the quality and quantity of Colorado's natural resources and environment.

New Programs, and/or Addressing NIFA Priorities: The US Census of Agriculture reports decreasing numbers of mid- and large-sized farms and a significant increase in the number of small farms. Small acreage owners/operators frequently may not possess much agricultural or business knowledge. Extension addresses the needs of small acreage producers and work with agricultural industry personnel and governmental agencies to assure that land managers and

communities can evaluate a broad range of opportunities to enhance viability while respecting the environment. The AES conducts research on water, natural resources, and other management systems that impact large scale landscapes, production agriculture, and the interface of urban and rural interfaces for scarce resources.

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; and
- enhancing international competitiveness
- Conducting basic and applied research

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

Integrated Program Accomplishments:

Yellow toadflax is a creeping perennial weed that is noxious in Colorado and very problematic in the Intermountain West. It is very difficult to control; and in our experiments to date, acceptable control was not achieved 1 or 2 years after treatments (YAT) were applied and site to site variation has been extreme. The site to site variation was eliminated with higher rates of either herbicide and while imazapyr is not a standard recommendation because of limited selectivity, chlorsulfuron is a common recommendation and the site variation vanished at the highest rate. ALS enzyme bioassays indicated that the variable response to chlorsulfuron and imazapyr is not due to inherited herbicide resistance. The spatial variation associated with using herbicides to control yellow toadflax that we have observed in many experiments over the years appears to be environmentally related rather than associated with inherited resistance. Growth stage when yellow toadflax seems to be most susceptible to herbicide application will be easily identified as the post bloom stage. Land managers can apply herbicide during this time likely will achieve a greater and longer lasting decrease in yellow toadflax population abundance. This allows greater time to reclaim an infested site with desirable plant species without intense competition from the recovering weed species. Adoption of our results by public land managers not only increase success in decreasing toadflax abundance and decreased injury to desirable shrubs and forbs will be evident by using less herbicide.
Eurasian watermilfoil (Myriophyllum spicatum) is an invasive aquatic macrophyte that infests lakes and some irrigation canals in Colorado. This invasive species can drastically impact recreation and ecosystem services normally provided by aquatic environments. Recently, a new herbicide, imazamox, was registered for aquatic uses, and its behavior in Eurasian watermilfoil was evaluated. The results of this research provide these managers with critical information necessary to make appropriate decisions about using this new herbicide. Imazamox has attributes that make it a reasonable choice for managing this species. Applicators now have very detailed

information about its behavior in the plant and the importance of managing water movement during treatment.
Since the infection rate of Dutch Elm Disease has not changed dramatically in Fort Collins or elsewhere in Colorado, even though the vector population has been predominately S. schevyrewi for a decade, it appears that S. schevyrewi is a new vector of the DED pathogen but is not any more efficient than S. multistriatus. Thus, the current aggressive management programs that remove declining elms as elm bark beetle breeding sites, rapid removal of DED infected elms prior to beetle emergence and the planting of DED-resistant elms should continue to be effective management tactics.

Community Resource Development (CRD)

Extension Program Goals: CRD Programs provide tools so that citizens can make informed decisions to increase tax revenues, maintain and/or increase employment, and maintain and/or grow valued community resources.

New Programs, and/or Addressing NIFA Priorities: Community Resource Development (CRD), and its partner, Economic Development, are 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 background 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: CRD technologies will be provided through training and technical assistance to Extension agents, as the system views CRD as a process rather than an issue. The goal is to intentionally integrate CRD into all issues work.

Clean Energy Strategic Initiative

Extension Program Goals: Diffuse and adopt renewable energy sources and sustainable practices that reduce dependence on nonrenewable energy through public knowledge of energy efficiency and clean energy options.

New Programs, and/or Addressing NIFA Priorities: Clean energy interests and efforts were organized as an Extension 'strategic initiative team' in fall, 2008. Progress by the team is reflected in showing the work as a planned program, and including it in the Program Leadership Team as a Program Area. While not all clean energy is sustainable, it is an area of high interest to county partners, as documented by a search of county priorities on Web sites throughout the state. The Work Team's objective is to educate a core group of Extension agents about renewable energy options and energy efficiency, and to broadly educate all Extension agents on the basics of renewable energy. Deliverables include:

- demonstration sites;
- short term classes;
- partnerships with campus faculty;
- green jobs programs for schools;
- school enrichment materials using STEM-based standards.

Ongoing, Consistent, and/or Successful Programs: The long range intention is that Extension will be considered the educational entity of choice in the area of clean energy. These activities and intentions are recognized as outputs, as the planned program is very new and not fully resourced. The Work Team will create its Logic Model and articulate outcomes for the immediate, short, and long term.

Cross-cutting or Cross-disciplinary Initiatives: Our Clean Energy Specialist can more effectively connect Extension's clean energy efforts with multiple research and teaching opportunities that are ongoing in several colleges on campus.

Childhood Obesity

Extension Program Goals: No Work Team has been established to address issues of childhood obesity in Colorado.

New Programs, and/or Addressing NIFA Priorities: conscious focus on nutrition and physical activity in some 4-H Youth Development programs.

Ongoing, Consistent, and/or Successful Programs: n/a

Cross-cutting or Cross-disciplinary Initiatives: n/a

Nutrition and Health

Extension Program Goals: Reduced incidence of chronic diseases (such as diabetes, heart disease, obesity and cancer), thus reducing health insurance premiums and mortality rates, and increasing

employee productivity.

New Programs, and/or Addressing NIFA Priorities: The Nutrition and Health Work Team provides research-based nutrition and health education to a variety of audiences across Colorado in an effort to promote healthful nutrition, activity and lifestyle behaviors.

Ongoing, Consistent, and/or Successful Programs: These work teams members participated in the FCS focusing activity in June, 2009, and have specific outcome targets and indicators by which they collect their statewide data. Indicators for Nutrition and Health include:

- Consumption of fruits and vegetables;
- Consumption of calcium-rich foods;
- Physical activity.

AES Program Goals: The AES research program in human nutrition, health and food safety focuses on basic and applied research to understand:

- the interrelationships between nutrition, exercise, and human health, and
- the basic biochemistry of human nutrition, and
- food safety research emphasizing pre-harvest, handling and post-harvest detection of pathogens in crops and livestock to prevent contamination of meat and crop products and the transmission of pathogens to humans.

Program Accomplishments:

AES scientists collaborated with regulatory agencies to address the listeria outbreak from one cantaloupe producer/processor's operations that has had major impacts across the U.S. AES scientists and Extension are developing safe practices in cooper
ation with other growers as well as developing information to help restore the confidence in the "Rocky Ford Cantaloupe".

Total Actual Amount of professional FTEs/SYs for this State

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	150.0	0.0	50.0	0.0
Actual	0.0	0.0	56.1	0.0

II. Merit Review Process

1. The Merit Review Process that was Employed for this year

- 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 include alignment with college priorities, resource allocation, and meeting needs of Coloradoans.

In addition, Extension programs are subject to review by the Program Leadership Team (PLT) and Program Area Leaders(PALs). Extension is identifying, through a focusing effort, areas of emphasis for program delivery. In March, 2010, PALs, Work Team Leaders, county agents, county directors, Regional Directors, and Extension administrators convened to focus programs in other areas. Currently, Extension specialists and agents team together on about 20 work teams (WT), jointly lead by a specialist and an agent. Each WT has completed a Logic Model, including providing a situation statement, identification of inputs, outputs and impacts. All plans were updated during the fall, 2010, in order to be posted to a new on-line planning and reporting system.

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, the 59 Extension county programs have a total of 112 advisory committees involving close to 2000 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. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged 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, one regional engagement center, 54 individual county offices and three area programs serving 59 counties. 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 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. 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 state Extension Advisory Committee, representing both program recipient groups, as well as programmatic collaborators provides oversight and input at the state level. 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 Colorado Extension Advisory Committee (CEAC) for additional input and acceptance. There is an open call for additional work teams so that additional priority areas may be identified and state-wide focus provided. Diversity among stakeholders is expected, but as NIFA reviewers have noted, it is not documented.

2(A). A brief statement of the process that was 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 was 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 staff meet regularly with advisory committees and other stakeholders to solicit input on program direction, focus, implementation and success. In addition, CSU has required a yearly satisfaction survey of county commissioners regarding the Extension program in their county. That survey has provided valuable information on county needs and the impact/success of the Extension programs

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.

Input from stakeholder groups/individual is expected to be reflected in programming changes - both suggestions for new programs and changes to existing programs at the county/area level. In addition, programmatic suggestions are funneled from county stakeholders to the Colorado Extension Advisory Committee (CEAC) for consideration, recommendation, and implementation. The AES research program is modified based on input from stakeholders. Examples include an evaluation of oilseeds that was initiated to assess bioenergy potential based on stakeholder requests; multi-disciplinary and integrated activities are conducted on invasive plants; and the goals of wheat breeding program that reflect the needs of the wheat industry. In essence, ongoing interaction with stakeholders through formal and informal means is used to insure program relevancy.

Brief Explanation of what you learned from your Stakeholders

County needs must take priority for Extension programs.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
3048216	0	3403250	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	3048216	0	3217249	0
Actual Matching	3048216	0	3217249	0
Actual All Other	6514620	0	31944159	0
Total Actual Expended	12611052	0	38378657	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	2787220	0	0	0

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

4-H Youth Development

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
307	Animal Management Systems	5%		5%	
802	Human Development and Family Well-Being	5%		5%	
806	Youth Development	90%		90%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	50.0	0.0	0.0	0.0
Actual Paid Professional	85.6	0.0	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1071571	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1071571	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
2290151	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Supported traditional club program by recruiting and establishing new clubs
- Conducted after school and school enrichment programs that provide curriculum in Science, Technology, Engineering and Math (STEM), leadership, citizenship and life skills development.
- Developed new curriculum in response to new audience needs
- Strengthened 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, Developing new funding support through individual and group solicitation, grant applications and fee-for-service programs.

2. Brief description of the target audience

- For 4-H Youth Development programming - all Colorado youth, ages 5 - 19.
- For volunteers - interested adults, parents, community members, seniors, partner agencies.
- For increased funding - potential funding entities, including grant providers.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	11590	1825	102991	6970

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Increased funding for 4-H Youth Development through private dollars by increasing support from the Colorado 4-H Foundation. (These have been increased based on our 2005-06 actual of $240,000.)

Year	Actual
2011	480792

Output #2

Output Measure

- Number of web hits regarding 4-H topics, excluding pages of Agent Resources and Blog areas of the site.

Year	Actual
2011	379459

Output #3

Output Measure

- Number of youth reached by all 4-H delivery methods-club, after school, school enrichment. These numbers are being revised upward based on actual numbers for 2006-07 program year. Not reporting on this Output for this Annual Report

Output #4

Output Measure

- New/revised curriculum to meet changes in needs for youth audiences.
  Not reporting on this Output for this Annual Report

Output #5

Output Measure

- Number of volunteer management trainings held and tools developed.
  Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of volunteer leaders. (These have been reduced to reflect the anticipated increase from a current base of 8900.)

Year	Actual
2011	11970

Output #7

Output Measure

- Number of on-line e-Learning orientation modules completed by volunteers.
  Not reporting on this Output for this Annual Report

Output #8

Output Measure

- Amount of grant dollars generated to support 4-H Youth Development programs.
  Not reporting on this Output for this Annual Report

Output #9

Output Measure

- Value of volunteers' time that Colorado 4-H adult volunteers provide to 4-H programming, based an average donation of 128 hours/volunteer at $20.25/hour (national average for value of time)
  Not reporting on this Output for this Annual Report

Output #10

Output Measure

- Increased volunteer leaders' effectiveness as measured by retention rate of first year leaders.

Year	Actual
2011	773

Output #11

Output Measure

- Number of new volunteer leaders engaged and strengthening leadership capacity in community functions

Year	Actual
2011	490

Output #12

Output Measure

- Value of volunteers' time that Colorado 4-H adult volunteers provide to 4-H programming, based an average donation of 128 hours/volunteer at $21.62/hour (national average for value of time.

Year	Actual
2011	2587914

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent of youth reporting positive change in life skills including leadership, citizenship, decision making and communications skills as a result of 4-H participation.
2	Percent of volunteers reporting increased skills in area of responsibility.
3	Percent of youth reporting increased knowledge of Science, Technology, Engineering and Math (STEM) competencies through 4-H participation.
4	Percent of youth reporting change in behavior based on 4-H participation in Science, Technology, Engineering and Math (STEM) education/activities.
5	Percent of participating youth who increased knowledge through Meat Quality Assurance (MQA) training.
6	Percent of participating youth who changed behavior as a result of Meat Quality Assurance (MQA) training. Indicators may include making ethical decisions, being careful in storing medications, or properly handling and caring for animals,.
7	Percent of participating youth demonstrating improved behavior in science learning, such as career exploration, leading or teaching groups, or volunteer experiences
8	Percent of participating youth applying science process skills, including incorporation of science learning in community service and/or entrepreneurship/career success
9	Percent of participating youth increasing knowledge and/or skills in Science, Technology, Engineering and Math (STEM)content and/or careers
10	Percent of participating youth increasing positive attitude and/or aspirations about Science, Technology, Engineering and Math (STEM) learning and careers
11	Percent of participating youth increasing science process skills (observation, comparison, hypothesis), use of the scientific method, or problem solving.
12	Percent of participating volunteers who increased knowledge regarding community leadership
13	Percent of participating volunteers increasing skills: helping youth develop life skills; solving problems; connecting to the community; demonstrating pride in accomplishments
14	Percent of participating volunteers who consider they have made a positive impact on the lives of others.
15	Percent of participating volunteers who have learned valuable skills.
16	Youth demonstrate use of life skills.
17	Youth demonstrate science process skills.

18	Volunteers increase their skills for delivering education programs to youth.

Outcome #1

1. **Outcome Measures**

Percent of youth reporting positive change in life skills including leadership, citizenship, decision making and communications skills as a result of 4-H participation.

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Percent of volunteers reporting increased skills in area of responsibility.

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Percent of youth reporting increased knowledge of Science, Technology, Engineering and Math (STEM) competencies through 4-H participation.

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Percent of youth reporting change in behavior based on 4-H participation in Science, Technology, Engineering and Math (STEM) education/activities.

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Percent of participating youth who increased knowledge through Meat Quality Assurance (MQA) training.

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Percent of participating youth who changed behavior as a result of Meat Quality Assurance (MQA) training. Indicators may include making ethical decisions, being careful in storing medications, or properly handling and caring for animals,.

Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

Percent of participating youth demonstrating improved behavior in science learning, such as career exploration, leading or teaching groups, or volunteer experiences

Not Reporting on this Outcome Measure

Outcome #8

1. **Outcome Measures**

Percent of participating youth applying science process skills, including incorporation of science learning in community service and/or entrepreneurship/career success

Not Reporting on this Outcome Measure

Outcome #9

1. **Outcome Measures**

Percent of participating youth increasing knowledge and/or skills in Science, Technology, Engineering and Math (STEM)content and/or careers

Not Reporting on this Outcome Measure

Outcome #10

1. **Outcome Measures**

Percent of participating youth increasing positive attitude and/or aspirations about Science, Technology, Engineering and Math (STEM) learning and careers

Not Reporting on this Outcome Measure

Outcome #11

1. **Outcome Measures**

Percent of participating youth increasing science process skills (observation, comparison, hypothesis), use of the scientific method, or problem solving.

Not Reporting on this Outcome Measure

Outcome #12

1. **Outcome Measures**

Percent of participating volunteers who increased knowledge regarding community leadership

Not Reporting on this Outcome Measure

Outcome #13

1. **Outcome Measures**

Percent of participating volunteers increasing skills: helping youth develop life skills; solving problems; connecting to the community; demonstrating pride in accomplishments

Not Reporting on this Outcome Measure

Outcome #14

1. **Outcome Measures**

Percent of participating volunteers who consider they have made a positive impact on the lives of others.

Not Reporting on this Outcome Measure

Outcome #15

1. **Outcome Measures**

Percent of participating volunteers who have learned valuable skills.

Not Reporting on this Outcome Measure

Outcome #16

1. Outcome Measures

Youth demonstrate use of life skills.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	16145

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Today, 4-H meets the needs of and engages young people in positive youth development experiences. These experiences are based on the idea that young people should be regarded as resources to be developed.

What has been done
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.

Results
Members of organized 4-H Youth Development clubs were surveyed by local county 4-H agents at various times; including during club meetings, contests, events, etc. Knowledge (learning) and behavior (action) were measured. Changes in behavior (action) are reported. Life skills listed included: Finish tasks, Help make my community better, Help others, Keep good records, Make good choices, Make good decisions, Plan and organize, Responsible for my actions, Set goals, Solve problems, Speak to a group of people, Take leadership role(s), Use new methods or improved technology, and Use time wisely.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #17

1. Outcome Measures

Youth demonstrate science process skills.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	6767

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
STEM priority benefits from available and developing content and resource support from National 4-H Headquarters, Colorado State University, Extension, and county partners.

What has been done
Four Regional STEM Specialists were on board to support STEM education across the state.

Results
Participants in 4-H Youth Development STEM programs and activities were surveyed by state and regional STEM specialists, and local county 4-H agents. Knowledge (learning) and behavior (action) were measured. Changes in behavior (action) are reported. 6352 reporting using science process skills, and 415 expressed interest in STEM careers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #18

1. Outcome Measures

Volunteers increase their skills for delivering education programs to youth.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	267

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Volunteers increase the capacity of CSU Extension to deliver 4-H youth development programs and activities to youth.

What has been done
Ongoing professional development for volunteers.

Results
267 volunteers reported they increased their skills for delivering educational program(s) to youth.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

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 not to 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 relevant programs in non-rural environments.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

• 4-H Life Skills are increased according to evaluations on community service, contest participation, horse projects, volunteer impact, volunteer knowledge & skill.

• DARE to be You program conducted the CARE to Wait Multistate Comparison Study. Parents increased positive communication skills, knowledge of aspects of abstinence, basic parenting skills and efficacy to use skills. Parents also increased their knowledge of monitoring youth and skills to monitor. Youth learned aspects of abstinence and dangers of STD's.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Family Economic Stability

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	100%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	12.0	0.0	0.0	0.0
Actual Paid Professional	5.2	0.0	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
65095	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
65095	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
139121	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Educational activities include:

- Co-author new fact sheets
- Conduct train-the-trainer programs to increase the capacity of other entities to be able to increase financial literacy.
- Support Extension sponsorship of the Rocky Mountain Conference on Aging: Avoiding Financial Exploitation
- Teach money management using other curricula as appropriate to the audience, such as Money Talk Investing For Your Future Spend Some, Save Some, Share Some Small Steps to Health and Wealth Preparing for Long Term Care Finances Dollar Works 2 Green Homes, Green Wallet

2. Brief description of the target audience

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

3. How was eXtension used?

Promoted eXtension's Financial Security for All materials to the members of the Family Economic Stability Work Team and suggested that they use them as a reference and promote them to clientele who have questions or a need for information not covered in scheduled programs. Agents participated in webinars and utilized the calendar feature as well as the Frequently Asked Questions.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	3895	239	677	0

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

Patent Applications Submitted

Year: 2011
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	4	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- AgrAbility workshops held.
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Trainings held in family financial management.

Year	Actual
2011	3

Output #3

Output Measure

- Number of newsletters/publications distributed.
  Not reporting on this Output for this Annual Report

Output #4

Output Measure

- Grant dollars (external) generated to support this program.
  Not reporting on this Output for this Annual Report

Output #5

Output Measure

- Number of individuals trained in agribility issues (dealing with disabilities on the farm/ranch.)
  Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of individuals trained in family financial management, financial management in later life, teen financial management, and other family finance programs.

Year	Actual
2011	741

Output #7

Output Measure

- Number of volunteers supporting this program
  Not reporting on this Output for this Annual Report

Output #8

Output Measure

- Numbers of partnering agencies supporting this program
  Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent of participants demonstrating change in knowledge of financial management.
2	Percent of participants intending to change behavior and/or reporting change in attitudes regarding financial management.
3	Percent of participants in financial management training demonstrating change in behavior.
4	Percent of families indicating improvement in financial health due to changes based on skills learned in financial management trainings.
5	Percent of individuals demonstrating increase in knowledge regarding strategies for dealing with disabilities on the farm or ranch.
6	Percent of participants in AgrAbility workshops reporting change in behavior regarding coping with disabilities on the farm/ranch.
7	Percent of workshop alumni who report enhanced quality of life as the result of AgrAbility training.
8	Financial management: Number of participants reporting intent to implement knowledge gained.
9	Saving & energy conservation: Number of participants reporting intent to implement knowledge gained by taking steps to increase savings through energy conservation and efficiency methods.
10	Saving, investing & long-term care: Number of participants reporting they plan to implement plans for savings, investing, and long term care finances.
11	Financial fraud: Number of participants reporting behavior changes/use of skills in avoiding financial fraud.
12	Youth: Number of participants reporting intent to implement knowledge gained by taking steps to begin teaching children and youth health money habits.

Outcome #1

1. **Outcome Measures**

Percent of participants demonstrating change in knowledge of financial management.

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Percent of participants intending to change behavior and/or reporting change in attitudes regarding financial management.

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Percent of participants in financial management training demonstrating change in behavior.

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Percent of families indicating improvement in financial health due to changes based on skills learned in financial management trainings.

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Percent of individuals demonstrating increase in knowledge regarding strategies for dealing with disabilities on the farm or ranch.

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Percent of participants in AgrAbility workshops reporting change in behavior regarding coping with disabilities on the farm/ranch.

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Percent of workshop alumni who report enhanced quality of life as the result of AgrAbility training.

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Financial management: Number of participants reporting intent to implement knowledge gained.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	781

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Colorado families' financial instability includes increasing rates of bankruptcy, economic crises and loss of jobs.

What has been done
Working in partnership with state and nongovernmental agencies, agents delivered DollarWorks2 and other curricula relevant to individuals and families in difficult economic times.

Results

781 participants reported they plan to implement knowledge gained by taking steps to improve financial management strategies such as setting financial goals; record keeping; creating and using a spending plan; understanding credit and debt reduction; and risk management. In addition, 526 participants reported they had changed behavior/increased use of skills in : setting financial goals; organized record keeping; following a spending plan; maintaining an emergency fund; increasing savings; using credit wisely, reducing debt, regularly obtaining and reviewing credit reports; and managing financial risk. And, 646 participants reported they feel confident and able to implement financial management strategies such as setting financial goals; record keeping; creating and using a spending plan; understanding credit and debt reduction; and risk management.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #9

1. Outcome Measures

Saving & energy conservation: Number of participants reporting intent to implement knowledge gained by taking steps to increase savings through energy conservation and efficiency methods.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	317

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Colorado families' financial instability includes increasing rates of bankruptcy, economic crises and loss of jobs.

What has been done
Working in partnership with state and nongovernmental agencies, agents will deliver DollarWorks2 and other curricula relevant to individuals and families in difficult economic times.

Results
317 participants reported intent to implement knowledge gained by taking steps to increase savings through energy conservation and efficiency methods. In addition, 243 participants reported feeling confident taking steps to save money by increasing energy conservation and

efficiency methods. And, 13 participants reported behavior change/use of skills in reducing energy usage and costs, and increasing efficiency.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #10

1. Outcome Measures

Saving, investing & long-term care: Number of participants reporting they plan to implement plans for savings, investing, and long term care finances.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	221

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Colorado families' financial instability includes increasing rates of bankruptcy, economic crises and loss of jobs.

What has been done
Working in partnership with state and nongovernmental agencies, agents will deliver DollarWorks2 and other curricula relevant to individuals and families in difficult economic times.

Results
221 participants reported they plan to implement plans for savings, investing, and long term care finances. In addition, 78 participants reported they feel confident and able to implement plans for savings, investing, and long term care finances. And, 33 participants reported behavior changes/increased use of skills including increased saving, investing, and planning for long term care finances.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #11

1. Outcome Measures

Financial fraud: Number of participants reporting behavior changes/use of skills in avoiding financial fraud.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	268

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Colorado families' financial instability includes increasing rates of bankruptcy, economic crises and loss of jobs.

What has been done
Working in partnership with state and nongovernmental agencies, agents will deliver DollarWorks2 and other curricula relevant to individuals and families in difficult economic times.

Results
268 participants reported behavior changes/use of skills in avoiding financial fraud. In addition, 277 participants reported they feel confident in their ability to avoid and deal with financial fraud. And, 543 participants reported intent to implement knowledge gained by taking steps to avoid and deal with financial fraud.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #12

1. Outcome Measures

Youth: Number of participants reporting intent to implement knowledge gained by taking steps to begin teaching children and youth health money habits.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	172

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Colorado families' financial instability includes increasing rates of bankruptcy, economic crises and loss of jobs.

What has been done
Working in partnership with state and nongovernmental agencies, agents will deliver DollarWorks2 and other curricula relevant to individuals and families in difficult economic times.

Results
172 intent to implement knowledge gained by taking steps to begin teaching children and youth health money habits. In addition, 54 participants reported they feel confident teaching children and youth healthy money habits. And, 12 participants reported behavior changes/use of skills in teaching children and youth healthy money habits.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

As economic conditions change, the audience's interest in improving their financial literacy may change.

· Appropriations at the federal, state, or county level may change the number of Extension Agents available to teach financial management.

· Public policy changes, such as the Credit Card Act, may change people's interest in financial literacy.

· Competing public priorities may influence Extension Agents as they determine the most important work to do in their communities.

· Competing Extension programmatic challenges are a significant factor FCS agents' ability to do financial education programming as most of the Work Team members carry (at least) dual responsibilities such as FCS and 4-H, FCS and County Director, or other arrangements.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Participants evaluated report very high levels of increase in knowledge, although this report does not include those measures. Action outcomes also showed results, including plan/intent to change a behavior , and actual behavior change/use of skills after Family Economic Stability programming.

Key Items of Evaluation

A variety of programs offered by members of the Financial Economic Stability work team are increasing levels of financial literacy and capability of Coloradans. These positive impacts help to improve financial stability and reduce negative situations (high numbers of bankruptcies, repossessions, evictions, foreclosures, and less reliance on public assistance) which are beneficial for families, communities, counties, and the state as a whole.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Food Safety

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	10%		0%	
501	New and Improved Food Processing Technologies	10%		0%	
503	Quality Maintenance in Storing and Marketing Food Products	10%		0%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	10%		0%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	60%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	16.0	0.0	6.0	0.0
Actual Paid Professional	6.4	0.0	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
80117	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
80117	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
171226	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Food Safety 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.
Research

- Technical and extension publications
- Development of new technologies for improving food safety
- Development of recommendations on diet, exercise or other health related topics

2. Brief description of the target audience

Food Safety Education

- Consumers, High Risk Audiences (pregnant, immune-compromised, elderly).
- Food handlers and their managers at retail food establishments.
- Producers and processors of plant and animal agricultural products.

3. How was eXtension used?

eXtension primarily used via the Ask-an-Expert program.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	4732	1148	210	99

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	13	10	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of trainings in food safety held.

Year	Actual
2011	240

Output #2

Output Measure

- Grant dollars (external) received to support Food Safety

Year	Actual
2011	189700

Output #3

Output Measure

- Number of individuals reached by newsletters distributed on food safety .

Year	Actual

2011	35000

Output #4

Output Measure

- Number of individuals trained via workshops in food safety

Year	Actual
2011	7948

Output #5

Output Measure

- Number of partnering agencies in Colorado who collaborated in food safety efforts.

Year	Actual
2011	100

Output #6

Output Measure

- Number of volunteers supporting food safety

Year	Actual
2011	174

Output #7

Output Measure

- Number of curricula developed or reviewed that support food safety

Year	Actual
2011	8

Output #8

Output Measure

- User Fees Generated through Food Safety work.

Year	Actual
2011	10120

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent of participants at trainings in Food Safety indicating an increase in knowledge gained
2	Percent of participants reporting a change in attitude regarding Food Safety.
3	Percent of participants indicating a change in behavior as a result of Food Safety training
4	Number of new technologies in pre-harvest livestock management adopted to reduce and/or avoid contamination of meat and/or plant products with human pathogens.
5	Number of new technologies in handling and/or post-harvest detection and management systems adopted to prevent contamination of meat and plant products with human pathogens.
6	Hand Washing: Number of participants demonstrating proper hand washing technique.
7	Food Preparation: Participants intend to use clean cutting boards, utensils, knives, etc. and wash produce using recommended methods.
8	Food Temperature: Participants intend to use a food and/or refrigerator thermometer to monitor proper temperatures.
9	Food Preservation: Participants intend to use tested recipes for preserving food.

Outcome #1

1. **Outcome Measures**

Percent of participants at trainings in Food Safety indicating an increase in knowledge gained

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Percent of participants reporting a change in attitude regarding Food Safety.

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Percent of participants indicating a change in behavior as a result of Food Safety training

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Number of new technologies in pre-harvest livestock management adopted to reduce and/or avoid contamination of meat and/or plant products with human pathogens.

2. **Associated Institution Types**

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #5

1. Outcome Measures

Number of new technologies in handling and/or post-harvest detection and management systems adopted to prevent contamination of meat and plant products with human pathogens.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #6

1. Outcome Measures

Hand Washing: Number of participants demonstrating proper hand washing technique.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1162

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Food Safety programs will reduce the economic burden and human suffering that can be caused by food-borne illness in the US.

What has been done
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.

Results
1162 participants demonstrated they can use proper hand washing technique. Both youth and adults were trained. Boulder County received a small grant ($500) to purchase thermometers, GloGerm kit, and other supplies for the hand washing class.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #7

1. Outcome Measures

Food Preparation: Participants intend to use clean cutting boards, utensils, knives, etc. and wash produce using recommended methods.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1082

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Food Safety programs will reduce the economic burden and human suffering that can be caused by food-borne illness in the US.

What has been done
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.

Results
1082 participants reported they planned to use clean cutting boards, utensils, knives, etc. and wash produce using recommended methods. Participants in one session of the ServSafe class for managers reported increasing knowledge across 25 key food safety principles from 80.2% on the pre-quiz to 95.1% on the post quiz.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #8

1. Outcome Measures

Food Temperature: Participants intend to use a food and/or refrigerator thermometer to monitor proper temperatures.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	379

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Food Safety programs will reduce the economic burden and human suffering that can be caused by food-borne illness in the US.

What has been done
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.

Results
379 participants reported they plan to use a food and/or refrigerator thermometer to monitor proper temperatures. Ten of 11 in one class learned how to calibrate a thermometer.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #9

1. Outcome Measures

Food Preservation: Participants intend to use tested recipes for preserving food.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	926

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Food Safety programs will reduce the economic burden and human suffering that can be caused by food-borne illness in the US.

What has been done
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.

Results
926 participants reported the plan to use tested recipes for preserving food. All participants in one class showed in increased knowledge in selecting and following research-based recipes and procedures.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

V(H). Planned Program (External Factors)

External factors which affected 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.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Food Safety efforts focused on personal hygiene (hand washing), food preservation, and use of adequate temperatures. Only action/behavior outcomes are reported here. There are numerous learning/knowledge outcomes that were collected and reported in Colorado's on-line planning and reporting system (CPRS).

Key Items of Evaluation

Food Safety efforts focused on personal hygiene (hand washing), food preservation, and use of appropriate temperatures. Food Safety is now structured as a stand-alone Extension Work Team in order to more fully address the NIFA priority. Food Safety research and education may be integrated into other Work Teams so that they are not limited to program delivery by FCS agents, but rather viewed as integral in many aspects of AES and Extension outreach.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Global Food Security and Hunger

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	30%		0%	
301	Reproductive Performance of Animals	30%		0%	
302	Nutrient Utilization in Animals	5%		0%	
303	Genetic Improvement of Animals	5%		0%	
307	Animal Management Systems	5%		0%	
311	Animal Diseases	5%		0%	
601	Economics of Agricultural Production and Farm Management	20%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	25.0	0.0	29.0	0.0
Actual Paid Professional	10.3	0.0	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
128939	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
128939	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
275567	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Direct contact (one-on-one and group) with producers.
- Producer field days during growing seasons and harvest periods for key crops.
- Disseminate information via newsletters, appropriate web sites (including CSUBeef.com), producer conference calls, and/or video streaming
- Education on emergency preparedness
- Farm Service Agency County Rangeland Assessments
- Organization of networks
- Yearly study tour to different parts of Colorado for 2-3 days in conjunction with a producer meeting.
- The primary target audience will include traditional farm, ranch, and feedyard operations, 4-H/FFA members, wool cooperatives, processors, and dairies. Full owner/ operators account for 58% in Colorado while part owners and tenants account for the remaining 42%. Support will also be given to part-time and small acreage operators, a large percentage of beef cows in the US are in herds of less than 50 head. In addition, rangeland managers on both private and public lands will be targeted in this plan of work since decisions regarding land resource management have a direct impact on grazing livestock.

· Partnerships within and outside the University (e.g. Department of Agricultural and Resource Enconomics, Department of Soil and Crops Sciences, Department of Biological Sciences and Pest Management, Agricultural Experiment Station, Colorado Wheat Administrative Committee, Colorado Seed. Crops Work Team members will continue to be active in high profile conferences and committees.

- Team members will be active in high profile conferences and committees (e.g. Range Beef Cow Symposium, Robert E. Taylor Beef Symposium, Western Beef Resource Committee, and Colorado Farm Show Beef Day).

2. Brief description of the target audience

The primary target audience included traditional farm, ranch, and feedyard operations, 4-H/FFA members, wool cooperatives, processors, and dairies. Full owner/ operators accounted for 58% in Colorado while part owners and tenants accounted for the remaining 42%. Support was also given to part-time and small acreage operators, as a large percentage of beef cows in the US are in herds of less than 50 head. In addition, rangeland managers on both private and public lands were targeted in this plan of work since decisions regarding land resource management have a direct impact on grazing livestock.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	30340	28015	1730	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	30	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of attendees at workshops/trainings/field days
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Amount of grant dollars garnered to support animal research and outreach programs
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Number of workshops presented.
  Not reporting on this Output for this Annual Report

Output #4

Output Measure

- Number of volunteers supporting this work

Year	Actual
2011	186

Output #5

Output Measure

- Number of agencies partnering in this program effort.

Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of one-on-one contacts with producers

Year	Actual
2011	2505

Output #7

Output Measure

- Number of partnering agencies.

Year	Actual
2011	171

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent of participants in workshops/trainings/field days indicating an increase in knowledge gained
2	Percent of participants indicating change in behavior/ best practices adopted
3	Economic impact of the change in behavior reported, reported in dollars.
4	Number of new technologies adopted to increase food production
5	Profitable Animal Enterprises: Participants intend to further investigate strategies to increase the profitability of their animal enterprises.
6	Range Management: Participants intend to implement range management strategies for increasing the grazing capacity of their land.
7	Range/Pasture Monitoring: Participants have improved range/pasture monitoring skills.
8	Range/Pasture Management: Participants intend to implement range management strategies for increasing the grazing capacity of their land.
9	Promoting Meat Consumption: Participants will actively promote beef and lamb consumption.
10	Succession: Participants intend to develop formal plans regarding succession.
11	Farm Transfer: Participants intend to develop or update plans for transferring their farms/ranches to the next generation.
12	Revenue/Costs: Participants will have sustainable profits due to increased revenues and/or decreased costs.

Outcome #1

1. **Outcome Measures**

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

   Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

   Percent of participants indicating change in behavior/ best practices adopted

   Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

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

   Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

   Number of new technologies adopted to increase food production

   Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

   Profitable Animal Enterprises: Participants intend to further investigate strategies to increase the profitability of their animal enterprises.

2. **Associated Institution Types**

   - 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	2249

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results
2249 participants reported they intend to further investigate strategies for increasing the profitability of their animal enterprises. In addition, 81 reported they have decreased supplemental feed costs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

Outcome #6

1. Outcome Measures

Range Management: Participants intend to implement range management strategies for increasing the grazing capacity of their land.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	841

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results
841 participants reported they intend to implement range management strategies for increasing the grazing capacity of their land.

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources

Outcome #7

1. Outcome Measures

Range/Pasture Monitoring: Participants have improved range/pasture monitoring skills.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	8035

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results
8035 participants reported they have improved range/pasture monitoring skills.

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources

Outcome #8

1. Outcome Measures

Range/Pasture Management: Participants intend to implement range management strategies for increasing the grazing capacity of their land.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	841

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results
841 participants reported that they intend to implement range management strategies for increasing the grazing capacity of their land.

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources

Outcome #9

1. Outcome Measures

Promoting Meat Consumption: Participants will actively promote beef and lamb consumption.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	943

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results
943 participants reported they actively promote beef and lamb consumption.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

Outcome #10

1. Outcome Measures

Succession: Participants intend to develop formal plans regarding succession.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results
100 participants reported they intend to develop formal plans regarding succession.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

Outcome #11

1. Outcome Measures

Farm Transfer: Participants intend to develop or update plans for transferring their farms/ranches to the next generation.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	75

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results
75 participants intend to develop or update plans for transferring their farms/ranches to the next generation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

Outcome #12

1. Outcome Measures

Revenue/Costs: Participants will have sustainable profits due to increased revenues and/or decreased costs.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1293

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

1293 participants reported they will have sustainable profits due to increased revenues and/or decreased costs. This indicator shows up three times in our reporting system, with three different numbers. There may be an additional 339 + 652, but it is unclear whether these numbers are original or duplicate.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

none provided by Work Team

V(I). Planned Program (Evaluation Studies)

Evaluation Results

AES programs/projects are evaluated annually through progress reporting compared to stated objectives and intended outcomes. Corrective action, if needed, is addressed by the AES Director, faculty and their department heads. Programs/projects with significant outcomes are reported in this annual report based upon our internal assessment process.

Key Items of Evaluation

Global Food Security and Hunger is a broad category that could encompass plant and animal production, food safety, nutrition, and other related areas. For this report, Extension has reported Animal Production Systems in this area; however the AES has reported Animal Production Systems as a separate program. We cannot resolve this difference in this report. Further, we suggest that NIFA identify the KAs that "best fit" this program that will assist us in resolving what should and can be reported, given the limitation of 20 KAs. In addition, Global Food Security is not simply the provision of crops and livestock to meet demands, but security is as much related to threats to the food system. For example, contamination of water sources for production, disruption of transportation, disruption of oil sources and others have a larger bearing on security of production and distribution than the production itself as reported in Plant and Animal Production Systems and food safety. To deal with security in this context may require a rethinking by NIFA of defining what the program is as well as the KAs associated with outcomes, etc.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Plant Production Systems

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	0%		4%	
103	Management of Saline and Sodic Soils and Salinity	0%		7%	
111	Conservation and Efficient Use of Water	0%		5%	
121	Management of Range Resources	10%		9%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		5%	
202	Plant Genetic Resources	0%		7%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		6%	
205	Plant Management Systems	50%		6%	
206	Basic Plant Biology	0%		3%	
213	Weeds Affecting Plants	5%		3%	
216	Integrated Pest Management Systems	10%		13%	
301	Reproductive Performance of Animals	10%		0%	
307	Animal Management Systems	15%		0%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	0%		9%	
403	Waste Disposal, Recycling, and Reuse	0%		5%	
405	Drainage and Irrigation Systems and Facilities	0%		10%	
502	New and Improved Food Products	0%		4%	
601	Economics of Agricultural Production and Farm Management	0%		2%	
605	Natural Resource and Environmental Economics	0%		2%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Extension	Research

Year: 2011	1862	1890	1862	1890
Plan	15.0	0.0	26.0	0.0
Actual Paid Professional	36.5	0.0	18.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
456919	0	1276497	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
456919	0	1276497	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
976524	0	10165360	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

• Wheat-based & Other Cropping Systems Work Team members continued to be active in high profile conferences and committees.
• Direct contact (one-on-one and group) with producers.
• Partnerships within and outside the University (e.g. Department of Agricultural and Resource Enconomics, Department of Soil and Crops Sciences, Department of Biological Sciences and Pest Management, Agricultural Experiment Station, Colorado Wheat Administrative Committee, Colorado Seed. Crops Work Team members will continue to be active in high profile conferences and committees.
• Producer field days during growing seasons and harvest periods for key crops.
• Conduct basic and applied reserach in plant production systems

2. Brief description of the target audience

Individual agricultural producers, agribusinesses, and commodity organizations.
Scientists
Govermental agencies and policy-makers

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	260233	234851	1884	1990

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

Patent Applications Submitted

Year: 2011

Actual: 2

Patents listed

Plant Select: Delosperma "P001S" Fire Spinner Ice Plant

Plant Select: Osteospermum "Avalanche" Avalanche White Sun Daisy

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	14	178	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of new technologies released

Year	Actual
2011	2

Output #2

Output Measure

- Number of attendees at workshops/trainings/field days.
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Amount of grant dollars garnered to support natural plant production systems research and outreach.

Year	Actual

2011	7779016

Output #4

Output Measure

- Number of Extension workshops focusing on plant production systems.

Year	Actual
2011	405

Output #5

Output Measure

- Number of volunteers supporting plant production systems work.

Year	Actual
2011	205

Output #6

Output Measure

- Number of newsletters distributed in support of this plan of work.

Year	Actual
2011	45

Output #7

Output Measure

- Number of workshops, educational classes for producers

Year	Actual
2011	279

Output #8

Output Measure

- Number of demonstration plots and field days

Year	Actual
2011	236

Output #9

Output Measure

- Number of individual consultations

Year	Actual
2011	376

Output #10

Output Measure

- Number of agencies partnering in this work
  Not reporting on this Output for this Annual Report

Output #11

Output Measure

- Technical publications in the topical area of plant production systems

Year	Actual
2011	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent of participants at workshops/trainings/field days indicating an increase in knowledge gained.
2	Percent of participants indicating change in behavior/best practices adopted.
3	Economic impact of the change in behavior reported.
4	Adoption of improved wheat cultivars.
5	Adoption of crop production technology as measured by agricultural statistics
6	Communicate knowledge gained
7	Grass and Legume Production
8	Production of Chile Peppers
9	Management of Powdery Scab of Potatoes
10	Management Guidelines for New and Existing Potato Cultivars
11	Proso Millet for Ethanol Production
12	Adaptation of Annual, Perennial and Woody Plants for Colorado Landscapes
13	Management of Dutch Elm Disease
14	Management Strategies for Iris Yellow Spot Virus and Onion Thrips
15	Control of Weeds in Colorado Agronomic Crops
16	Remote Sensing for Irrigation Management, Soil Salinity Monitoring, Water Rights and Acquifer Depletion

Outcome #1

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Economic impact of the change in behavior reported.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	9910254

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Collaborative On-Farm Trials (COFT), supported by the Colorado Wheat Research Foundation since its inception, is unique to Colorado. No other state engages farmers in wheat development through large-scale, uniform on-farm variety testing.

What has been done
COFT speeds the overall adoption of new varieties around the state, and increases total annual yields. The COFT reports were voted as the most important information source in helping them

select new wheat varieties by 297 (one seventh of Colorado Wheat Producers) in Extension's 2010 producer survey.

Results
Wheat farmers adoption of just three of the newer CSU wheat varieties created a significant economic for Colorado's farmers with an impact worth over $18,000,000 in 2011 according to Jay Parsons, a CSU Agricultural Economist.

This impact translates to an increased income in 2011 for dry land farmers. The impact by County is estimated at:

oAdams $ 1,166,000
oArapaho $ 588,000
oKit Carson $ 2,110,400
oLogan $ 978,000
oMorgan $ 420,000
oPhillips $ 887,000
oSedgwick $ 657,000
oWeld $ 821,000
oWashington $ 2,146,500
oYuma $1,134,600

4. Associated Knowledge Areas

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems
206	Basic Plant Biology
213	Weeds Affecting Plants
216	Integrated Pest Management Systems

Outcome #4

1. Outcome Measures

Adoption of improved wheat cultivars.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The objectives of the wheat breeding project are to a) develop wheat cultivars and germplasm having desirable agronomic, disease and insect resistance, and end-use quality characteristics and b) conduct research to improve understanding of genetic and environmental factors that affect wheat yield and end-use quality in Colorado. Development of improved wheat cultivars serves the wheat industry in Colorado by reducing wheat production costs, reducing pesticide use, and providing improved marketing options.

What has been done
: In fall 2011, six experimental lines were released as new cultivars. Three of these lines have been named as new cultivars - Byrd, Denali, Brawl CL Plus - and will be marketed primarily by the Colorado Wheat Research Foundation, either alone or in collaboration with other parties. In Colorado trials, Byrd has shown very high grain yield, approximately 10% higher than the current leading variety Hatcher, and also shows good test weight and stripe rust resistance, and exceptional milling and bread baking quality. Brawl CL Plus carries a second gene for tolerance to imazamox herbicide and has shown grain yield comparable to other imazamox-tolerant varieties (Clearfield*), high test weight, good stripe rust resistance, and excellent milling and bread baking quality.

Results
Since inception of the program, average wheat grain yields in Colorado have more than doubled with at least 50% of this increase attributed to improved cultivars. While the value of these yield increases varies according to production and market prices, estimates of economic returns in Colorado from CSU-developed wheat varieties were approximately $43 million for the 2011 crop alone. These estimates include yield increases resulting from improved CSU varieties ($29 million), marketing benefits resulting from CSU varieties with enhanced end-use quality ($9 million), and yield-protection resulting from adoption of CSU varieties carrying herbicide tolerance traits for winter annual grassy weed control ($5 million).

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems
206	Basic Plant Biology
213	Weeds Affecting Plants

Outcome #5

1. Outcome Measures

Adoption of crop production technology as measured by agricultural statistics

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems
206	Basic Plant Biology
213	Weeds Affecting Plants
216	Integrated Pest Management Systems

Outcome #6

1. Outcome Measures

Communicate knowledge gained

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	7515

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results
7515 participants reported they can communicate knowledge gained to others.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #7

1. Outcome Measures

Grass and Legume Production

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
One of the objectives of this project was to investigate methods of interseeding grasses and legumes into existing stands of perennial forages. Interseeding legumes into grass-dominated stands can benefit pasture and hay producers by increasing the yield and quality of forage they produce and reducing their need for inputs of nitrogen fertilizer. The challenge is to get the legumes established given the competition from existing vegetation.

What has been done
: A cooperative study was initiated in 2010 that involved sites and personal from Colorado, Idaho, and Oregon. Five legume species (alfalfa, birdsfoot trefoil, red clover, white clover, and sainfoin) were interseeded into existing grass pastures and hayfields that were suppressed either with glyphosate herbicide, close mowing to simulate early spring grazing, or direct seeded (control).

Results
This study confirmed that suppressing the grasses with glyphosate prior to seeding results in the most consistent legume establishment. Close mowing to simulate heavy grazing generally did not result in improved establishment. Of the 5 legumes evaluated, alfalfa established the best in the glyphosate treatment in Colorado, increasing yield by over a ton per acre. In Idaho, establishment was more variable with red clover establishing well regardless of suppression treatment. No legumes established at the Oregon site due to heavy rodent activity. This study highlighted the importance of suppressing the existing grasses and choosing a vigorous legume species for interseeding to reduce the risk of seeding failure. The most influential output for 2011 was the completion of the second edition of the Intermountain Grass and Legume Production Manual. This was a cooperative effort among numerous authors. Numerous hard copies have been distributed to producers, Extension agents, NRCS field personnel, and agriculture consultants within Colorado as well as several western states.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #8

1. Outcome Measures

Production of Chile Peppers

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Chile peppers are an important specialty crop in the Arkansas Valley of Colorado and improving the yield and quality of the crop is an important goal of producers. Problems associated with the cost and availability of labor for thinning, hoeing, and harvesting have made chile pepper production more challenging. Further, in many rapidly urbanizing western states, the competition for water resources is dramatically increasing. State-wide, irrigation water historically used for agriculture is under pressure from municipal demands. As a result, water availability is another factor that may limit pepper productivity and profitability in the future.

What has been done
We examined the water use and horticultural characteristics of different chile pepper varieties irrigated with three different techniques: furrow irrigation, drip irrigation, and drip irrigation plus plastic mulch. Overall, several new hybrid chile pepper varieties had yields that exceed those of commonly used open-pollinated varieties. Those same varieties had good quality as measured by pod size and pod straightness. For all varieties, yield and quality was highest on treatments that were grown with drip irrigation plus plastic mulch. Further, the consumptive use of irrigation water was lowest in the drip-irrigated plus mulch treatment (16.6 acre-inches) followed by the drip-irrigated (24.8 acre-inches) and furrow-irrigated treatments (34.2 acre-inches).

Results
Chile peppers are an important specialty crop in the Arkansas Valley of Colorado. Plasticulture techniques employing drip irrigation and plastic mulch can dramatically improve fresh market yield of chile peppers. Gross returns from chile peppers grown for the fresh market have the potential to reach $10,000 per acre. These studies suggest that growing hybrid chile pepper varieties with black plastic mulch and drip irrigation increases fresh market yield and reduces the consumptive use of irrigation water.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #9

1. Outcome Measures

Management of Powdery Scab of Potatoes

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Powdery scab of potato caused by the protest Spongospora subterranean has been an ongoing disease problem for Colorado producers. This is especially true of producers of the thin-skinned, specialty type cultivars, the yellows, reds, fingerlings and newer clones. Producers have been hamstrung by the inability to adequately control this skin defect problem. Because of the powdery scab lesions on the tubers, production of many of the cultivars which can make high dollars in the market place are being replaced with more of the russet, commodity type cultivars. The reason for this is that russet cultivars are generally resistant to the skin lesions associated with powdery scab. However, these cultivars can often produce spores which can infest the soil by the formation of root galls.

What has been done
We developed a comprehensive management strategy which couples use of a PCR technique to screen soils for the sporeball inoculum with use of a chemical, fluazinam or trade name Omega, on the most susceptible cultivars applied during the planting phase. Also, a technique to apply the chemical into the covering soil and over the seed piece was developed which made this chemistry even more effective in controlling the disease. Finally, through use of a greenhouse screening technique developed by this program, many new cultivars have been screened for the various phases of the disease and two commercial russets have been identified with very low sporeball production, both on the tubers and on the roots, Mesa Russet and Rio Grande Russet, as well as several specialty type clones.

Results
The largest potato producer in Colorado and much of the Southwest has indicated that by following this management plan his problems with powdery scab have diminished to the point that he no longer considers this a major disease threat to his production. For the past three years his farming operation has screened in excess of 50 fields for the presence of soil borne inoculum. He has utilized this information in his planting schemes when production of susceptible cultivars is necessary. In addition, he has used the soil screening program to assess his other field production practices such as the growth of certain green manure crops on the level of inoculum found in the field. The release and growth of several newer cultivars which are resistant or moderately resistant to the disease has resulted in the successful production of susceptible cultivars with few grade related problems due to powdery scab. This has generated an additional estimated 480,000 cwt of clean, marketable potatoes with a fair market value in excess of $7.2 million, due to the nature of the high prices received for specialty type potatoes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #10

1. Outcome Measures

Management Guidelines for New and Existing Potato Cultivars

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Each potato cultivar has its own unique set of cultural management requirements to attain maximum tuber yield and quality. To attain the sustainable yield and quality potential of any potato cultivar, optimum management guidelines for the cultivar need to be followed. The objective of this project was to establish cultivar specific management guidelines for the successful, sustainable, and economic production of new and existing potato cultivars, which optimize their genetic potential, while minimizing economic inputs and environmental degradation.

What has been done

: In 2011, horticultural evaluations were conducted on 28 potato cultivars and advanced selections in 21 trials at 11 locations in the San Luis Valley of Colorado. Tests included 16 Russets, 10 Specialty Potatoes, four chipping potatoes, and 1 fingerling. The trials assessed the influence of different cultural management practices on plant growth, development, tuber yield, tuber size distribution, and tuber quality of potato cultivars, in an effort to establish optimum management guidelines for each cultivar; data collected were summarized into a booklet and distributed to potato growers in Colorado. Observations from the 2011 field studies and some of the data collected were presented at the Potato Research and Extension program meeting held in Minneapolis, MN; at the Southern Rocky Mountain Agricultural Conference in Monte Vista, CO; to crop consultants in the San Luis Valley, CO; at various professional meetings in the United States, and at the Potato Expo, to potato industry personnel.

Results

The development of optimum nitrogen application rates for potato cultivars developed in Colorado has helped reduce nitrogen fertilizer inputs in potato production. This has reduced the production cost of potato farmers, which has gone a long way to increase the profit margin of growers. It is estimated that potato growers in the San Luis Valley are saving an average of $10 million dollars a year on fertilizer purchase by using the fertilizer application rates suggested by this program. As growers reduce the use of nitrogen fertilizer in their operations, the potential of excess nitrate nitrogen leaching into ground waters to contaminate wells that are used for drinking water has significantly reduced. Results from plant population studies conducted for individual cultivars has resulted in growers planting the optimum amount of seed needed for the production of maximum yield and quality tubers. Production cost has reduced as a result of relatively less quantity of seed used for planting some of the new cultivars released from the Colorado Potato Development Program.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #11

1. Outcome Measures

Proso Millet for Ethanol Production

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Ethanol production from proso millet will increase the income of producers and the economies of rural communities in the Southern High Plains will strengthen. Ethanol production in rural communities has been reported to stabilize and even increase agriculturally based economies. Expanding ethanol production from proso millet will lessen our nation's dependence on foreign oil and will further our national goal of greater energy independence based on renewable feedstocks. Proso millet is an undervalued crop. The price of proso millet is limited because it is almost entirely marketed as birdseed.

What has been done
We planted four proso millet cultivars at monthly intervals from May to August for grain production (kg/ha), ethanol yield (kg/L) and ethanol production (L/ha). Of four proso millet cultivars studied, Huntsman and Sunrise provided higher grain and ethanol production than Horizon and Plateau. For the drier and warmer Southern High Plains region, Huntsman and Sunrise appear well adapted. The June 3 planting date produced the highest grain production, ethanol production, and ethanol yield of the monthly planting dates tested. The two earliest planting dates, May 12 and June 3, produced highest grain and ethanol production, then dropped precipitously for the two later planting dates, July 2 and August 2. From our results, the planting date window for proso millet at Walsh is late May to mid June.

Results
From our analysis, proso millet marketed as an ethanol crop was worth $0.092/kg more than proso millet as a birdseed crop. It would be profitable for ethanol plants to include proso millet as part of their ethanol feedstock, even if they paid substantial premiums compared to the birdseed price. Because of the price differential between the birdseed market and the ethanol market for proso millet, ethanol production facilities seeking the least cost grain would make profitable decisions by including proso millet as part of their fermentation feedstock. If ethanol plants include proso millet as a feedstock, then the demand and price would increase, and proso millet would expand into nontraditional production areas. This possible crop expansion of proso millet would offer more cropping options and more income stability to growers in the water-deficient lands of the Southern High Plains.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #12

1. Outcome Measures

Adaptation of Annual, Perennial and Woody Plants for Colorado Landscapes

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Specific performance results from annual, perennial and woody plant trials help determine which new and superior annual and perennial varieties growers throughout the state and region should grow and market.

What has been done
The multi-site woody plant trial continued at four locations throughout the state with 4 additional taxa planted in 2011. Four herbicides: Certainty, Echelon (F68750.3G), Freehand (BAS 659HG), and Snapshot 2.5TG were evaluated for weed control effectiveness and phytotoxicity on thirteen different herbaceous perennials and annuals with the experiment repeated twice in Fort Collins. Echelon, Freehand and Snapshot applied at three different rates had no adverse effects on the thirteen different plant taxa. However, Certainty resulted in adverse effects on the growth of some Liatris spicata.

Results
: A performance report for annuals and perennial trials was published and sent to all cooperators and industry personnel in the state and region. Many seed and vegetatively propagated varieties including Argyranthemum, New Guinea Impatiens, spreading petunias and Pennisetums have become important bedding plant crops in the state. Plant Select plants, which are either introductions including two with plant patents in 2011 or recommendations were promoted throughout the state and region. In 2011, over 1.6 million Plant Select plants were sold and over one million people visited over 75 demonstration gardens. Weed control research with container grown plants help growers control weeds considerably cheaper than hand pulling, which ultimately lowers the cost of production which is passed on to consumers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #13

1. Outcome Measures

Management of Dutch Elm Disease

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Dutch Elm Disease (DED) is a vascular wilt disease of Ulmus species (elms) incited in North America primarily by the exotic fungus Ophiostoma novo-ulmi. The pathogen moves between trees through root grafts and elm bark beetle vectors (Curculionidae subfamily Scolytinae) -- including the native North American elm bark beetle, Hylurgopinus rufipes Eich., and the exotic smaller European elm bark beetle, Scolytus multistriatus Marsham. The banded elm bark beetle, Scolytus schevyrewi Semenov is an exotic Asian bark beetle found in over 28 states in the U.S.A. and has apparently replaced the European elm bark beetle S. multistriatus as the dominate elm bark beetle in the Rocky Mountain region. It is not known if S. schevyrewi will out-compete S. multistriatus, if it will have an equivalent vector competence for the exotic DED pathogen, or if management recommendations need to be updated.

What has been done
inoculation of trees by the movement of the O. novo-ulmi to wounds was successful 35% of the time in in-vivo trials and 33% in in-vitro trials. Although wilting was not induced in the inoculated trees, the fungus colonized branches for a short distance from the wound. The number of wounds per introduced beetle was 0.025 in field experiments and 0.045 in the in-vitro trials.

Results
Since the infection rate of DED has not changed dramatically in Fort Collins or elsewhere in Colorado, even though the vector population has been predominately S. schevyrewi for a decade, it appears that S. schevyrewi is a new vector of the DED pathogen but is not any more efficient than S. multistriatus. Thus, the current aggressive management programs that remove declining

elms as elm bark beetle breeding sites, rapid removal of DED infected elms prior to beetle emergence and the planting of DED-resistant elms should continue to be effective management tactics.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #14

1. Outcome Measures

Management Strategies for Iris Yellow Spot Virus and Onion Thrips

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Iris yellow spot virus (IYSV) and its onion thrips (Thrips tabaci) vector are immediate and serious threats to sustainable and profitable onion production in Colorado.

What has been done
During 2011, we identified the following germplasm with significantly greater plant vigor after season-long exposure to thrips and the virus: selections from Plant Introduction (PI) lines 258956 (Calderana), 288909, 343049, 546188 (Winegar), dpSeeds Mesquite, Crookham 05-05, and B5336C (Mike Havey selection from P53-364-2C). These lines were selected as candidates for the translational genomics study coordinated by colleagues involved with the USDA-SCRI Project 2008-04804. Volunteer onions were monitored after leaf and bulb expansion for the presence of thrips and IYSV in the vector and plants.

Results
Outcomes of this work have been posted on web sites and presented at various meetings for use by the Colorado and national onion industries, growers, seed company breeders and pathologists, and integrated pest management specialists to develop and implement more effective management strategies including the promotion of varieties that are less susceptible to

damage by thrips and the virus. Growing less susceptible varieties of onions and reducing virus and thrips pressure in Colorado could increase yields by a conservative estimate of 10 percent, valued at 5 million dollars annually. With an estimated cost of 250,000 dollars for salaries and operating costs of project participants from various sources, the Return on Investment is valued at more than 25 to 1.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
216	Integrated Pest Management Systems

Outcome #15

1. Outcome Measures

Control of Weeds in Colorado Agronomic Crops

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The goal is to understand the agronomic practices driving new mechanisms of resistance in key Colorado weeds which in turn will allow development of new strategies to control these weeds. The objectives are: A) To determine the molecular and genetic bases of glyphosate/dicamba resistance in kochia biotypes including the possibility of kochia biotypes with combined glyphosate and dicamba resistance. B) To develop alternative strategies for glyphosate/dicamba resistant kochia control in corn, wheat, sunflower, and fallow. C) To determine the inheritance patterns of glyphosate resistance conferred by EPSPS gene amplification in kochia, Palmer amaranth, and waterhemp.

What has been done
We have been able to build on a collection of kochia accessions from the Central Great Plains states of CO, KS, NE, SD, and ND to show that glyphosate resistance in these populations is due to gene amplification of the EPSPS gene which produces the enzyme targeted by glyphosate in

plants. In the fall of 2011 we collected seed from 20 individual kochia plants at 80 locations in eastern Colorado. All sites are georeferenced and represent a range of growing conditions from corn fields to wheat stubble to roadsides. A greenhouse and molecular approach is being used to screen these largely random collections for their response to glyphosate, dicamba, atrazine, and metsulfuron. These results serve as a baseline data base for kochia beginning in 2011 -- the first year that this issue showed up at multiple sites in Colorado.

Results

We have been able to build on a collection of kochia accessions from the Central Great Plains states of CO, KS, NE, SD, and ND to show that glyphosate resistance in these populations is due to gene amplification of the EPSPS gene which produces the enzyme targeted by glyphosate in plants. In the fall of 2011 we collected seed from 20 individual kochia plants at 80 locations in eastern Colorado. All sites are georeferenced and represent a range of growing conditions from corn fields to wheat stubble to roadsides. A greenhouse and molecular approach is being used to screen these largely random collections for their response to glyphosate, dicamba, atrazine, and metsulfuron. These results serve as a baseline data base for kochia beginning in 2011 -- the first year that this issue showed up at multiple sites in Colorado.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
205	Plant Management Systems
206	Basic Plant Biology
213	Weeds Affecting Plants

Outcome #16

1. Outcome Measures

Remote Sensing for Irrigation Management, Soil Salinity Monitoring, Water Rights and Acquifer Depletion

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Reliable regional estimation of crop evapotranspiration (ET) using remote sensing (RS) is important for irrigation management, soil salinity monitoring, water rights, and aquifer depletion estimates. Estimates of RS-based ET have been evaluated using eddy covariance (EC), Bowen ratio (BR), lysimeters and scintillometers. Results have shown that the RS methods can determine distributed ET with relative accuracy, depending on crop and local environmental conditions. There is a need to test and determine/improve an RS-based ET algorithm for Colorado.

What has been done

The objectives of the study during the period of January 1 to December 31 of 2011 were: a) to install 3 Large Aperture Scintillometers (LAS), side by side to investigate the inter-sensor variability, and ancillary sensors (i.e., net radiometer, soil heat flux plates, soil temperature and water content probes), and b) to evaluate the performance of the LAS system over a native vegetation cover and dry surface conditions using an eddy covariance system. There is a need to test the LAS system, and its inter-sensor variability, over a wider range of sensible heat flux values. The overarching research questions is whether the LAS system can be used in irrigation management and in the validation of remote sensing derived evapotranspiration maps.

Results

The results of the inter-comparison of the 3 LAS units H values indicated that there was a variation in the measurements of H. Being LAS 2 unit H values larger than the LAS 3 unit H values, which in turn had larger H measured values than LAS 1 unit. These findings suggest that there are some issues with the LAS instruments (e.g., lens/optics) performance. In addition, wind gusts seem to affect the stability of the system and consequently the appropriate light beam alignment. There is evidence that the Large Aperture Scintillometer (LAS) instrument evaluated in this study works better for very dry field conditions where sensible heat flux values are rather large (150-450 W/m^2) as compared to very low to negative H values. Therefore, the LAS system tested is not recommended in applications of irrigation water management when optimal crop yields are desired (full irrigation).

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

The most significant factor affecting AES and Extension programs are the severe reductions in state appropriated funding resulting in lost faculty and professional positions.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Colorado wheat producers adopt improved wheat varieties faster than farmers in any other wheat producing state in the United States. For example, Hatcher a 2004 Colorado State University wheat release became the number one planted variety in its second year from Certification. Furthermore Hatcher was planted on thirty percent of planted acres in its third year. CSU wheat releases accounted for two thirds of the plantings for the 2011 crop season.

The rapid adoption of improved wheat varieties increased the returns to Colorado farmers by $31,482,000 in 2010 as measured against the standard wheat variety, TAM 107, planted on the majority of acres a decade earlier. The basis for this claim was derived from the Colorado Agricultural Statistics wheat variety planting report, the Ag Statistics 2011 Annual Report, and yield comparison data from Colorado's Wheat Variety testing information.

According to the National agriculture Statistics Service, in 2010 Colorado growers seeded 26.5 percent of an estimated 2.4 million acres in Hatcher alone. Haley says the hard red winter wheat variety averages 10 percent more bushels per acre than many other known varieties. In 2010, Ripper was the second most seeded variety (12.5 percent of acres). In fact, of the top 10 most seeded varieties in 2010, six were developed by CSU. According to Jay Parsons, CSU agricultural economist, analysis of just three CSU varieties - Hatcher, Ripper and Bill Brown--indicate an $18,000,000 economic impact on Colorado's wheat industry. (Paragraph from Carol Busch's Report).

In 2010 CSU Extension surveyed Colorado wheat growers to determine how its Wheat Team impacts farm profitability/sustainability. Nearly 1/7th of all wheat growers completed the survey. The survey demonstrated that all four of the Teams major outputs ranked as the most important sources of information:

- Extension Collaborative On-Farm Trials
- Wheat Planting Decision meetings
- June Field days
- Making Better Decisions annual report

In addition 92% of respondents claimed increases of 3 to more than 5 bushels per acre due to CSU programs, which translates to an annual economic gain of $25.20 per acre, $28,200 per farm, and a total of $8,460,000 for just these survey respondents. Finally, 67% stated that the time to adopt a wheat variety was "once it has proven itself in CSU trials."

AES programs/projects are evaluated annually through progress reporting compared to stated objectives and intended outcomes. Corrective action, if needed, is addressed by the AES Director, faculty and their department heads. Programs/projects with significant outcomes are reported in this annual report based upon our internal assessment process.

Key Items of Evaluation

Colorado State University's **wheat based and other cropping systems** programs make impacts:

novel farming systems in an effort to find those that enhance their operational profitability and sustainability.

- These farmers have also enhanced their leadership skills because they freely share their findings with others

- Colorado wheat farmer's adoption of three CSU varieties increased their farm income by $18,000,000 in 2011.
- Program research and engagement efforts have contributed to the adoption of wheat-summer crop-fallow systems as replacements for the traditional wheat-fallow system. This innovation on about 1.5 million acres in Colorado has increased net return by $22,275,000 per year. The conservation tillage practices used in this farming system also builds soil organic matter approximately 1%. Farmers reduce their weather and market related risks when adopting these sustainable systems.
- Through our efforts, over 300 farmer operators have become co-investigators in experimenting

The Legume ipmPIPE Network was coordinated nationally in 20 legume (non soybean) producing states by members of the Pest Management Work Team during 2010 to 2011. During this 2-year period, stakeholders frequently visited the general ipmPIPE and legume websites with an average of 55000 hits per month. Up-to-date information on crop health and iPM-related issues was posted in collaboration with legume stakeholders by university and USDA specialists at http://legume.ipmpipe.org/cgi-bin/sbr/public.cgi

Chile peppers are an important specialty crop in the Arkansas Valley of Colorado. Plasticulture techniques employing drip irrigation and plastic mulch can dramatically improve fresh market yield of chile peppers. Gross returns from chile peppers grown for the fresh market have the potential to reach $10,000 per acre. These studies suggest that growing hybrid chile pepper varieties with black plastic mulch and drip irrigation increases fresh market yield and reduces the consumptive use of irrigation water.

The second edition of the Intermountain Grass and Legume Production Manual was published. Numerous hard copies have been distributed to producers, Extension agents, NRCS field personnel, scientists, and agriculture consultants within Colorado as well as several western states.

A performance report for annuals and perennial trials was published and sent to all cooperators and industry personnel in the state and region. Plant Select plants, which are either introductions including two with plant patents in 2011 or recommendations were promoted throughout the state and region. In 2011, over 1.6 million Plant Select plants were sold and over one million people visited over 75 demonstration gardens.

Since the infection rate of Dutch Elm Disease has not changed dramatically in Fort Collins or elsewhere in Colorado, even though the vector population has been

predominately S. schevyrewi for a decade, it appears that S. schevyrewi is a new vector of the DED pathogen but is not any more efficient than S. multistriatus. Thus, the current aggressive management programs that remove declining elms as elm bark beetle breeding sites, rapid removal of DED infected elms prior to beetle emergence and the planting of DED-resistant elms should continue to be effective management tactics.
The release and growth of several newer cultivars which are resistant or moderately resistant to the disease has resulted in the successful production of susceptible cultivars with few grade related problems due to powdery scab. This has generated an additional estimated 480,000 cwt of clean, marketable potatoes with a fair market value in excess of $7.2 million, due to the nature of the high prices received for specialty type potatoes.
The development of optimum nitrogen application rates for potato cultivars developed in Colorado has helped reduce nitrogen fertilizer inputs in potato production. This has reduced the production cost of potato farmers, which has gone a long way to increase the profit margin of growers. It is estimated that potato growers in the San Luis Valley are saving an average of $10 million dollars a year on fertilizer purchase by using the fertilizer application rates suggested by this program.

Knowledge areas are limited to 20 per program area. The scope of KAs for the AES and Extension generally exceed 20. Therefore, KAs were consolidated into broader KAs to reduce to 20. By example, specific KAs that represent sub-elements of Integrated Pest Management were consolidated into IPM. This results in breaking linkages between KAs and outcomes and generating error messages. This problem cannot be resolved in the 2011 report and will be addressed in the 2012 report.

The release and growth of several newer cultivars which are resistant or moderately resistant to the disease has resulted in the successful production of susceptible cultivars with few grade related problems due to powdery scab. This has generated an additional estimated 480,000 cwt of clean, marketable potatoes with a fair market value in excess of $7.2 million, due to the nature of the high prices received for specialty type potatoes.

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V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Natural Resources and Environment

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	13%		9%	
111	Conservation and Efficient Use of Water	17%		8%	
121	Management of Range Resources	2%		5%	
123	Management and Sustainability of Forest Resources	8%		9%	
131	Alternative Uses of Land	2%		3%	
133	Pollution Prevention and Mitigation	0%		6%	
136	Conservation of Biological Diversity	9%		2%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		3%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	15%		2%	
205	Plant Management Systems	9%		8%	
206	Basic Plant Biology	0%		5%	
213	Weeds Affecting Plants	8%		3%	
216	Integrated Pest Management Systems	16%		14%	
307	Animal Management Systems	0%		5%	
511	New and Improved Non-Food Products and Processes	0%		3%	
605	Natural Resource and Environmental Economics	1%		15%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	30.0	0.0	11.0	0.0
Actual Paid Professional	52.2	0.0	17.9	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
653457	0	629290	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
653457	0	629290	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1396563	0	11815491	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

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

2. Brief description of the target audience

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

3. How was eXtension used?

Ask an Expert Activity for Colorado, as reported by one specialist:
Questions Categorized with a Colorado Location
Open (still awaiting a response) 0
Total Resolved Questions (Answered, Rejected, Responded) **3044**
Answered 2876
Rejected 88
Responded "We do not have this expertise" 59
Ask an Expert Activity by Experts in Colorado:
Total Resolved Questions (Answered, Rejected, Responded) 2671

Answered 2639
Rejected 6
Responded "We do not have this expertise" 15

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	311191	6117912	20675	1855

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

Year: 2011
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	101	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

Year	Actual
2011	356

Output #2

Output Measure

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

Year	Actual
2011	10393004

Output #3

Output Measure

- Number of Master Gardener and Wildlife Master volunteer hours

Year	Actual
2011	65100

Output #4

Output Measure

- Value of volunteer time at $20.25/hr (nationally recognized value.)
  Not reporting on this Output for this Annual Report

Output #5

Output Measure

- Number of volunteers supporting this program.

Year	Actual
2011	1550

Output #6

Output Measure

- Number of partnering agencies supporting this program.

Year	Actual
2011	34

Output #7

Output Measure

- Number of new technologies adopted by producers.

Year	Actual
2011	0

Output #8

Output Measure

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

Year	Actual
2011	0

Output #9

Output Measure

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

Year	Actual
2011	14

Output #10

Output Measure

- Number of Small Acreage Workshops Delivered

Year	Actual
2011	0

Output #11

Output Measure

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

Year	Actual
2011	0

Output #12

Output Measure

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

Year	Actual
2011	0

Output #13

Output Measure

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

Year	Actual
2011	6127

Output #14

Output Measure

- Number of Native Plant Master Volunteer Hours

Year	Actual

2011	0

Output #15

Output Measure

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

Year	Actual
2011	0

Output #16

Output Measure

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

Year	Actual
2011	24942

Output #17

Output Measure

- Pounds of produce donated to local food banks via Colorado master Gardener-supported projects

Year	Actual
2011	19700

Output #18

Output Measure

- Value of volunteer time at $21.62 = national value of volunteer time, adjusted for Colorado

Year	Actual
2011	1407000

Output #19

Output Measure

- Economic impact of the change in behavior reported

Year	Actual
2011	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent of participants in workshops/trainings/field days indicating an increase in knowledge gained about agriculture/horticultural practices and the environment.
2	Percent of participants indicating change in behavior/best practices adopted.
3	Economic impact in dollars reported as a result of the change in behavior.
4	Percent of participants gaining knowledge to change irrigation practices in order to provide a cleaner environment.
5	Percent of participants indicating they changed behavior in order to have less pollution and more efficient water use.
6	Land managers and residents use, protect, and encourage native plants.
7	Land managers and residents control weeds.
8	Water use.
9	Pest management.
10	Small acreage landowners.
11	Technologies for measuring consumptive water use
12	Management of Aquatic Ecosystems
13	Management of Noxious Weeds

Outcome #1

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Land managers and residents use, protect, and encourage native plants.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	493

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Sustainable landscapes use site-appropriate native plants and can reduce the need for water, maintenance time and pesticide use. Research demonstrates that landscapes including natives and adapted non-natives can reduce water usage by 60%. Native plants can also be beneficial because they are environmentally adapted, hardy, provide food and shelter for wildlife and maintain local biological diversity. However, many residents need education in selecting plants appropriate to their state's local environmental conditions such as water availability, soils and elevation.

Invasive, non-native weeds are a critical concern in many communities and threaten native ecosystems. Management of invasive weeds is critical when maintaining a natural space or a landscaped yard and garden. The United States spends $137 billion per year in controlling weeds and mitigating damage. Noxious weeds are moving into valued ecosystems displacing natives at an alarming rate. Invasive species are a factor in the decline of 49% of all imperiled species. Each year invasive species advance by 1.7 million acres and are found on 133 million acres across the country. In order to reduce cost and impact of invasive weeds, education is required.

What has been done
1. Educate the public about native plants in order to foster stewardship, sustainable landscaping and management of weeds that threaten native ecosystems.
2. 0Native Plant Master(r) courses offered in the field using living examples of the local flora.
3. Trainers teach identification of native and non-native plant species using dichotomous keys.
4. Trainers focus on sustainable landscape use of native plants and management strategies for invasive non-native plants.
5. Courses on public and private lands during spring, summer and fall.

Results
There are many knowledge(learning) outcomes; only behavior (action) outcomes are reported here. 493 land managers and residents reported using research-based resources to support efforts to use natives in sustainable landscaping. In addition, participants reported:
16 new job opportunities in the horticulture landscape industry;
60 land managers and residents who got a new job or retained their existing job;
309 land managers and residents began or increased planting of natives in a sustainable landscape;
85,238 acres impacted by planting of natives in a sustainable landscape;
144 land managers and residents asked for native plants at a local garden center;
$44,920 saved by planting of natives in a sustainable landscape;
212 land managers and residents who left wild native plants to produce seed rather than collecting or picking wildflowers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
205	Plant Management Systems

Outcome #7

1. Outcome Measures

Land managers and residents control weeds.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	211

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Invasive, non-native weeds are a critical concern in many communities and threaten native ecosystems. Management of invasive weeds is critical when maintaining a natural space or a landscaped yard and garden.

What has been done
In order to reduce cost and impact of invasive weeds, education is required.

Results
211 participants reported they began or increased weed control efforts. In addition, 79, 288 acres were impacted by alien weed control efforts, and $50,475 were saved by alien weed control efforts.

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants

Outcome #8

1. Outcome Measures

Water use.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	114

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Adequate supplies of clean water are essential to the health and well being of Colorado citizens, agriculture, industry, wildlife and the economic vitality of the state. Agriculture, industry, homeowners and agencies look to Colorado State University Extension to provide research-based information and educational programs on water quality, water quantity, water policy, and other water resource issues.

What has been done
Adequate supplies of clean water are essential to the health and well being of Colorado citizens, agriculture, industry, wildlife and the economic vitality of the state. Agriculture, industry, homeowners and agencies look to Colorado State University Extension to provide research-based information and educational programs on water quality, water quantity, water policy, and other water resource issues.

Results
114 Lawncheck customers reported better turf quality/fewer turf problems and/or money saved by changing irrigation practices after incorporating maintenance recommendations into their personal lawn care programs. In addition,
40 Participants reported they have limited irrigation practices that improve water management for reduced water availability.
85 Participants have improved skills for scheduling their irrigation water.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water

Outcome #9

1. Outcome Measures

Pest management.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	5225

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Pest infestations are serious issues endemic to SW Colorado and other areas. Impacts include loss of agricultural and horticultural production; decreasing property values and aesthetics; degradation of the environment and wildlife habitat; loss of desirable plants and native species; tourism impacts; and increasing economic costs of control and mitigation. Specific values and local and/or regional examples include firewood management to reduce pest movement that has become a major issue in North America.

What has been done

Team members monitor for and manage endemic and invasive pests that affect plants, animals and people in agricultural and non-agricultural sectors and economies of Colorado society. We have conducted research and delivered many presentations, and are helping with the State's firewood management plans. Workshops covered the topics of poisonous plants, insect pests, plant diseases, wildlife damage, and tamarisk management.

Results
5,225 participants reported they improved their practices, decisions, and skills in action where pest diagnosis was involved.
2,282 Improved practice, decisions and skills in action where reduction of pesticides saving money were involved;
3,621 Improved practice, decisions and skills in action when focus was on IPM practices;
750 Reduced misapplication of pesticides, reduced overall pesticide use, reduced exposure to pesticides, and realized money savings;
1,186 Stakeholders (agricultural, urban, natural resource based) intended to apply appropriate IMP tactics that minimize exposure to pesticides and enhance the economic return to the user.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #10

1. Outcome Measures

Small acreage landowners.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	383

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Small acreage owners/operators frequently may not possess much agricultural or business knowledge.

What has been done
AES and Extension address the needs of small acreage producers and work with agricultural industry personnel and governmental agencies to assure that land managers and communities can evaluate a broad range of opportunities to enhance viability while respecting the environment.

Results
383 small acreage landowners reported they established a weed management and monitoring plan for their property and/or reported having managed noxious or unwanted weeds;
In addition, of small acreage landowners who participated and were surveyed:
?40 Participants reported they have limited irrigation practices that improve water management for reduced water availability.
?85 Participants have improved skills for scheduling their irrigation water.
?65 report implementation of proper manure management including storage, composting, and/or proper disposal;
?383 established a weed management and monitoring plan for their property and/or reported having managed noxious or unwanted weeds;
?302 have established proper grazing and pasture management on their property;
?212 have identified existing vegetation on their property, including weeds and grasses;
?89 have implemented the use of cover crops, proper grass establishment, crop rotation, or other best management practices on their cropland, grassland, and/or gardens;
?2 have planted or properly maintained windbreaks on their property;
?33 implemented composting or vermicomposting;
?1 planted windbreaks or other vegetative cover to reduce soil erosion;
?15 report having a plan in place which addresses livestock and animal diet and supplements, emergency veterinary care, emergency evacuation, and death;
?4 report having conducted a well water quality test;
?54 report protecting water quality through a change in management;
?95 report utilizing techniques to deter unwanted wildlife;
?78 utilize soil tests on their property.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
121	Management of Range Resources
131	Alternative Uses of Land
205	Plant Management Systems
213	Weeds Affecting Plants

Outcome #11

1. Outcome Measures

Technologies for measuring consumptive water use

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Accurate determination of crop evapotranspiration (ET) is essential in farm irrigation management and administration of water rights in entire river basins.

What has been done
Measurements of alfalfa ET were obtained during 4 harvest cycles in 2011 from a precision weighing lysimeter in the Arkansas River Valley of Colorado. In addition, data from the 2010 alfalfa growing season were analyzed. Irrigation, crop growth, and soil water balance data from 3 corn fields and 1 alfalfa field in Eastern Colorado were collected. The data from these fields were used in improving a spreadsheet-based irrigation scheduling tool that uses daily estimates of crop ET and soil water content to determine the timing and amount of irrigation. One fact sheet describing ET-based irrigation scheduling was published online.

Results
Average alfalfa crop coefficient curves for 4 cutting cycles were developed from 3 years of data (2008 to 2010). These locally developed curves can be used with reference ET calculated from the ASCE standardized equation that is being widely adopted in Colorado. Measurements from a precision weighing lysimeter in the Arkansas River Valley showed that alfalfa, which is a dominant irrigated crop, consumed 1333 mm of water in 2008, 1179 mm of water in 2009, and 1455 mm of water in 2010 through ET. Results from 2008 to 2010 were presented to 34 water users/managers in the Lower Arkansas River Basin. A presentation on ET-based irrigation scheduling resulted in 33 individuals learning about how crop coefficients are developed and how they can be used with ASCE standardized reference ET to estimate the ET of different crops. Based on CSU Extension web page statistics, the ET-based irrigation scheduling fact sheet was viewed 11,323 times (July - Dec., 2011).

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water

Outcome #12

1. Outcome Measures

Management of Aquatic Ecosystems

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
: Eurasian watermilfoil (Myriophyllum spicatum) is an invasive aquatic macrophyte that infests lakes and some irrigation canals in Colorado. This invasive species can drastically impact recreation and ecosystem services normally provided by aquatic environments. Selective Eurasian watermilfoil control can be achieved with a number of herbicides like 2,4-D, triclopyr and endothall. Aquatic macrophytes, like Eurasian watermilfoil, have been studied as bio-accumulates of organic compounds for bio-remediation and as a risk to animals using these plants for food.

What has been done
Recently, a new herbicide, imazamox, was registered for aquatic uses, and its behavior in Eurasian watermilfoil was evaluated. This research is one of the more comprehensive studies evaluating herbicide absorption and metabolism in an aquatic species. Only about 1% of the imazamox in the water column was absorbed by the plant and absorption was directly related to the external concentration, indicating that movement into the plant was driven by diffusion. Imazamox metabolism was fairly rapid with only 20% of the absorbed imazamox remaining after 24 hours. As soon as the external concentration was reduced, imazamox moved from the plant to the water column to establish a new equilibrium concentration. This research represents one of the few studies examining the behavior of a highly water soluble herbicide in an invasive aquatic species.

Results

Managers of aquatic ecosystems are often dealing with invasive species like Eurasian watermilfoil. The results of this research provide these managers with critical information necessary to make appropriate decisions about using this new herbicide. Imazamox has attributes that make it a reasonable choice for managing this species. Applicators now have very detailed information about its behavior in the plant and the importance of managing water movement during treatment.

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants

Outcome #13

1. Outcome Measures

Management of Noxious Weeds

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Yellow toadflax is a creeping perennial weed that is noxious in Colorado and very problematic in the Intermountain West. It is very difficult to control; and in our experiments to date, acceptable control was not achieved 1 or 2 years after treatments (YAT) were applied and site to site variation has been extreme.

What has been done
Identical experiments were established at 5 sites in 2008 as part of a series of experiments to determine whether site to site variation is genetically or environmentally based. Treatments included chlorsulfuron at 53, 88, and 105 g ai/ha, imazapyr at 140, 280, and 420 g ai/ha, and a non-treated control plot. Chlorsulfuron at 105 g ai/ha controlled 95 and 97% of yellow toadflax at 2 sites 2 YAT, which was superior to the 3 other sites (71, 77, and 83% control). The site variation was not detected 1 YAT with chlorsulfuron at 105 g ai/ha. Similar site variation occurred with the imazapyr treatments where 140 g ai/ha controlled 87, 86, and 73% of yellow toadflax at 3 sites and was better control than the remaining 2 sites (51 and 44% control). Imazapyr at 280 g ai/ha

controlled 88 to 99% of yellow toadflax at 4 sites but only 40% was controlled at the remaining site.

Results

The site to site variation was eliminated with higher rates of either herbicide and while imazapyr is not a standard recommendation because of limited selectivity, chlorsulfuron is a common recommendation and the site variation vanished at the highest rate. ALS enzyme bioassays indicated that the variable response to chlorsulfuron and imazapyr is not due to inherited herbicide resistance. The spatial variation associated with using herbicides to control yellow toadflax that we have observed in many experiments over the years appears to be environmentally related rather than associated with inherited resistance. Growth stage when yellow toadflax seems to be most susceptible to herbicide application will be easily identified as the post bloom stage.Land managers can apply herbicide during this time likely will achieve a greater and longer lasting decrease in yellow toadflax population abundance. This allows greater time to reclaim an infested site with desirable plant species without intense competition from the recovering weed species. Adoption of our results by public land managers not only increase success in decreasing toadflax abundance and decreased injury to desirable shrubs and forbs will be evident by using less herbicide.

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

• Weather conditions such as drought, flooding, hail, moisture/temperature trends influencing pathogen and pest life cycles, which will require short/medium/long term redirection of effort to accommodate program needs;
• Economic issues that may lead more individuals to acquire and/or redirect their IPM strategies according to resource limitations or opportunities;
• Continued funding through federal, state and county agencies;
• Changes by governmental and non-governmental agencies to irrigation and pest management requirements;
• Continued staffing of pest management Extension positions; and
• Continued increase in population of Colorado.
• Water Court decisions impacting consumptive water use between Coloradoand Kansas

V(I). Planned Program (Evaluation Studies)

Evaluation Results

One measure of the impact or one Work Team -- the Pest Management Work Team and BSPM IPM Program -- can be obtained by tracking changes in pest management practices and knowledge gained. For example, high correlation between changes in pesticide use and severity of pest problems would indicate practitioners have adopted sound pest management decision making. Periodic performance surveys of Extension agents, research scientists and BSPM IPM specialists are conducted to solicit input on effectiveness from statewide Extension faculty (via pre/post test instruments at meetings, clinics, field days), other clientele and commodity groups. Additional feedback will be obtained from stakeholders and administrators on IPM and individual specialist performance. Behavior change surveys have been developed and implemented to determine impact six months and a year after participant exposure to extension workshops. These survey instruments utilize email addresses of the participants and the Internet product Survey Monkey.

AES programs/projects are evaluated annually through progress reporting compared to stated objectives and intended outcomes. Corrective action, if needed, is addressed by the AES Director, faculty and their department heads. Programs/projects with significant outcomes are reported in this annual report based upon our internal assessment process.

Key Items of Evaluation

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

The CSUE Small Acreage Management work team contributes to the NIFA focus on Food Safety through noxious weeds, livestock management, animal safety, manure management, well and septic, water law, and site visits. These programs are imperative for small acreage land owners who oftentimes do not understand the impact of their practices on their property and the adjacent lands. Large ranch and farm owners are generally well educated on these topics because their livelihood depends on it. The small acreage landowners are often hobby ranchers/farmers and do not understand the impacts they place on the land, water systems, and other natural resources that can end up affecting the adjacent ranches/farms. These issues may impact food safety through contaminated water systems, spread of noxious weeds, and being vectors for various animal diseases due to lack of knowledge. The CSUE small acreage management team addresses all these issues to educate this ever-increasing segment within the agriculture system.

Knowledge areas are limited to 20 per program area. The scope of KAs or the AES and Extension generally exceed 20. Therefore, KAs were consolidated into broader KAs to reduce to 20. By example, specific KAs that represent sub-elements of Integrated Pest Management were consolidated into IPM. This results in breaking linkages between KAs and outcomes and error messages. This problem cannot be resolved in the 2011 report and will be address in the 2012 report.

Eurasian watermilfoil (Myriophyllum spicatum) is an invasive aquatic macrophyte that infests lakes and some irrigation canals in Colorado. This invasive species can drastically impact recreation and ecosystem services normally provided by aquatic environments. Recently, a new herbicide, imazamox, was registered for aquatic uses, and its behavior in Eurasian watermilfoil was evaluated. The results of this research provide these managers with critical information necessary to make appropriate decisions about using this new herbicide. Imazamox has attributes that make it a reasonable choice for managing this species. Applicators now have very detailed information about its behavior in the plant and the importance of managing water movement during treatment.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Community Resource Development

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
111	Conservation and Efficient Use of Water	0%		3%	
112	Watershed Protection and Management	0%		3%	
121	Management of Range Resources	0%		12%	
122	Management and Control of Forest and Range Fires	0%		12%	
141	Air Resource Protection and Management	0%		6%	
405	Drainage and Irrigation Systems and Facilities	0%		2%	
511	New and Improved Non-Food Products and Processes	0%		6%	
602	Business Management, Finance, and Taxation	8%		6%	
603	Market Economics	2%		0%	
604	Marketing and Distribution Practices	8%		7%	
605	Natural Resource and Environmental Economics	2%		9%	
607	Consumer Economics	0%		12%	
608	Community Resource Planning and Development	73%		6%	
610	Domestic Policy Analysis	5%		4%	
723	Hazards to Human Health and Safety	0%		7%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	2%		0%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	0%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Extension	Research

Year: 2011	1862	1890	1862	1890
Plan	5.0	0.0	6.0	0.0
Actual Paid Professional	10.1	0.0	4.5	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
126435	0	284477	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
126435	0	284477	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
270216	0	1611227	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- 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 emp0loyment 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. Brief description of the target audience

Community members, general public, consumers, community organizations. The intuitive success of Extension professionals in community/economic development will be enhanced for formalized training and opportunities to accurately report these on-going efforts.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	12501	611928	288	371

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	37	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of training opportunities for community members
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Amount of grant dollars garnered to support community development research and outreach.
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Number of agencies partnering in this effort.
  Not reporting on this Output for this Annual Report

Output #4

Output Measure

- Number of volunteers supporting this planned program.

Year	Actual
2011	202

Output #5

Output Measure

- Number of new technologies adopted by participants/communities.
  Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of collaborative projects implemented

Year	Actual
2011	42

Output #7

Output Measure

- Number of community capacity-building activities, such as meetings, presentations, committee meetings, needs assessments, etc.

Year	Actual
2011	872

Output #8

Output Measure

- Curricula developed

Year	Actual
2011	3

Output #9

Output Measure

- One-on-One intervention, including coaching and consulting.

Year	Actual
2011	123

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent of community residents, businesses and leaders who increase their understanding of sustainable community development, tourism and economic development principles.
2	The number of communities that evaluate the potential for sustainable community development, tourism and economic development and prioritize to target specific interests, actions, and valued community resources to maintain and grow.
3	The number of communities which experience increased economic gain from sustainable community development, tourism, and economic development efforts including increased tax revenues, employment, and retention of community valued resources.
4	Percent of program participants reporting changing an attitude as a result of Community Resource Development programs.
5	Percent of participants reporting intent to change behavior and/or changing behavior as a result of these programs.
6	Percent of participants reporting increase in knowledge as a result of these programs.
7	Number of Colorado communities that have improved their built environment, while demonstrating stewardship of natural resources for future generations.
8	Number of communities in which Colorado youth and adults actively influence the development of their communities through skillful and informed engagement in planning, decision making, and implementation efforts.
9	Number of communities where citizens make informed decisions that sustain the integrity of natural resources while improving quality of life.
10	Community and Economic Development
11	Community engagement in public policy.
12	Community needs assessment and planning.
13	Farming and food safety.

Outcome #1

1. Outcome Measures

Percent of community residents, businesses and leaders who increase their understanding of sustainable community development, tourism and economic development principles.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

The number of communities that evaluate the potential for sustainable community development, tourism and economic development and prioritize to target specific interests, actions, and valued community resources to maintain and grow.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation

604	Marketing and Distribution Practices
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development
610	Domestic Policy Analysis

Outcome #3

1. Outcome Measures

The number of communities which experience increased economic gain from sustainable community development, tourism, and economic development efforts including increased tax revenues, employment, and retention of community valued resources.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development

610 Domestic Policy Analysis

Outcome #4

1. Outcome Measures

Percent of program participants reporting changing an attitude as a result of Community Resource Development programs.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Percent of participants reporting intent to change behavior and/or changing behavior as a result of these programs.

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Percent of participants reporting increase in knowledge as a result of these programs.

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Number of Colorado communities that have improved their built environment, while demonstrating stewardship of natural resources for future generations.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development

Outcome #8

1. Outcome Measures

Number of communities in which Colorado youth and adults actively influence the development of their communities through skillful and informed engagement in planning, decision making, and implementation efforts.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results

{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #9

1. Outcome Measures

Number of communities where citizens make informed decisions that sustain the integrity of natural resources while improving quality of life.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development

Outcome #10

1. Outcome Measures

Community and Economic Development

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	214

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
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 background 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.

What has been done
CRD Programs provided tools so that citizens can make informed decisions to increase tax revenues, maintain and/or increase employment, and maintain and/or grow valued community resources. Activities included: Building statewide coalitions, alliances, and network connections; Coaching and consulting, Conducting community assessments, surveys, asset mapping and other analysis processes, including secondary data and trend analysis; Developing community assessments, surveys or other community analysis tools; Forming coalitions or develop a planning/advisory group; Convening community groups, provide resources/support, identify and invite participants, coordinate logistics for meetings; Developing community actions plans, coordinate, and implement; and Providing technical assistance on community food efforts.

Results
214 participants reported that communities developed plans targeting specific interests, actions and community resources towards maintaining and growing economic base. In addition:
1) 15 participants reported that communities increased resources and financial assets through

grants supporting community development, tourism, and economic development initiatives.
2) 175 participants reported that communities networked and partnered to engage in community and economic development, planning and action.
3) 1 participant reported that his/her community provided leadership development training or program.
4) 176 participants reported that community members engaged in community and economic development, planning and action.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #11

1. Outcome Measures

Community engagement in public policy.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1132

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
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 background 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.

What has been done

CRD Programs provided tools so that citizens can make informed decisions to increase tax revenues, maintain and/or increase employment, and maintain and/or grow valued community resources. Activities included:
?Building statewide coalitions, alliances, and network connections.
?Coaching and consulting
?Conducting community assessments, surveys, asset mapping and other analysis processes, including secondary data and trend analysis
?Developing community assessments, surveys or other community analysis tools
?Forming coalitions or develop a planning/advisory group
?Convening community groups, provide resources/support, identify and invite participants, coordinate logistics for meetings
?Developing community actions plans, coordinate, and implement
?Providing technical assistance on community food efforts

Results
1,132 Community members reported engagement in a participatory community process such as: public issue deliberation, decision-making processes, action planning and evaluation. In addition:
1) 352 Community members participated in community processes.
2) 47 Community members reported being engaged in public policy processes.
3) 11 Community members reported employing effective strategies for public decision making.
4) 133 Community members reported increased connection to, and relationship with, local and state government
5) 1 Community member reported initiating new public policy or policy changes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
610	Domestic Policy Analysis

Outcome #12

1. Outcome Measures

Community needs assessment and planning.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual

2011	467

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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 background 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.

What has been done

CRD Programs provided tools so that citizens can make informed decisions to increase tax revenues, maintain and/or increase employment, and maintain and/or grow valued community resources. Activities included: Building statewide coalitions, alliances, and network connections; Coaching and consulting, Conducting community assessments, surveys, asset mapping and other analysis processes, including secondary data and trend analysis; Developing community assessments, surveys or other community analysis tools; Forming coalitions or develop a planning/advisory group; Convening community groups, provide resources/support, identify and invite participants, coordinate logistics for meetings; Developing community actions plans, coordinate, and implement; and Providing technical assistance on community food efforts.

Results

467 participants reported their communities had assessed needs, assets, and available resources. In addition:
1) 97 community processes were conducted for community members to address local needs and issues;
2) 46 participants reported community plans were developed and adopted;
3) 33 participants reported community plans were implemented.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #13

1. Outcome Measures

Farming and food safety.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	397

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
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 background 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.

What has been done
CRD Programs provided tools so that citizens can make informed decisions to increase tax revenues, maintain and/or increase employment, and maintain and/or grow valued community resources. Activities included: Building statewide coalitions, alliances, and network connections; Coaching and consulting, Conducting community assessments, surveys, asset mapping and other analysis processes, including secondary data and trend analysis; Developing community assessments, surveys or other community analysis tools; Forming coalitions or develop a planning/advisory group; Convening community groups, provide resources/support, identify and invite participants, coordinate logistics for meetings; Developing community actions plans, coordinate, and implement; and Providing technical assistance on community food efforts.

Results
397 Participants intended to further investigate strategies for increasing the profitability of their crop enterprises. In addition:
1) 40 Participants expanded their networks of resource providers and peer-producer networks through participation in various long-term programming efforts (food advisory councils, Colorado Building Farmers) and related Extension programs
2) 55 Participants intended to further investigate alternative marketing strategies for their crops
3) 27 Public sector workers and elected officials engaged in food system dialogue with producers and Extension staff.

4. Associated Knowledge Areas

KA Code	Knowledge Area
603	Market Economics
604	Marketing and Distribution Practices

V(H). Planned Program (External Factors)

External factors which affected 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.)

Brief Explanation

In the recent Colorado Rural Development Council's Annual Report (2008), 13 Colorado counties are now being referred to as AgUrban. These counties have access to additional resources economic and political resources and face additional challenges such as infrastructure for transportation systems that link the urban/rural interface they represent.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Only behavior (action) outcomes are reported here. There are many knowledge (learning) outcomes documented as well.

Most data for educational seminars, workshops and programs is collected via surveys at the end of classes regarding perceived knowledge gained and potentially several weeks after classes to measure behavior change. Other data is drawn from sources such as summary reports on completed projects, focus groups, and observation.

AES programs/projects are evaluated annually through progress reporting compared to stated objectives and intended outcomes. Corrective action, if needed, is addressed by the AES Director, faculty and their department heads. Programs/projects with significant outcomes are reported in this annual report based upon our internal assessment process.

Key Items of Evaluation

None

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Sustainable Energy

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
132	Weather and Climate	5%		0%	
402	Engineering Systems and Equipment	5%		0%	
605	Natural Resource and Environmental Economics	5%		0%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	85%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	2.0	0.0	0.0	0.0
Actual Paid Professional	10.3	0.0	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
128940	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
128940	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
275567	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Programming from the Clean Energy Strategic Initiative Team activities will reduce the knowledge gap for people interested in renewable energy and energy efficiency, increasing implementation of energy efficient measure and installations of renewable energy projects. Our first- and second-year plan (this is Year 2) includes:

• Create, staff, and maintain an oversight (steering) committee to lead Clean Energy work in Colorado Extension.

• Identify and enlist, then maintain the support and commitment of field agents who will either lead the subcommittees or participate on them.
• Identify and enlist the support and commitment from on-campus faculty who will either lead the subcommittees or participate on them.

2. Brief description of the target audience

Colorado individuals, families and communities interested in clean energy.

3. How was eXtension used?

Three Work Team members report serving as "ask an expert".

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	16991	20809	3945	2

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

Patent Applications Submitted

Year: 2011
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	20	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of trainings/workshops/field days/camps/classes conducted

Year	Actual
2011	67

Output #2

Output Measure

- Amount of grant dollars generated to support clean energy

Year	Actual
2011	87433

Output #3

Output Measure

- Number of technical (fact sheets) generated about clean energy

Year	Actual
2011	20

Output #4

Output Measure

- Number of volunteers supporting clean energy

Year	Actual
2011	49

Output #5

Output Measure

- Number of partnering agencies/organizations around clean energy

Year	Actual
2011	37

Output #6

Output Measure

- Number of Extension Agents trained

Year	Actual
2011	0

Output #7

Output Measure

- Number of new technologies adopted by individuals/families/organizations/communities

Year	Actual
2011	6

Output #8

Output Measure

- Number of curricula developed and/or disseminated for both formal and informal education.

Year	Actual
2011	20

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent of participants reporting increase in knowledge about clean energy
2	Percent of participants reporting change in behavior in energy use
3	Percent of participants reporting a change in condition in their home, business, community, etc.
4	Planning, development and implementation of bio-based, renewable energy projects (such as processing plant, wind farm, etc.)
5	Participants intend to implement low- or no-cost conservation, efficient, and/or renewable energy measures.
6	Participants gain ability to perform a basic home energy assessment using a prescribed checklist.
7	Participants reduce use of fossil fuel energy as measured by number of utility-generated BTUs used.

Outcome #1

1. **Outcome Measures**

Percent of participants reporting increase in knowledge about clean energy

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Percent of participants reporting change in behavior in energy use

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Percent of participants reporting a change in condition in their home, business, community, etc.

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Planning, development and implementation of bio-based, renewable energy projects (such as processing plant, wind farm, etc.)

2. **Associated Institution Types**

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
402	Engineering Systems and Equipment
605	Natural Resource and Environmental Economics
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #5

1. Outcome Measures

Participants intend to implement low- or no-cost conservation, efficient, and/or renewable energy measures.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	991

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Reduce dependence on nonrenewable energy.

What has been done
Diffuse and adopt renewable energy sources and sustainable practices through public knowledge of energy efficiency and clean energy options.

Results
991 participants reported that they intend to implement low- or no-cost conservation, efficient, and/or renewable energy measures.

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #6

1. Outcome Measures

Participants gain ability to perform a basic home energy assessment using a prescribed checklist.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Renewable energy sources and sustainable practices that reduce dependence on nonrenewable energy.

What has been done
Diffuse and adopt renewable energy sources and sustainable practices through public knowledge of energy efficiency and clean energy options.

Results
15 participants gain ability to perform a basic home energy assessment using a prescribed checklist.

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #7

1. Outcome Measures

Participants reduce use of fossil fuel energy as measured by number of utility-generated BTUs used.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Reduce dependence on nonrenewable energy.

What has been done
Diffuse and adopt renewable energy sources and sustainable practices through public knowledge of energy efficiency and clean energy options.

Results
69 participants were documented to have reduced use of fossil fuel energy as measured by number of utility-generated BTUs used.

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

V(H). Planned Program (External Factors)

External factors which affected 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.)

Brief Explanation

Weather extremes have a significant effect on energy use for heating and cooling as well as irrigation. Economic growth may lead to greater energy use, while an economic recession may lead to the opposite. Less funding may lead to reduced energy use in the government and non-profit sectors in particular. Public policy and government regulations can make financial incentives more or less attractive for consumers and can also require clean energy to be utilized to a certain extent. Competing public priorities can crowd out the tax credits available for energy efficiency and renewable energy. Competing programmatic challenges affect Clean Energy (CE) Work Team's outreach efforts since only one specialist is dedicated to clean energy full-time. Demographic (population changes) can increase or decrease consumer energy use as higher income groups tend to use more energy than lower income groups.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Programs successfully impart knowledge (learning) --not reported here--to support behavior change (action).

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Childhood Obesity

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
703	Nutrition Education and Behavior	50%		0%	
724	Healthy Lifestyle	50%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	5.0	0.0	0.0	0.0
Actual Paid Professional	0.0	0.0	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Programming to parents and care givers so they can learn and convey the importance of healthful dietary and activity habits to children.

2. Brief description of the target audience

Target audiences include children (birth through high school), parents, teachers and other school staff.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2011
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	3	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshops/trainings delivered to parents and/or care givers concerning healthful dietary and activity habits in children

Year	Actual
2011	0

Output #2

Output Measure

- Number of participants in workshops

Year	Actual
2011	0

Output #3

Output Measure

- Number of volunteers engaged in this work

Year	Actual
2011	0

Output #4

Output Measure

- Number of external grant dollars generated for this work

Year	Actual
2011	0

Output #5

Output Measure

- Number of agencies partnering in this work

Year	Actual
2011	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent of participants who learn and convey the importance of healthful dietary and activity habits to children
2	Percent of participants who change behavior in order to improve healthful dietary and activity habits in children.
3	Participants improve overall diet quality.
4	Participants increase fruits and vegetables consumption.
5	Participants increase physical activity.

Outcome #1

1. Outcome Measures

Percent of participants who learn and convey the importance of healthful dietary and activity habits to children

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Percent of participants who change behavior in order to improve healthful dietary and activity habits in children.

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Participants improve overall diet quality.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	327

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results
SNAP-ED curriculum emphasizes latest Dietary Guidelines and My Pyramid.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #4

1. Outcome Measures

Participants increase fruits and vegetables consumption.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	2007

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Prevention or reduction of incidence of childhood obesity and improved health outcomes for children.

What has been done

Results
2007 participants increased consumption of fruits and vegetables, as reported through 4-H Youth Development and Nutrition and Health Promotion Work Team. Evaluations showed increase in knowledge and increased acceptance in trying new/unfamiliar foods that children were involved in preparing during lessons. Verbal testimonies from teachers and parents also suggest an increase in willingness to eat a greater variety of foods.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #5

1. Outcome Measures

Participants increase physical activity.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	780

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Prevention or reduction of incidence of childhood obesity and improved health outcomes for children.

What has been done
One outcome example is improved healthful dietary and activity habits in children. An associated indicator is increased fruit and vegetable consumption (report improved knowledge, increased consumption or intent to increase consumption.) A second indicator is increased physical activity (report increased knowledge, increased activity [e.g. steps], or intent to increase activity.)

Results
780 participants reported through the Nutrition and Health Promotion Work Team that they had increased physical activity.
1)Parents reported they loved the "Mighty Moves" activities and were committed to trying some of the activities at home. All parents took home a sports ball, balancing bean bag or other tools to continue using at home.
2) During Jefferson County Head Start Food Friend Parent Night, 50 parents and children engaged in 15 minutes or more of fun physical activity and all parents raised their hand to the question, "Will you try to repeat this kind of fun adventure and movement activities at home?"
3) The Hope Center was on fire with activity and parents wanting a copy of the CD to use at home.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Public Policy changes
- Competing Programmatic Challenges

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

We are only beginning to collect data on childhood obesity programs. Many learning/knowledge gains were reported into the Colorado Planning and Reporting System (CPRS), but only action/behavior outcomes are reported here.

Key Items of Evaluation

Childhood obesity is reportable by our Nutrition and Health Promotion Work Team, and by 4-H Youth Development Work Team.

V(A). Planned Program (Summary)

Program # 10

1. Name of the Planned Program

Nutrition and Health Promotion

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
204	Plant Product Quality and Utility (Preharvest)	0%		2%	
206	Basic Plant Biology	0%		10%	
212	Pathogens and Nematodes Affecting Plants	0%		7%	
213	Weeds Affecting Plants	0%		2%	
308	Improved Animal Products (Before Harvest)	0%		2%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	0%		5%	
501	New and Improved Food Processing Technologies	0%		3%	
502	New and Improved Food Products	0%		6%	
607	Consumer Economics	0%		6%	
701	Nutrient Composition of Food	0%		4%	
702	Requirements and Function of Nutrients and Other Food Components	0%		8%	
703	Nutrition Education and Behavior	70%		8%	
704	Nutrition and Hunger in the Population	10%		0%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	0%		6%	
723	Hazards to Human Health and Safety	0%		6%	
724	Healthy Lifestyle	20%		7%	
802	Human Development and Family Well-Being	0%		12%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	0%		6%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	12.0	0.0	0.0	0.0
Actual Paid Professional	26.9	0.0	10.3	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
336743	0	571807	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
336743	0	571807	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
719685	0	4805229	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Health Promotion/Chronic Disease Prevention 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

Conduct Basic and Applied Research in Nutition and Health Promotion
- 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

2. Brief description of the target audience

Adults and youth in Colorado

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	233557	47640	10248	414

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	39	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of Trainings Delivered on Health Promotion and/or Disease Prevention topics.

Year	Actual
2011	7635

Output #2

Output Measure

- Number of individuals trained in workshops related to health promotion and/or disease prevention.

Year	Actual
2011	0

Output #3

Output Measure

- Grant funding (external) received to support this work

Year	Actual
2011	4810426

Output #4

Output Measure

- Number of individuals reached by newsletters distributed on Health Promotion and Disease Prevention

Year	Actual
2011	0

Output #5

Output Measure

- Number of volunteers engaged with these programs.

Year	Actual
2011	0

Output #6

Output Measure

- Number of agencies partnering in this work.

Year	Actual
2011	0

Output #7

Output Measure

- User fees generated through these programs.

Year	Actual
2011	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent of participants indicating an increase in knowledge regarding health promotion and/or disease prevention.
2	Percent of participants reporting a change in behavior following participation in a health promotion/disease prevention program.
3	Disease Risk: Participants will decrease risk of chronic disease.
4	Disease Prevention: Participants increase intake of Calcium and Vitamin D.
5	Disease Prevention: Participants increase consumption of fruits and vegetables.
6	Disease Prevention: Participants increase physical activity.

Outcome #1

1. Outcome Measures

Percent of participants indicating an increase in knowledge regarding health promotion and/or disease prevention.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Percent of participants reporting a change in behavior following participation in a health promotion/disease prevention program.

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Disease Risk: Participants will decrease risk of chronic disease.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	2498

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Reduced incidence of chronic diseases (such as diabetes, heart disease, obesity and cancer), thus reducing health insurance premiums and mortality rates, and increasing employee productivity.

What has been done
Multi-lesson series including 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 (worksite wellness);
Youth program including Food Friends/Making New Foods Fun for Kids, Eating Right Is Basic, Chef Combo's Fantastic Adventures in Tasting and Nutrition, Professor Popcorn.

Results
2498 participants reported they reduced their risk of chronic disease. 45 of 51 "Small Changes Make a Big Difference" participants plan to make one or more changes to reduce their risk of developing type 2 diabetes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #4

1. Outcome Measures

Disease Prevention: Participants increase intake of Calcium and Vitamin D.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	759

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Reduced incidence of chronic diseases (such as diabetes, heart disease, obesity and cancer), thus reducing health insurance premiums and mortality rates, and increasing employee productivity.

What has been done
Multi-lesson series including 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 program including Food Friends/Making New Foods Fun for Kids, Eating Right Is Basic, Chef Combo's Fantastic Adventures in Tasting and Nutrition, Professor Popcorn.

Results
759 participants reported increasing their consumption of calcium and vitamin D.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #5

1. Outcome Measures

Disease Prevention: Participants increase consumption of fruits and vegetables.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	815

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Reduced incidence of chronic diseases (such as diabetes, heart disease, obesity and cancer), thus reducing health insurance premiums and mortality rates, and increasing employee productivity.

What has been done
Multi-lesson series including 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 program including Food Friends/Making New Foods Fun for Kids, Eating Right Is Basic, Chef Combo's Fantastic Adventures in Tasting and Nutrition, Professor Popcorn.

Results
815 participants reported they increased their consumption of fruits and vegetables.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #6

1. Outcome Measures

Disease Prevention: Participants increase physical activity.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1395

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Reduced incidence of chronic diseases (such as diabetes, heart disease, obesity and cancer), thus reducing health insurance premiums and mortality rates, and increasing employee productivity.

What has been done
Multi-lesson series including 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 program including Food Friends/Making New Foods Fun for Kids, Eating Right Is Basic, Chef Combo's Fantastic Adventures in Tasting and Nutrition, Professor Popcorn.

Results
1395 participants reported they increased their physical activity. Examples included more walking, increased intensity of activity, adding strength training.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Pulling apart the Food Safety and Nutrition and Health Promotion Work Teams allows focus to become sharper.

The AES includes Food Safety, Nutrition and Health Promotion in this program area. This needs to be resolved between AES adn Extension in the next reporting.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Food Safety efforts focused on personal hygiene (hand washing), food preservation, and use of adequate temperatures.

AES programs/projects are evaluated annually through progress reporting compared to stated objectives and intended outcomes. Corrective action, if needed, is addressed by the AES Director, faculty and their department heads. Programs/projects with significant outcomes are reported in this annual report based upon our internal assessment process.

Key Items of Evaluation

Program evaluation has found that INP achieved significant behavior changes in children. Children participating in INP consumed a greater amount of fruits/vegetables at school lunch and showed improved knowledge of the Food Guide Pyramid and increased confidence in food preparation and eating targeted foods.

The AES reports Food Safety, Nutrition and Health Promotion in this progra due to the integrated nature of our research. This difference with Extension cannot be resolved until the next reporting cycle.

V(A). Planned Program (Summary)

Program # 11

1. Name of the Planned Program

Animal Production Systems

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
205	Plant Management Systems	0%		9%	
301	Reproductive Performance of Animals	0%		24%	
302	Nutrient Utilization in Animals	0%		13%	
303	Genetic Improvement of Animals	0%		10%	
305	Animal Physiological Processes	0%		9%	
306	Environmental Stress in Animals	0%		12%	
307	Animal Management Systems	0%		9%	
308	Improved Animal Products (Before Harvest)	0%		8%	
601	Economics of Agricultural Production and Farm Management	0%		6%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Actual Paid Professional	0.0	0.0	5.2	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	455178	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	455178	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	3546852	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct basic and applied research on livestock, primarily beef, dairy, sheep, and horses.

2. Brief description of the target audience

Individual agricultural producers, commodity groups, and agri-business partners

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2011
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	95	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Conduct basic and applied research in animal production systems

Year	Actual
2011	0

Output #2

Output Measure

- Number of peer reviewed publications

Year	Actual
2011	95

Output #3

Output Measure

- Number of patent applications submitted
  Not reporting on this Output for this Annual Report

Output #4

Output Measure

- Number of grant dollars supporting Animal Production Systems Research

Year	Actual
2011	2942687

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

Outcome #1

1. Outcome Measures

Develop Improved Animal Production Systems

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
: The primary goal of this project is to continue development and enhancement of a flexible, user-friendly decision support system that can be utilized by commercial and seedstock producers of beef cattle to improve profitability through improved selection of breeding animals and better design of mating systems. The beef cattle decision support system is designed to improve profitability of beef production at the individual producer level. The model aims to incorporate producer-specific economic conditions with expected progeny differences (EPD) on potential breeding animals to select those whose progeny will be more profitable in that production scenario.

What has been done
Characterization of the producer specific economic conditions include accounting for animal-derived sources and amount of income, as well as the costs of producing those animals. We chose to use the Red Angus Association of America database to characterize genetic levels of animals to evaluate economic outputs for a validation by inspection approach. Results of the validation showed that, under average economic circumstances as derived from Dhuvetter and Langemeier (2010), and the Livestock Marketing Information System reports for Torrington, Wyoming, the difference in profitability between high and low growth genetic merit (2 standard deviations above and below average) was over $250 per bull used in the mating program. This specific example only evaluated changes in genetic potential for growth.

Results
Breed associations who have agreed to contribute genetic information on potential sires represent over 170,000 registrations per year. Assuming half of these registrations are male calves and half of those are sold as breeding animals, the system has the potential to have a large influence on

profitability of beef production with 40,000 bulls being used in breeding programs. Even when considering only changes in growth genetics, at $250 net per bull (under average historical pricing systems) this would translate into over $10 million annually in improved profitability. Considering that reproductive traits impact cow/calf profitability at much greater levels, the overall value of adoption would be considerably larger. The current model only considers animal production and sale of excess offspring through weaning, but as later segments of the industry are included, the overall effect to the industry is expect to further increase.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
307	Animal Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #2

1. Outcome Measures

Develop Information and Methods to Improve Reproductive Efficiency

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The CSU Center for Genetic Evaluation of Livestock (CGEL) has the goal to develop and implement large scale genetic evaluation and improvement tools for livestock populations. In the past year, we have maintained our national cattle evaluation research and development relationships with more than 20 clients, including (inter)national beef breed associations, producer groups and private ranches.

What has been done
CGEL has completed a prototype genetic evaluation of dry matter intake using data from the American Gelbvieh Association (AGA). Activities included model development and actual

estimation of expected progeny differences and accuracy values. This prototype will be ongoing with AGA approval, and serve as a framework for including feed intake and utilization data from other breeds and groups. In most databases, the number of feed intake records is extremely limited, increasing the difficulty of estimating necessary genetic parameters that are required to set up and solve the equation systems used in national cattle evaluation.

Results
The prototype genetic evaluation of feed intake for Gelbvieh has provided their association members with the first tools in that breed to make selection decisions and genetic improvement for that major input cost in beef production. In time, data will continue to accumulate and the numbers of animals evaluated and their EPD accuracy values will increase. The use of similar data from the CSU Feed Intake Unit was crucial in early phases of the development of software to analyze feed intake data in a national database. The meta-analysis will be heavily utilized in industry and in developing countries where data sparsity limits the ability to conduct genetic evaluation. While the impact of genetic improvement of feed intake in the cow herd can only be estimated, it has been predicted that use of these selection tools could translate to over $100M per year in feed cost savings in Colorado alone.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
601	Economics of Agricultural Production and Farm Management

Outcome #3

1. Outcome Measures

Develop and Conduct Program in Integrated Resource Management

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
To conduct research regarding animal management systems that will enhance the profitability and, therefore, sustainability of Colorado farmers and ranchers. To utilize the results of all appropriate research for development of integrated livestock management systems and provide this information to students and appropriate clientele groups. To investigate the effectiveness of different educational systems in getting producers and/or managers to adapt integrated approaches to resource management.

What has been done
The Western Center for Integrated Resource Management graduate program has worked to make the IRM Graduate program available completely online. We are currently putting the finishing touches on the final course to make the IRM Graduate Program online in its entirety. Our standards for development of distance education courses require that our courses: be easily navigable; be interactive from student-to-student, and student-to-professor; demonstrate learning mastery (multiple avenues for assessment); effectively address multiple learning styles; allow for ease of development and maintenance; and consistently putting out the best product(courses) we can to make the students' learning experience lifelong and significant.

Results
We offered five courses online during Fall 2011. Our enrollment in these two courses, which include our hallmark introductory course (AGRI 630) and one of our business training courses (AGRI 631), attracted thirteen and twenty-two students, respectively. This enrollment has been accomplished without marketing or promotion, mainly by student inquiry. Many students affirm that they find our program through online searches using terms like Master of Sustainable Agriculture and through word of mouth from previous students. Our Online Learning Program, along with our campus program, will continue to push us towards excellence by maintaining courses that are challenging and will equip students to obtain positions and stand out in their particular agricultural field.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
601	Economics of Agricultural Production and Farm Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

The external factors marked above could cause changes in programming and the time Extension Agents and Specialists could devote to any one specific program or topic.

· A natural disaster, such as drought, would require 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 animal production issues.

· Members of the Beef Team, Small Ruminant, and/or Agriculture Business Management would tailor the topics presented in workshops, change educational programming, and/or develop new or different technologies and strategies for animal producers if there were changes in government regulations.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

AES programs/projects are evaluated annually through progress reporting compared to stated objectives and intended outcomes. Corrective action, if needed, is addressed by the AES Director, faculty and their department heads. Programs/projects with significant outcomes are reported in this annual report based upon our internal assessment process.

We continue the development and enhancement of a flexible, user-friendly decision support system that can be utilized by commercial and seedstock producers of beef cattle to improve profitability through improved selection of breeding animals and better design of mating systems. Breed associations who have agreed to contribute genetic information on potential sires represent over 170,000 registrations per year. Assuming half of these registrations are male calves and half of those are sold as breeding animals, the system has the potential to have a large influence on profitability of beef production with 40,000 bulls being used in breeding programs. Even when considering only changes in growth genetics, at $250 net per bull (under average historical pricing systems) this would translate into

over $10 million annually in improved profitability. Considering that reproductive traits impact cow/calf profitability at much greater levels, the overall value of adoption would be considerably larger. The current model only considers animal production and sale of excess offspring through weaning, but as later segments of the industry are included, the overall effect to the industry is expect to further increase.

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Key Items of Evaluation

For this report, Extension has reported Animal Production Systems in Global Food Security and Hunger; however the AES has reported Animal Production Systems as a separate program. We cannot resolve this difference in this report.