2012 Colorado State University Combined Research and Extension Annual Report of Accomplishments and Results

Status: Accepted

Date Accepted: 06/10/2013

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 local needs and research information from the AES, the colleges of Agricultural Sciences, Applied Human Sciences (Health and Human Sciences as of July 1, 2013), Engineering, Veterinary Medicine and Natural Resources. Programs emphasize best management practices in addressing issues that affect Coloradans.

Most Extension data for this report were provided through our Colorado Planning and Reporting System (CPRS). Plans of Work (POW) were submitted by Work Teams (WTs), and individuals linked to them in creating their own Plans to Invest (PTI). During the program year, individuals entered program data, and reports were generated during the first quarter of 2013. 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 2012 as no percentages are available.

An unintended consequence of the adoption of CPRS is differences in scope and reporting of program areas by the AES and Extension. These differences were addressed in the updated Plan of Work and this 2012 Integrated Report.

The following accomplishments are reflective of the programmatic goals and objectives stated in the Plan of Work.

4-H Youth Development - Accomplishments

Larimer County Extension successfully responded to the impacts of the High Park Fire that occurred in Larimer County in June and July, 2012. 4-H Coordinator Diane Kern worked with 4-H club members and The Ranch staff to coordinate work schedules of the many 4-H volunteers who were feeding animals and cleaning stalls. She also recruited dozens of 4-H families who took in animals after they left The Ranch.

Family Economic Stability - Accomplishments

Project efforts are being communicated to appropriate professionals in state and nationally. Presentations were made at the Eastern Family Economics Resource Management Association conference in Charlotte, NC in February, 2012; the Colorado Culture of Health Conference in Denver in April, 2012; the National Extension Association of Family and Consumer Sciences conference in Columbus, OH in September, 2012; and the Association for Financial Counseling and Planning Education conference in St. Louis, MO in November, 2012.

Food Safety - Accomplishments

Statement by a county advisory board member: "Thank you for the opportunity to participate in the Food Safety Works training last week. Margery and I (both former home economics teachers) were very impressed with your safe food handler program. Your presentation and pace along with the slides were clear and informative. The hands on activities proved we learn - and remember - by doing! It was great to see the reactions of all the participants washing hands to see "germs" under blue light and calibrating food thermometers. The Food Safety Works: Educational Manual for the Food Service Worker is an excellent reference handbook for "take home" - and to be shared with others at work. The use of resources to accommodate the Spanish speaking food service workers was an amazing service in partnership with the Poudre River Library District. It was easy to see the group hearing Irene Romsa's interpreting felt comfortable using/learning with headsets. The updates on a few of the proposed changes to Colorado's food service regulation for 2013 kept everyone interested. It was also valuable to have KT Gallagher, food inspector, as part of this training for her time and "up-front" responses to participant questions. Please keep me on your mailing list for the Food Safety Works quarterly newsletter. It's great to see a resource that is very valuable for all our local food service institutions. Again, appreciation goes to you and your team with CSU Larimer Co Extension, Department of Health and Environment, and Poudre River Library District. With the various important Extension Food Safety Education Programs for multiple populations in our community, let's continue to take action spreading the word about food safety - it's everyone's benefit!"

Global Food Security and Hunger - Accomplishments

The beef cattle selection decision support system is intended for use by beef cattle producers to integrate economic and production characteristics of their operation with the selection of breeding animals in an effort to improve profitability through genetic improvement. Based on feedback from cattle breeders using the system we have been adding new features to streamline its use. That effort continues with the reprogramming and migration of the system to a new platform for delivery. In the current year, besides the continuation of the system migration/reprogramming, we have compiled average performance information from an intermountain-region seedstock Angus herd. This performance information will serve as a validation dataset for the bio-economic simulation.

With appropriate application this system could improve overall profitability of beef production. For instance, bulls are typically used for 3 breeding seasons with an average of 25 offspring produced per season; each of these bulls would produce a total of 75 offspring. If the system yields only an average of $10 more profit per progeny produced and sold at weaning, this is $750 per bull put in service. Given that cow-calf producers would likely keep replacements from progeny produced, economic benefits would exceed those estimates. Additionally, such a system would help producers select replacements specifically for the production and economic circumstances on their operation, potentially yielding increased results on an individual rather than a breed-wide basis.

Plant Production Systems - Accomplishments

Powdery scab and early blight have been significant issues for the potato industry in Colorado and the Western U.S. Any one of these disease problems can reduce yield and quality and can have a major influence on a producer's yield, quality and ultimately, the marketing of the potato product. Growers need a better understanding of various potato diseases under Colorado conditions and to implement disease suppression control strategies through a best management practices approach.

Impacts from this research have been varied and consistently benefited potato producers in Colorado. One impact has been reduction and management of early blight .Controlling early blight utlizing the rotation of chemistries used in this research project coupled with the proper timing of the applications

results in a savings to the average producer based on their former practices of over 50%/ha or about $61.75/ha. Producers for at least 5,000 ha of potatoes have indicated that they are using these early blight treatments for an annual savings of $309,000.

Development of improved wheat cultivars serves the wheat industry in Colorado and the western Great Plains by reducing wheat production costs, reducing pesticide use, and providing improved marketing options. In fall 2012, experimental line CO07W245 was released as 'Antero'. Antero is a hard white winter wheat (HWW) from the cross KS01HW152-1/TAM 111 made in 2003. Antero is medium height and medium maturing, and has a medium-length coleoptile, good straw strength, and excellent test weight. Pre-harvest sprouting tolerance of Antero is similar to Snowmass, which is similar to Hatcher hard red winter wheat (HRW). Antero is resistant to stripe rust, moderately resistant to stem rust and wheat soilborne/wheat spindle streak mosaic virus, moderately susceptible to barley yellow dwarf and wheat streak mosaic viruses, and susceptible to leaf rust and all biotypes of Russian wheat aphid. Antero was the second highest yielding entry in the trials, similar to Byrd HRW.

Since inception of the program, 36 CSU-bred wheat cultivars account for 61.3% (or 77.4% of the accounted-for acreage) of Colorado's 2.4 million acres (2012 crop). Average wheat grain yields in Colorado have more than doubled with at least 50% of this increase attributed to improved cultivars. 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).

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.

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

The COFT wheat program translates to increased income in 2011 for dryland farmers in Eastern Colorado. The impact by County is estimated as follows (based on Colorado Ag Statistics data):

- Adams $ 1,217,700
- Arapaho $ 424,800
- Cheyenne $ 1,489,500
- Kiowa $ 1,395,000
- Kit Carson $ 1,774,800
- Lincoln $ 904,500
- Logan $ 1,010,700
- Morgan $ 459,000
- Phillips $ 795,600
- Prowers $1,082,700
- Sedgwick $ 546,300
- Washington $2,362,500
- Weld $1,098,000
- Yuma $1,099,800

The major objectives of the Colorado Potato Breeding and Selection Program are to address the needs of Colorado growers to have new potato cultivars (russets, reds, chippers, and specialties) with increased yield, improved quality, improved nutritional characteristics, resistance to diseases and pests,

and tolerance to environmental stresses. by assessing production, adaptability, marketability, and other characteristics of advanced selections.

Twelve advanced selections were evaluated in the Southwest Regional Trials, Western Regional Trials, or by Colorado producers in 2012. Several selections are being considered for exclusive release. Selections to be named are AC99329-7PW/Y (Masquerade), CO99053-3RU (Crestone Russet), CO99100-1RU (name to be determined). CSU releases accounted for 58% of the 55,100 acres planted to fall potatoes in Colorado in 2012. Colorado cultivars and clonal selections accounted for 46% of the 13,286 acres of Colorado certified seed accepted for certification in 2012.

Consumers prefer tastier evidence-based health food products whereas potato producer's primary preference is the ability to sell the crop - thus, it is critical to develop farm to fork operations that optimizes the health-benefits without losing the sensory attributes.

Color-fleshed potatoes are a rich source of anthocyanins, which may contribute to the protection of high-fat diet induced inflammation and obesity. However, color-fleshed potatoes can undergo 3-6 months of storage before processing/consumption. Purple-fleshed potatoes had greater phenolic content (TP) and antioxidant activity (AA) as compared to traditional white- and yellow-fleshed genotypes. The AA of all clones increased with storage; however, an increase in TP was observed only in purple-fleshed clones. Baking caused minimal losses while chipping reduced the phenolic and anthocyanin content, and AA of the potatoes. With storage, total phenolic and anthocyanin content, and AA increased in baked samples while in the chipped samples, they remained constant. Storage and processing (chipping vs. uncooked) caused a shift in the metabolite profiles of potato clones. However, baking retained similar metabolite profile as that of uncooked potato.

Purple-fleshed (Purple Majesty and CO97227-2P/PW) varieties/advanced selection were identified as rich sources of bioactive compounds and anti-oxidant capacity compared to all other varieties tested. CO97227-2P/PW retained the anti-oxidant capacity and anti- colon cancer properties (obesity and/or type 2 diabetes promotes colon cancer). Baking not only retains metabolite profile similar to that of uncooked but also retains biological activity against human colon cancer cell lines.

Natural Resources and the Environment - Accomplishments

Information and models are needed by growers for water limited agroecosystems and sustainable management of both dryland and limited-irrigation cropping systems in eastern Colorado. Field research and models are used to develop cropping systems that improve crop water productivity. The limited irrigation research has been used to identify profitable cropping systems with reduced consumptive water use of 20-50%.

Intensive dryland cropping systems build soil organic carbon, improve soil quality, and improve both air and surface water quality because they provide high amounts of year around cover. These benefits have been realized for about 1,500,000 acres in CO that have been converted from wheat-fallow to wheat-summer crop-fallow. This conversion increased net return by $22,275,000 per year under normal precipitation conditions. Limited irrigation cropping systems based on conservation tillage practices demonstrated in this project build soil organic carbon, improve soil quality, and improve both air and surface water quality because they provide high amounts of year around cover. These benefits have the potential to affect as much as 2,000,000 acres in CO.

Growers need an irrigation water management tool that utilizes localized crop ET estimates, weather, and soil information for efficient use of irrigation water. In the Arkansas Valley, such information is necessary for resolving the Colorado/Kansas water dispute. An irrigation-scheduling spreadsheet (Excel)

tool has been developed. Two versions of the tool are available: one for annual crops and another for hay crops (e.g., alfalfa hay). Daily crop consumptive water use is estimated from reference crop evapotranspiration (ET) calculated by CoAgMet and adjusted with a daily crop coefficient for the specific crop. The hay crop version incorporates alfalfa hay crop coefficients developed from the lysimeter studies at Rocky Ford, CO. Hourly and daily consumptive water use of alfalfa hay was collected using two weighing lysimeters at Rocky Ford, CO during the 2012 growing season.

Information on the consumptive water use of alfalfa hay in the Arkansas River Valley of southeast Colorado was presented to approximately 120 water professionals (water managers, irrigators, water lawyers) in Colorado. Also, a newly-developed irrigation scheduling spreadsheet tool gives users that have Internet access the capability of tracking the daily soil water balance of individual irrigated fields calculated from evapotranspiration and rainfall data from the Colorado Agricultural Meteorological Network (CoAgMet) and field-specific soils information from USDA-NRCS Web Soil Survey. The irrigation scheduling tool was delivered to Colorado NRCS for use at their field offices in Colorado.

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

(http://www.farmland.org/resources/rockymtn/documents/Strategic%20Ranchland%20in%20the%20Rocky%20Mountain%20West.pdf).

Small acreage landowners have a significant impact on the conditions of soil, water, plants, animals, and other natural and man-made resources through their cumulative effects. The large tracts of agricultural lands in Colorado are being subdivided into one to 100 acre tracts of dry land for rural homesteads. Many of these homesteaders move from cities or other states and do not have the land management knowledge base which traditional agricultural landowners hold. Therefore, the demand for information and technical assistance is immense. Weed control, water use, and grazing management are prime examples of the land management skills which many small acreage landowners seek. CSU Extension, along with partners such as the USDA-Natural Resources Conservation Service, Colorado Division of Parks and Wildlife, and local Conservation Districts will lead this educational effort.

Clean Energy - Accomplishments

Continued involvement with local individuals and groups such as the Rifle Energy Village group, promoting non-traditional energy sources, uses, and associated businesses. City of Rifle is very well known for its promotion of new energy projects as well as the on-going use of natural gas, etc. Providing information on traditional and non-traditional energy and viability in Western Colorado locales

Health Promotion and Disease Prevention - Accomplishments

In 2012, the Larimer County Farmers' Market submitted a grant to the Colorado Farmers' Market Association to offer matching SNAP (Supplemental Nutrition Assistance Program--formerly food stamps) coupons to qualifying customers. We received a $400 grant and used $400 of our funds to match it (for a total of $800). We also received a $1000 grant from Kaiser-Permanente to support these efforts. All together, we had $1800 to distribute to SNAP customers from mid-August through the end of October. This program met the needs of helping an underserved audience have access to fresh fruits and vegetables from local producers.

We set the parameters of the grant that we would match up to $10 in additional SNAP coupons for each customer, once per week. A total of 119 SNAP transactions occurred during the 12 week program. We had 26 people use the program once, and 2 people used the program every week. We had an average of 10 customers per week use their Colorado Quest card to receive SNAP coupons.

A total of $2,447 SNAP coupons were purchased, with $1,176 in matching SNAP funds distributed. We have $624 remaining that we can use for the program in 2013. In addition to word of mouth advertising and several press releases that were sent to local newspapers, we worked with Lily Martinez, SNAP-Ed Educator in the Larimer County office to inform her clients of this program.

We were very proud of the success this program had and are excited to seek new forms of funding in 2013 to increase the program. Instead of $10, we could consider $20 or matching dollar-for-dollar. The community and vendor support was also very encouraging.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	140.0	0.0	50.0	0.0
Actual	173.0	0.0	53.7	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 meeting needs of Coloradoans, alignment with college priorities, and resource allocation.

In addition, Extension programs are subject to review by the Program Leadership Team (PLT) and Program Area Leaders (PALs). Currently, Extension specialists and agents team together on about 20 work teams (WTs), 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 revised and/or updated during the fall, 2012, in order to be posted to CPRS. WTs were encouraged to simplify indicators and discuss how to report collaborative efforts in order to have data necessary for various reports to stakeholders.

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 six off-campus research centers, one regional engagement center, 54 individual county offices and three area programs serving 61 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, Colorado's state Extension Advisory Committee (CEAC), representing 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 local and state-wide 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
3075596	0	3397008	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	3181387	0	3243932	0
Actual Matching	3181387	0	3243932	0
Actual All Other	7405638	0	31874301	0
Total Actual Expended	13768412	0	38362165	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	105791	0	159318	0

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	4-H Youth Development
2	Consumer and Family
3	Food Safety
4	Global Food Security and Hunger
5	Plant Production Systems
6	Natural Resources and Environment
7	Community Resource Development
8	Sustainable Energy
9	Childhood Obesity
10	Health Promotion and Disease Prevention

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

4-H Youth Development

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
806	Youth Development	100%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	47.0	0.0	0.0	0.0
Actual Paid Professional	61.2	0.0	0.0	0.0
Actual Volunteer	54.9	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
848370	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
848370	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1974837	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Communities in Colorado depend on quality, contributing members of society. Fostering productive community members begins with our young people. 4-H is Colorado State University's premier youth development program. Positive youth development addresses broader developmental needs of youth, in

contrast to deficit-based models which focus solely on youth problems. Positive youth development occurs from an intentional process that promotes outcomes for young people by providing opportunities and relationships and externally, through the delivery of projects and curriculum designed according to the best practices of youth development.

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

In order for youth in Colorado to cultivate critical life skills, the 4-H Youth Development work team will strive to incorporate the three mission mandates from National 4-H Council which are Science, Engineering and Technology (SET), Healthy Living, and Citizenship.
Program delivery is via one of six different delivery methods 1) Organized clubs, 2) School enrichment, 3) Short term/special interest, 4) School-age child care, 5) After school programs, 6) Camping.

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.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	30852	396179	56872	11192

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

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	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
2012	361241

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
2012	478004

Output #3

Output Measure

- Number of youth reached by all 4-H delivery methods including organized clubs, after school, school enrichment.

Year	Actual
2012	91659

Output #4

Output Measure

- New and/or revised curriculum to meet changes in needs for youth audiences.

Year	Actual
2012	30

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.

Year	Actual
2012	10855

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

- 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/year/volunteer at $20.47/hour (national average for value of time, adjusted for Colorado)
  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.
  Not reporting on this Output for this Annual Report

Output #11

Output Measure

- Number of new volunteer leaders engaged and strengthening leadership capacity in community functions
  Not reporting on this Output for this Annual Report

Output #12

Output Measure

- Value of volunteers' time that Colorado 4-H adult volunteers provide to 4-H programming, based an average donation of 6.7 hours/year(CPRS) x 7629 volunteers (CPRS) at $22.03/hour (national average for value of time, adjusted for Colorado. Number of volunteers reported previously is from ES237.

Year	Actual

2012 1127627

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

18	Youth apply STEM skills.

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

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1427

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
A successful 4-H youth development program is dependent on adequate numbers of competent and well trained volunteers.

What has been done
Volunteers are trained face to face and/or through e-learning modules. Surveys document their action: http://www.colorado4h.org/research_impact/surveys/Survey-VolunteerImpactOnCommunities.pdf

Results
Volunteers reported increasing leadership capacity; fostering life skill development in youth; increasing effectiveness of Extension programs; contributing to increased public service; generating a sense of goodwill and social well-being.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #17

1. Outcome Measures

Youth develop life skills.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	3610

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Colorado 4-H Youth Development Program provides youth a unique and inclusive setting for individual life skill development and mastery of subject matter competencies through the interactions with caring adults (paid and volunteer).

4-H youth development staff has the ability to recognize and understand the needs of individuals in communities, and to facilitate educational opportunities in response to those needs.

What has been done
4-H projects and events use various content to teach life skills. Participants are surveyed to document their behavior change:
http://www.colorado4h.org/research_impact/surveys/MemberLifeSkillSurvey.pdf.

Results
Youth develop skills for setting goals, making decisions, keeping records, speaking in public, leadership, and responsibility. One example: From the Member Life Skills Survey, member quotes included...

My responsibility has skyrocketed because you are in charge of so many things. My patience has improved as well with dealing with other people and the judges. Speaking in front of judges was a little tough last year, but my fright has subsided and I am more comfortable now.
I am now more confident around others, and do very well at communicating. I've really enjoyed learning how to interview and handle professional criticism.
4-H made me think of others before myself.
4-H has helped me gain responsibility and help me become a leader
I am more eager to help out now than I have ever been.

These responses show that Adams County 4-H is making a difference in the lives of our 4-H members!!

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #18

1. Outcome Measures

Youth apply STEM skills.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	4005

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Colorado youth will have an increased understanding and interest in Science, Technology, Engineering, and Math skills to enhance the STEM talent pool to benefit our country and to enhance their marketability as they enter the work force.

What has been done
STEM skills are integrated into most 4-H projects and programs. Specific measurement of behavior change is conducted in some projects.

Results
4-H participants have opportunities to interact with:Standards-based science and math content; Application of science, engineering and technology process skills; Learning through hands-on, inquiry-based experiences connected to real life interests and issues; Support from adults acting as guides, facilitators and mentors; An intentional infusion of life skills; A chance to give back to the community. "Since adding STEM programs to what Summit County 4-H offers, we have reached over 1,000 youth. We have developed a partnership with the Summit School District and are now offering programs in the classroom, teacher workshops, after-school programs, career fair, etc. STEM has opened new partnerships and collaborators in our community that enables us to reach more youth in Summit County...."

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 (new planning and reporting system)

Brief Explanation

Colorado's o n-line planning and reporting system does not furnish data in percentages. Therefore, all previously planned %-age outcomes are not reported. Action outcomes are collapsed for volunteers and for youth, and STEM outcomes added.

Natural disasters including fires and drought affected outcomes in 2012.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

4-H Program Leader, Jeff Goodwin, works diligently with agents across Colorado to provide evaluation instruments and encourage timely, accurate reporting. He is in the process of creating Excel spreadsheets that will compile evaluation data from across the state for presentation through our on-line planning and reporting system.

Key Items of Evaluation

Our planning and reporting system does allow for narratives. This one was selected as an example of 4-H work that is responsive to community needs. In this case, a fire.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Consumer and Family

☑ Reporting on this Program

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: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	12.0	0.0	0.0	0.0
Actual Paid Professional	4.8	0.0	0.0	0.0
Actual Volunteer	1.3	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
88372	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
88372	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
205712	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The aim of the Financial Management Work Team is to provide financial education on basic money management and wealth building to Coloradoans who are seeking to increase their financial knowledge

and skills, prepare for the workforce, plan for retirement and achieve other goals such as debt reduction and increase financial security.

2. Brief description of the target audience

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

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	7097	125539	724	0

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

Patent Applications Submitted

Year: 2012

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	7	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
2012	258

Output #3

Output Measure

- Number of newsletters/publications distributed.

Year	Actual
2012	36

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
2012	3427

Output #7

Output Measure

- Number of volunteers supporting this program

Year	Actual
2012	218

Output #8

Output Measure

- Numbers of partnering agencies supporting this program

Year	Actual
2012	72

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	Participants intend to increase and/or adopted at least one strategy for financial management.

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

Participants intend to increase and/or adopted at least one strategy for financial management.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1629

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Small Steps to Health and Wellness (SSHW) is the first long-term Extension program developed to motivate Americans to simultaneously improve their health and personal finances by using the same personal behavior change strategies. The original SSHW program was developed upon a framework of 25 behavior change strategies for improved well-being by Cooperative Extension faculty at Rutgers University. In 2012 an updated version was created and is being delivered and evaluated in Colorado, funded for $136,095 by a Rural Health and Safety Education Competitive Program of the USDA National Institute of Food and Agriculture (NIFA) grant number 2011-46100-31139. This project is providing timely, quality health education and health promoting

activities along with financial information and wealth promoting activities to diverse populations. The connection of wealth to health serves as a unique motivational factor to increase positive behavior change.

What has been done
Colorado workshops began in January, 2012 to maximize the teachable moment when people are often making New Year's Resolutions to improve their health and wealth. Workshops will continue to be conducted in a Phase Two and Phase Three format. The funding was extended until September, 2013.

Results
1243 participants intended to increase utilization of successful strategies for financial management; 376 participants reported they adopted at least one strategy. (SSHW financial indicators: setting financial goals; record keeping; creating and using a spending plan; credit management and debt reduction; fraud, exploitation, and risk management; housing decisions; saving; investing; and long term and retirement planning).

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
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (new planning and reporting system)

Brief Explanation

Colorado's on-line planning and reporting system does not furnish data in percentages. Therefore, all previously planned%-age outcomes are not reported. Action outcomes are collapsed as strategies are the same for intended to adopt and adopted.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

In Phase One of the project, we received 164 Informed Consent Forms to participate in a follow-up evaluation which was conducted with158 participants (due to incomplete contact information for some participants with signed consent forms) in August, 2012, between one and five months or more after attendance at a SSHW workshop. There were 67 follow-up surveys completed online via Survey Monkey or telephone and mail surveys. Participants resided in 12 counties in Colorado. Respondents were primarily women (68.7%), white (88.7%), and living with a spouse or partner (75.9%). Four in ten (43.1%) had children under age 18 living at home. Almost three in ten (27.6%) had other adults over age

18 living in the household. Data is still being analyzed and reports created, but 52.2% of the respondents rated the program as "Very positive and motivational" and 44.8% rated it "Somewhat positive and motivational." Only 3% rated the program "Not very positive or motivational." Respondents indicated that they had taken multiple small steps since attending the workshop with a majority indicating that they had set a health goal (52.3%) and had set a wealth goal (52.3%). Several positive changes were reported including improved eating habits (61.3%), saved money (45.2%), reduced debt (37.1%), improved health (35.5%), lost weight (30.6%), achieved a health goal (22.6%), and achieved a wealth goal (19.4).

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Food Safety

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
206	Basic Plant Biology	0%		10%	
212	Pathogens and Nematodes Affecting Plants	0%		7%	
502	New and Improved Food Products	0%		8%	
607	Consumer Economics	0%		6%	
701	Nutrient Composition of Food	4%		12%	
703	Nutrition Education and Behavior	4%		8%	
704	Nutrition and Hunger in the Population	4%		0%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	40%		0%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	40%		12%	
723	Hazards to Human Health and Safety	0%		6%	
724	Healthy Lifestyle	4%		7%	
802	Human Development and Family Well-Being	0%		12%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	0%		6%	
805	Community Institutions, Health, and Social Services	4%		6%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	16.0	0.0	6.0	0.0

Actual Paid Professional	5.7	0.0	3.3	0.0
Actual Volunteer	1.2	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**
88372	0	254386	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
88372	0	254386	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
205712	0	4893514	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 and Food Safety for Food Bank Workers).Some of these programs are fee-based.

Promoting Food Security

• Multi-lesson series programs-Eat Well for Less, La Cocina Saludable]
• Single event programs targeting limited resource families
• Newsletters-Senior Nutrition News

Research

• Technical and extension publications
• Development of new technologies for improving food safety
• Development of recommendations on diet, exercise or other health related topics
• Recommendations crop varieties that have positive nutritional qualities and for which growing and marketing those varieties provide a competitive advantage

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.

Nurtrition and food safety recommendations for growers, processors, and marketing of plant and animal products

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	59373	1436150	684	0

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

Patent Applications Submitted

Year: 2012

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	5	75	80

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of trainings in food safety held.

Year	Actual
2012	543

Output #2

Output Measure

- Grant dollars (external) received to support Food Safety

Not reporting on this Output for this Annual Report

Output #3

Output Measure

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

Not reporting on this Output for this Annual Report

Output #4

Output Measure

- Number of individuals trained via workshops in food safety

Year	Actual
2012	250

Output #5

Output Measure

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

Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of volunteers supporting food safety

Not reporting on this Output for this Annual Report

Output #7

Output Measure

- Number of curricula developed or reviewed that support food safety

Not reporting on this Output for this Annual Report

Output #8

Output Measure

- User Fees Generated through Food Safety work.

Not reporting on this Output for this Annual Report

Output #9

Output Measure

- Participants completed food safety training and certification.

Year	Actual
2012	623

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	Participants adopted recommended food safety practices and/or safe home food preservation practices.
7	Participants planned to implement processes that will minimize microbial and/or chemical threats to the food supply.
8	Identification of potato varieties with high content of putative anti-obesity bio-active compounds

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.

   Not Reporting on this Outcome Measure

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
2012	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

Participants adopted recommended food safety practices and/or safe home food preservation practices.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	2036

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The incidence of food-borne illness is impacted by many factors including changes in pathogens, production methods, processing technologies, distribution patterns, and populations as well as food safety education outreach. Individuals experience decreased incidence of illness associated with contamination of food resulting from household food handling practices.

What has been done
Routt County and other FCS agents continue to train and utilize their Master Food Safety Advisers (MFSA) to promote safe food preservation methods. This year they conducted several canning classes as well as food preservation demonstrations at Farmers' Markets. Also had Master Food Safety Advisers supply scripts for November/December Holiday time frame on Food Safety and Handling topics. Local station sent scripts to another station. Radio audience of 500 daily heard the scripts.

Results
1010 Participants adopted recommended food safety practices (including food production, preparation, consumption and storage practices) to minimize risk of food-borne illness; 1026 participants adopted safe home food preservation practices (including use of tested recipes, following research-based procedures and canning equipment that is routinely inspected and tested for safety.

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

Participants planned to implement processes that will minimize microbial and/or chemical threats to the food supply.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	137

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Increase understanding of the ecology of threats to food safety from microbial and chemical sources: increase our understanding of the ecological impacts on the fate and occurrence of pathogens and fecal indicators in/on water, air, and land; increase our understanding of the social, cultural, and economic impacts on the ecology of pathogens and fecal indicators in environments associated with food; understand the interface of food with people, plants, soil, domestic animals and wildlife.

What has been done

Food safety is currently designated a priority on a national, state, and local level. CSU Extension's response to the Listeria outbreak and its after effects is truly an example of the power of Extension. The past 15 months have been a pivotal time for food safety in Colorado and probably the most challenging time for Extension Food Safety in the state's history.

Results

With the Listeria outbreak associated with Colorado-grown cantaloupe, we went from being a state that had never had a confirmed foodborne illness outbreak related to fresh produce to the site of the deadliest U.S. outbreak in recorded history. In response to the outbreak, FSHN faculty collaborated with College of Agriculture faculty to develop a Melon Task Force and implement a strategic plan to improve all practices related to the production, distribution, and consumption of melons. From the initial phone call in September 2011, when we learned that Rocky Ford melons might be the implicated food, to the end of December, 2012, when CSU was established as Ground Zero for melon research, we had secured over $250,000 in funding from four grants; hosted a seminar/summit with over 130 participants including food safety experts from CDC, CDPHE, FDA, USDA, UCD, CSPH, CSU, and multiple county health departments; and responded to media requests by numerous state and national television, newspaper, and radio programs with coverage in the Denver Post, Colorado Springs Gazette Telegraph, Pueblo Chieftain, Greeley Tribune, Coloradoan, NBC Nightly News and Television Channels 9, 7 and 4. The CSU Public Relations officer estimates the contact number in Colorado to be well over 1 million, perhaps a few million, and the news coverage spread across the United States. Articles appeared in multiple publications.

In addition to dealing with a major food-borne illness outbreak which will forever change produce production, in 2012, with the passing of the Colorado Cottage Food Act, there was a major change to state laws governing food regulation which allows home kitchens to be used for retail food production. The CSU Food Safety Education work team has been working since mid-March to meet the demand of hundreds of new food producers across the state. Grant money has been secured and a curriculum is being developed to be launched in early 2013.

Our Farm-to-Table website, along with the CDA Farm-to-Market website, is the platform for sharing information related to these food-related issues.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

Outcome #8

1. Outcome Measures

Identification of potato varieties with high content of putative anti-obesity bio-active compounds

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Color-fleshed potatoes are a rich source of anthocyanins, which may contribute to the protection of high-fat diet induced inflammation and obesity. However, color-fleshed potatoes can undergo 3-6 months of storage before processing/consumption and the effect of storage and processing on their bioactive anthocyanins remains unknown.

What has been done
Purple-fleshed potatoes had greater phenolic content (TP) and antioxidant activity (AA) as compared to traditional white- and yellow-fleshed genotypes. The AA of all clones increased with storage; however, an increase in TP was observed only in purple-fleshed clones. Baking caused minimal losses while chipping reduced the phenolic and anthocyanin content, and AA of the potatoes. With storage, total phenolic and anthocyanin content, and AA increased in baked samples while in the chipped samples, they remained constant. Storage and processing (chipping vs. uncooked) caused a shift in the metabolite profiles of potato clones. However, baking retained similar metabolite profile as that of uncooked potato.

Results
Purple-fleshed (Purple Majesty and CO97227-2P/PW) varieties/advanced selection were identified as rich sources of bioactive compounds and anti-oxidant capacity compared to all other varieties tested. CO97227-2P/PW retained the anti-oxidant capacity and anti- colon cancer properties (obesity and/or type 2 diabetes promotes colon cancer). Baking not only retains metabolite profile similar to that of uncooked but also retains biological activity against human colon cancer cell lines. Consumers prefer tastier evidence-based health food products whereas potato producer's primary preference is the ability to sell the crop - thus, it is critical to develop farm to fork operations that optimizes the health-benefits without losing the sensory attributes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
701	Nutrient Composition of Food

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.)
- Other (new planning and reporting system)

Brief Explanation

Colorado's on-line planning and reporting system does not furnish data in percentages. Therefore, all previously planned %-age outcomes are not reported. Action outcomes are collapsed as strategies are the same for intended to adopt and adopted.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Impact statement from Jim Devore, Supervising Environmental Health Specialist, Larimer Department of Health and Environment: "Although Larimer County Department of Health and Environment does not track the frequency of foodborne illness risk factors in relation to food safety training, we are very confident that safe food handler training programs such as Food Safety Works have a positive impact in reducing the incidence of these risk factors. Larimer County has found that the more knowledgeable operators, managers and food service workers are about food safety the more likely they are to identify and address food safety issues in their operations. This belief is supported by research conducted by FDA which has shown food service establishments that employ managers with formal food safety training have fewer foodborne illness risk factor critical violations than establishment with managers that do not have formal training. In addition, other studies have found that restaurant inspection ratings can improved significantly in establishments whose managers attended food safety training programs. The Food Safety Works food handlers training provides basic food safety information that anyone working in any food service establishment should know. Applying the knowledge gained by attending Food Safety Works training is a food services establishment's first step in preventing the occurrence of foodborne illness."

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Global Food Security and Hunger

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals	20%		10%	
302	Nutrient Utilization in Animals	20%		10%	
303	Genetic Improvement of Animals	0%		20%	
307	Animal Management Systems	20%		30%	
311	Animal Diseases	20%		10%	
315	Animal Welfare/Well-Being and Protection	20%		10%	
601	Economics of Agricultural Production and Farm Management	0%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	25.0	0.0	29.0	0.0
Actual Paid Professional	13.0	0.0	3.6	0.0
Actual Volunteer	4.0	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**
229767	0	342987	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
229767	0	342987	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
534852	0	3928488	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Extension report includes three Work Teams: Livestock & Range (LR), Small Acreage Management (SAM), and Agriculture & Business Management ABM). They conduct:

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

Extension and outreach programs enhance animal agriculture in Colorado and the West. Extension will include applied research and education relevant to emerging issues of Colorado's agricultural industries.

- Evaluate new crop, range, and livestock systems in semi-arid environments including disciplinary and interdisciplinary work in crop and soil sciences, animal sciences, pest sciences, range science, wildlife biology and ecology, forest science, water sciences, economics, and landscape design and policy applicable to the state and region. ·
- Develop improved animal production systems that are economical and environmentally sound including genetics and breeding, nutrition, and management components.
- Develop information and methods to improve reproductive efficiency including increasing pregnancy rate, decreasing embryonic mortality and decreasing prenatal mortality.
- Molecular biology and genomics of crop plants and their pests, mechanisms of biological resistance to pests, mechanisms of invasion of weed species, and understand the molecular and cellular foundations for crop improvement and crop pest management.
- Research in genetic determinants of host plant resistance, fundamental mechanisms of biological invasions, and ecology, bio-informatics, genomics, and population genetics of pests.

2. Brief description of the target audience

Individual agricultural producers, commodity groups, agri-business partners

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	39908	630660	1496	1231

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

Patent Applications Submitted

Year: 2012

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	22	93	115

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of attendees at workshops/trainings/field days

Year	Actual
2012	8659

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.

Year	Actual

2012	531

Output #4

Output Measure

- Number of volunteers supporting this work

Year	Actual
2012	15

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

- LR 10) New Technologies Expected to be Adopted by Producers

Year	Actual
2012	2

Output #7

Output Measure

- 0n-farm test plots

Year	Actual
2012	29

Output #8

Output Measure

- LR 7) Websites (number of Websites) ABM 8) Websites (number of Websites) SAM 7. Websites (number of Websites)

Year	Actual
2012	75

Output #9

Output Measure

- ABM 9) Websites (number of hits) LR 8) Websites (number of hits) SAM 8. Websites (number of hits)

Year	Actual

2012	41672

Output #10

Output Measure

- LR 4) Community Meetings Facilitated [examples: Focus Group, Citizen Forum, Round Table Dialogue, Strategic Planning Process]; ABM 4) Community Meetings Facilitated [examples: Focus Group, Citizen Forum, Round Table Dialogue, Strategic Planning Process]

Year	Actual
2012	100

Output #11

Output Measure

- SAM 4. Community Meetings Convened [examples: Advisory Groups, Councils, Coalition Meetings, Boards]

Year	Actual
2012	16

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	Livestock producers, adult and youth, report an increased adoption of best management practices for optimum production and economic sustainability.
6	Livestock and range operators report an increased use of rangeland monitoring to support improved animal performance, ecosystem health, and policy formation.
7	Small acreage landowners show an increase in knowledge or understanding of animal/livestock health and care.
8	Beef cattle decision support system
9	Integrated Resource Management

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**

   Livestock producers, adult and youth, report an increased adoption of best management practices for optimum production and economic sustainability.

2. **Associated Institution Types**

   - 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	10730

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
One Example: Mortality management threatens the sustainability of livestock production in many ways. In recent years, concerns about mad cow disease reduced the availability and increased the cost of rendering services. Alternatives are needed that protect the environment from contamination and prevent the spread of pathogens from mortalities to living, productive animals. These alternatives must be affordable and ideally would also create jobs in rural America. Composting mortalities is an alternative that holds promise for the achievement of environmental protection, economic sustainability, and job creation.

What has been done
A team of Cooperative Extension faculty from four states (MT, WY, CO, and NM) came together to develop and deliver educational materials on the subject of livestock mortality management. The team developed and disseminated four tools to guide mortality management decision-making in the region: a spreadsheet, a manual, a video, and a PowerPoint presentation. All materials were translated into Spanish to better reach Spanish-speaking audiences.

A decision aid spreadsheet tool was developed to assist producers in making informed and thorough mortality management decisions. In many cases, several options exist for mortality management on livestock operations, making it important to know and compare the costs of various alternatives. The spreadsheet tool is based on a method known as partial budgeting, allowing the livestock producer to estimate financial costs and benefits of alternative mortality management practices. Simply put, this approach accounts for additional and reduced costs and expenses for a potential change in practices.

A how-to-manual was developed to effectively communicate mortality composting basics and benefits, equipment and feedstock needs, the principles of site selection and preparation, carcass preparation and placement, handling of material, management during and after composting (including curing and storage), scavenger concerns, and end product quality and use. Environmental concerns and health issues (in particular, pathogen reduction) are addressed in the manual. The manual was published as a bulletin through Montana State University.

A video was produced that includes an overview of what composting livestock mortalities is and addresses issues such as the positive effect for the environment, the economics of composting versus other disposal methods, and the sustainability of composting. In addition, a brief "how-to" for composting livestock mortalities is described. This section discusses the process of composting and some of the factors that are necessary for success. Finally, interviews with producers in New Mexico and Montana were included to help promote the practice in a peer-to-peer fashion.

A PowerPoint presentation was also developed, with annotated speaker notes, which reflect and support information in the manual and the video. The presentation serves as an educational module tying together all deliverables and providing in-service professional development to those who view and study it. It is also available for individuals to edit and adapt the presentation to suit their needs as an educational tool for use directly with producers and compost facility managers.

These materials have all been posted on the CSU Extension website (http://www.ext.colostate.edu/pubs/ag/animal-compost.html) and the CSU Institute for Livestock and the Environment website (http://livestockandenvironment.org/projects-2/projects/). In addition, hard copies of the manuals and videos were distributed to NRCS and Extension offices in Montana, Wyoming, Colorado, and New Mexico and to others as requested. Due to their widespread distribution and continued availability online, we expect these educational materials to continue to grow in impact in the years ahead.

Results

This project team reached 285 agricultural professionals, technical service providers, and consultants with new, highly relevant information for them to pass on to their livestock-producing clientele. Short-term outcomes include increased understanding of mortality management concerns such as environmental protection and bio-security, mortality management practices, and composting livestock mortalities as a sustainable practice. In the medium-term, our audience members will develop their abilities to teach and advise on livestock mortality management options and provide technical details on composting as a viable option. In the long-term, livestock producers and managers of livestock operations will increase their awareness and knowledge of proper mortality management options, including composting as a bio-secure and environmentally sustainable method. Eventually, this will lead to increased use of cost effective and proper mortality management practices, with composting as a primary method when applicable, and a decreased threat to water quality and bio-security due to poor mortality management.

The work of the Mortality Management Team was highlighted in Simply Sustainable, the quarterly newsletter from Western SARE, in July 2012 (Volume 6, Issue 2). http://www.westernsare.org/Learning-Center/Newsletters/Western-SARE-Newsletter-Archives/Summer-2012-Simply-Sustainable

Our products were also linked to in the Progressive Dairyman issue published on Nov. 13, 2012. http://www.progressivedairy.com/index.php?option=com_content&view=article&id=9733:large-carcass-composting-in-cold-semi-arid-climates&catid=77:manure&Itemid=121

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #6

1. Outcome Measures

Livestock and range operators report an increased use of rangeland monitoring to support improved animal performance, ecosystem health, and policy formation.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1142

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Science-based information and research contributes to the optimum production and economic sustainability of livestock enterprises, range land health, and policy regulations.

What has been done
In addition to workshops, newsletters, and websites, the Livestock and Range Work Team members reported over 4,500 direct communications by phone or e-mail.

Results
65 producers documented range land monitoring activities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #7

1. Outcome Measures

Small acreage landowners show an increase in knowledge or understanding of animal/livestock health and care.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2012 320

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Small acreage landowners (owning one to 100 acres of land) often live on small acreage properties because they embrace the rural lifestyle but do not necessarily intend to derive income from the property. Small acreage landowners have a significant impact on the conditions of soil, water, plants, animals, and other natural and man-made resources through their cumulative effects. The large tracts of agricultural lands in Colorado are being subdivided into one to 100 acre tracts of dry land for rural homesteads. Many of these homesteaders move from cities or other states and do not have the land management knowledge base which traditional agricultural landowners hold. Therefore, the demand for information and technical assistance is immense. Weed control, water use, and grazing management are prime examples of the land management skills which many small acreage landowners seek.

What has been done
Small Acreage Management Work Team provides education on animal/livestock health (the number reported above); manure management; unwanted wildlife; desirable wildlife; soil health, fertility, erosion, composting, and compaction; weeds; grazing and pasture management; grass; windbreaks; native plants; forestland management; etc. One Example: A workshop was held on a weekend with sessions on Friday- 6-9 pm, Saturday 8am- 4 pm, and Sunday 8 -11 am. Attendance was small. Evaluation was conducted.

Participants included current landowners wanting specific information regarding their properties and potential landowners looking for information.
Module 1, Lesson 1 - What Do You Have and What Do You Want?

Participants rated this section high with 30/42 responses, as "Very Much So" or a 5, and 12 responses as a #4, on a 1-5 scale. Comments reflected that the information was informative and not too technical, but most participants wanted more information on soil and well testing and soil augmentation. All participants said this session would help them in their thinking and then planning of their acreage property. All participants said this workshop was "Very" worthwhile.

Module 2, Lesson 1- Soil Evaluation
Participants also rated this section high with 32/35 responses as, "Very Much So" or a 5, and 3 responses as a #4, on the 1-5 scale. Comments were that learning to do a soil test, learning about Ph and learning about soil texture was very valuable. "Playing in the dirt" and learning different soil textures was also valuable to participants. The participants would have liked to know more about different soil amendments, cover crops - specific to erosion and how to compost. (These topics were not covered in the class.) All participants said this module was "Very" worthwhile.

Module 3, Lesson 1 - Water Quality Evaluation

Participants also had high marks for this section with 31/35 responses as, "Very Much So" or a 5, and 4 responses as a #4, on the 1-5 scale. This most important part of this section dealt with learning about septic systems and water wells and the importance of testing their well. Several participants needed more help understanding the chemistry and the elements of our water that was discussed in class. One participant wanted more information in taking a seasonal water course and should they be doing anything to contain expansion of their water system as it relates

to debris and vegetation? All participants agreed that this program was also worthwhile and valuable.

Module 5, Lesson 1 - How Grass Grows
Participants had mediocre marks for this section with only half, 22/42 responses as, "Very Much So" or a 5, and 11 rating a #4, and 7 rating as a #3, on the 1-5 scale. Participants appreciated gaining knowledge on rotating pastures and grazing configurations.

One participate appreciated learning the different parts of a plant. Participants felt that the number of grasses and weeds covered, plus the calculations for figuring out pasture usage, was a bit overwhelming and more time should have been spent in that portion. Participants wanted to spend time in the field identifying grasses and getting comments on grasses in our area.

Module 6, Lesson 1- So You Want To Be An Animal Owner
Participants wanting or having horses rated this section high with 14/21 responses as, "Very Much So" or a 5, and 7/21 as a rating of #4. More information was wanted on small ruminants and poultry that instructors had limited knowledge of and rated the session with 4/7 responses as a rating of 4, 2 responses as a #3 and 1 as a #5 or "Very Much So". Participants also noted that they would have liked additional time to spend on their own questions about their operations, but noted that, "Everything was helpful."

Results
The workshop served as a good introduction to the topics of: Property Planning, Water Quality & Septic Systems, Soils, How Plants Grow and Considering Animals On Your Property and calculating forages.
Due to the volume of material, participants would have liked more time to discuss their own issues and to get feedback from the Agents. Some of this discussion took place, but not enough for the participants.

Participants indicated they would be interested in classes of longer lengths and realized just how much there is to know about your property, planning and growing plants or animals on it.

Participants requested more information that CSU Extension Agents offered on different types of buildings, current CSU brochures on "Livestock In the Mountains", and materials and specifics about different crops and grasses.
In the future, I think extending the time for these programs might be useful and giving the participants a, "TO DO" list before attending might also be helpful. Perhaps spending more time on calculations and helping them with the math portions would be helpful too. Several wanted a couple hours for discussion at the end and we could work that in as well. Perhaps thinning some of our program slides would be beneficial too.

Participants said they gained an important contact and getting to know local agents and where to go with their questions.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
315	Animal Welfare/Well-Being and Protection
601	Economics of Agricultural Production and Farm Management

Outcome #8

1. Outcome Measures

Beef cattle decision support system

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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

What has been done
The beef cattle selection decision support system is intended for use by beef cattle producers to integrate economic and production characteristics of their operation with the selection of breeding animals in an effort to improve profitability through genetic improvement. Based on feedback from cattle breeders using the system we have been adding new features to streamline its use. That effort continues with the reprogramming and migration of the system to a new platform for delivery. In the current year, besides the continuation of the system migration/reprogramming, we have compiled average performance information from an intermountain-region seedstock Angus herd. This performance information will serve as a validation dataset for the bio-economic simulation.

Results
With appropriate application this system could improve overall profitability of beef production. For instance, bulls are typically used for 3 breeding seasons with an average of 25 offspring produced per season; each of these bulls would produce a total of 75 offspring. If the system yields only an average of $10 more profit per progeny produced and sold at weaning, this is $750 per bull put in service. Given that cow-calf producers would likely keep replacements from progeny produced, economic benefits would exceed those estimates. Additionally, such a system would help producers select replacements specifically for the production and economic circumstances on their operation, potentially yielding increased results on an individual rather than a breed-wide basis.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #9

1. Outcome Measures

Integrated Resource Management

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Animal management systems are needed that will enhance the profitability and, therefore, sustainability of Colorado farmers and ranchers. The goal is 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 and to determine 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 seeks to serve their students in the best way possible to make them effective Agricultural leaders. This is accomplished through use of various outlets and methodologies of teaching that combine hands-on and technologically advanced tools. Our customer/student focus has allowed us to become a leader in the online education sphere on the campus due to our continuing enrollment growth. We succeeded in completing the launch of the entirety of our program in online format. This has allowed several more students to graduate with their Master of Agriculture with a specialization in Integrated Resource Management during this calendar year. We have several more who are expected to graduate in the upcoming Spring.

Results
Our enrollment in the online program continues to grow over previous years. Fall 2012 saw enrollment numbers for our introductory class AGRI 630 alone at 28 students. This number does not include additional enrollees in AGRI 631, 635, 636 and 639. We are in the process of

accepting another 12 candidates presently for the Spring 2013 semester. We expect to continue to grow in this field and will work toward making our program better, more applicable and up-to-date.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal 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

Colorado's on-line reporting system does not give %-age outcomes so none of these are reported this year.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Changes in knowledge are easy to survey and often measured. Behariorr changes are more difficult to document. Condition changes require external data points. All Work Teams are encouraged to include at least one external data source in their situation statements and reports.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Plant Production Systems

☑ Reporting on this Program

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	0%		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	30%		6%	
206	Basic Plant Biology	0%		3%	
211	Insects, Mites, and Other Arthropods Affecting Plants	10%		0%	
212	Pathogens and Nematodes Affecting Plants	10%		0%	
213	Weeds Affecting Plants	10%		3%	
215	Biological Control of Pests Affecting Plants	10%		0%	
216	Integrated Pest Management Systems	30%		13%	
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

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	15.0	0.0	26.0	0.0
Actual Paid Professional	13.9	0.0	19.7	0.0
Actual Volunteer	10.5	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
247441	0	1005412	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
247441	0	1005412	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
575994	0	10673520	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Extension reports activities from three work Teams in this section, including Pest Management (PM) , Small Farms and Specialty Crops (SFSC), and Wheat-Based and Other Cropping Systems (WOCS).

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

2. Brief description of the target audience

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

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	178140	273838	2038	322

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

Patent Applications Submitted

Year:	2012
Actual:	3

Patents listed

Potato selections to be named are AC99329-7PW/Y (Masquerade), CO99053-3RU (Crestone Russet), CO99100-1RU (name to be determined).

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	33	157	190

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of new technologies released

  Not reporting on this Output for this Annual Report

Output #2

Output Measure

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

Year	Actual
2012	13893

Output #3

Output Measure

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

  Not reporting on this Output for this Annual Report

Output #4

Output Measure

- Number of Extension workshops focusing on plant production systems.

Year	Actual
2012	862

Output #5

Output Measure

- Number of volunteers supporting plant production systems work.

Year	Actual
2012	37

Output #6

Output Measure

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

Year	Actual
2012	195

Output #7

Output Measure

- Number of workshops, educational classes for producers
  Not reporting on this Output for this Annual Report

Output #8

Output Measure

- Number of demonstration plots and field days
  Not reporting on this Output for this Annual Report

Output #9

Output Measure

- Number of individual consultations
  Not reporting on this Output for this Annual Report

Output #10

Output Measure

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

Output #11

Output Measure

- Field crop acreage under crop and soil management systems that result in an enhancement of soil health and crop productivity (including but not limited to no-till or conservation tillage practices).

Year	Actual
2012	130

Output #12

Output Measure

- Farmed acreage planted to diversified cropping systems.

Year	Actual
2012	175

Output #13

Output Measure

- Farmed acreage managed with research-based best management practices for water-use crop efficiency.

Year	Actual
2012	66

Output #14

Output Measure

- Greenhouse irrigation technology

Year	Actual
2012	0

Output #15

Output Measure

- Adaption of new potato varieties

Year	Actual
2012	0

Output #16

Output Measure

- Management of potato plant pathogens

Year	Actual
2012	0

Output #17

Output Measure

- Adoption of improved wheat cultivars

Year	Actual
2012	0

Output #18

Output Measure

- IPM legume pipe

Year	Actual
2012	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	Participants improve or intend to improve their practices, decisions and skills in action through timely access to pest management resources and/or pest identification and IPM implementation.
6	Participants will gain/increase knowledge/literacy in pest diagnostics and pest management.
7	Participants have accessed resources, information and networks to improve their production enterprises
8	Adoption of improved wheat cultivars
9	Green house irrigation technology
10	Adoption of new potato varieties
11	Management of potato plant pathogens
12	IPM Legume pipe

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.

   Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

   Adoption of improved wheat cultivars.

   Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

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

2. **Associated Institution Types**

   - 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	90816

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
One example: Onion production across the United States has been impacted by Iris Yellow Spot Virus (IYSV) which is vectored by the onion thrips (Thrips tabaci). Reducing thrips populations can sometimes help reduce infection rate of IYSV in onions. In Colorado, companion crops (living mulch) such as barley and spring wheat planted with onions to reduce wind and water erosion, has sometimes had an effect on thrips populations.

What has been done
Both of the Northern Colorado Onion Variety Field Trial locations were harvested and processed during the month of September. The Sakata location was harvested on 9/14 and processed on 9/17. The Winter location was harvested on 9/19 and processed on 9/20. During processing, onions were checked for size, disease and the number of double centers along with yield.

Results
Results from these trials are sent to onion seed companies, onion producers and onion researchers. Onion producers use this information to help them decide which onion varieties they will plant next spring. Onions are a $50 million dollar crop here in Colorado. Colorado State University Extension onion research is valued by the Colorado Onion Association and onion growers across Colorado. Extension's research has led to greater yields and higher quality of onions which positively impacts the onion producer's bottom line.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #6

1. Outcome Measures

Participants will gain/increase knowledge/literacy in pest diagnostics and pest management.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1870

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
A conservative loss estimate of 5% to 10% due to plant pests could cost Colorado producers in urban and rural settings $50 to $100 million annually.

What has been done
Components include identifying the pest, understanding the life cycle and biology of the pest, and selecting appropriate, timely and economical pest management strategies. The Tri River Area insect diagnostic lab identified more that 500 insect samples, 80% from the TRA, with the remainder mostly from the western region counties. These are samples not reported by Master Gardeners. Many are home and structural pests, and many have direct impact on human and animal healh. The lab receives bedbug, flea, conenose and many suspected biting arthropod samples, which are identified to species if necessary. The TRA lab is a primary identification source for for many pest management professionals in western Colorado when they get unique samples that need positive identification.

Results
Client comments are overwhelmingly positive: "There is no other reliable public source for insect identification in western Colorado."

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants

Outcome #7

1. Outcome Measures

Participants have accessed resources, information and networks to improve their production enterprises

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	750

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Commercial producers seek to attain their business goals and improve their business management and practices.

What has been done
Colorado farmers and ranchers have increased access to resources, information and networks to improve their production enterprises.

Results
Community development activities link with content expertise to help clients make good decisions.

4. Associated Knowledge Areas

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

Outcome #8

1. Outcome Measures

Adoption of improved wheat cultivars

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Development of improved wheat cultivars serves the wheat industry in Colorado and the western Great Plains by reducing wheat production costs, reducing pesticide use, and providing improved marketing options.

What has been done

In fall 2012, experimental line CO07W245 was released as 'Antero'. Antero is a hard white winter wheat (HWW) from the cross KS01HW152-1/TAM 111 made in 2003. Antero is medium height and medium maturing, and has a medium-length coleoptile, good straw strength, and excellent test weight. Pre-harvest sprouting tolerance of Antero is similar to Snowmass, which is similar to Hatcher hard red winter wheat (HRW). Antero is resistant to stripe rust, moderately resistant to stem rust and wheat soilborne/wheat spindle streak mosaic virus, moderately susceptible to barley yellow dwarf and wheat streak mosaic viruses, and susceptible to leaf rust and all biotypes of Russian wheat aphid. Antero was the second highest yielding entry in the trials, similar to Byrd HRW.

Results

Since inception of the program, 36 CSU-bred wheat cultivars account for 61.3% (or 77.4% of the accounted-for acreage) of Colorado's 2.4 million acres (2012 crop). Average wheat grain yields in Colorado have more than doubled with at least 50% of this increase attributed to improved cultivars. 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
202	Plant Genetic Resources
205	Plant Management Systems

Outcome #9

1. Outcome Measures

Green house irrigation technology

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The US greenhouse and nursery industry supplies consumers with ornamental plants, vegetable seedlings, and fruit trees for use in gardens throughout North America. Irrigation in greenhouses and nurseries can be difficult to manage, because many of the plants are grown in fairly small pots that may need to be watered several times per day. Most greenhouse and nurseries grow a wide variety of crops; adjusting irrigation of all these crops based on the actual watering needs is too time-consuming for growers.

What has been done
A nursery loses about 20 - 30% of the plants during the production, and most of these losses are due to watering too much. We have developed wireless sensor networks to help growers automate irrigation based on the actual water needs of their crops. The principle is simple: soil moisture sensors are inserted into the pots and they measure how much water is present. The sensors are connected to a node, which radios the data to a computer, where the data is presented in charts. Growers can see whether the various crops have adequate water. They can use this computer to instruct each node when and for how long to turn on the irrigation. Using the wireless sensor networks to automate the irrigation of the crop can eliminate these losses.

Results
The precision irrigation had various benefits to the nursery: since none of the plants died because of overwatering, the nursery could sell more plants than they anticipated. And shortening the production cycle reduced the production inputs (labor, fertilizer, pesticides). The required hardware only costs about $6,000, so the return on investment was just a few months. This research not only benefits the nurseries, but also society at large: by irrigation more precisely, nurseries can withdraw less ground water, leaving more water for other uses.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
205	Plant Management Systems
405	Drainage and Irrigation Systems and Facilities

Outcome #10

1. Outcome Measures

Adoption of new potato varieties

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The major objectives of the Colorado Potato Breeding and Selection Program are to address the needs of Colorado growers to have new potato cultivars (russets, reds, chippers, and specialties) with increased yield, improved quality, improved nutritional characteristics, resistance to diseases and pests, and tolerance to environmental stresses. by assessing production, adaptability, marketability, and other characteristics of advanced selections

What has been done
The primary emphasis is placed on the development of russet cultivars. The balance of the breeding effort is devoted to developing red, specialty, and chipping cultivars. This broad approach is important because it recognizes the diverse markets accessed by potato growers throughout Colorado and many other states in the region. Seventy-five advanced selections were saved and will be increased in 2013 pending results of ongoing evaluations. Twelve advanced selections were evaluated in the Southwest Regional Trials, Western Regional Trials, or by Colorado producers in 2012. Several selections are being considered for exclusive release. Selections to be named are AC99329-7PW/Y (Masquerade), CO99053-3RU (Crestone Russet), CO99100-1RU (name to be determined).

Results
Since 1975, there have been 27 potato cultivars/clonal selections released by Colorado State University (CSU) or in cooperation with other agencies. CSU releases accounted for 58% of the 55,100 acres planted to fall potatoes in Colorado in 2012. Colorado cultivars and clonal selections accounted for 46% of the 13,286 acres of Colorado certified seed accepted for certification in 2012. Three of the top 10 russet cultivars grown for seed in the U.S. [Russet Norkotah-S3 (#5), Canela Russet (#8), Rio Grande Russet (#10), in 2012 were developed by the Colorado program. For reds, Sangre-S11 ranked #5. For colored-fleshed specialties, Mountain Rose and Purple Majesty both continue to be ranked #1 among red- and purple-fleshed cultivars.

4. Associated Knowledge Areas

KA Code	Knowledge Area
202	Plant Genetic Resources
206	Basic Plant Biology
502	New and Improved Food Products

Outcome #11

1. Outcome Measures

Management of potato plant pathogens

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Powdery scab and early blight have been significant issues for the potato industry in Colorado and the Western U.S. Any one of these disease problems can reduce yield and quality and can have a major influence on a producers yield, quality and ultimately, the marketing of the potato product. Growers need a better understanding of various potato diseases under Colorado conditions and to implement disease suppression control strategies through a best management practices approach.

What has been done
Substantial progress has been made on management and control of powdery scab utilizing a series of integrated steps to inform the producer of potential problems and then use specific strategies to manage and control the disease. The steps include analyzing all of the common cultivars grown within the Colorado potato industry for susceptibility to powdery scab problems, conducting a soil assay using a specific PCR technique to determine the population of spore balls present in any given field, to assist the producer in making good decisions regarding the susceptibility of specific cultivars, planting in the right fields, using chemical controls when warranted, and correctly managing the field production environment to minimize infection by the pathogen.

Results

limpacts from this research have been varied and consistently benefited potato producers in Colorado. One impact has been reduction and management of early blight .Ccontrolling early blight utlizing the rotation of chemistries used in this research project coupled with the proper timing of the applications results in a savings to the average producer based on their former practices of over 50%/ha or about $61.75/ha. Producers for at least 5,000 ha of potatoes have indicated that they are using these early blight treatments for an annual savings of $309,000.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems

Outcome #12

1. Outcome Measures

IPM Legume pipe

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The IPM Legume PIPE project has evolved in its scope and interactivity with state, regional, and national stakeholders and organizations involved with the production, pest management (emphasis upon IPM strategies including selection of disease resistant varieties, planting clean seed, suitable crop rotation, scouting and confirmation of economic threats from disease organisms and insect pests, and timely application of pesticides as needed) and marketing of legumes (emphasis on non-soybean crops).

What has been done
This project evaluated breeding lines of common beans for resistance to priority diseases including rust and common bacterial blight. The Legume ipmPIPE web site and digital resources will be archived for access by stakeholders and linkage to new USDA-NIFA projects that will include international programs designed to reduce losses from root rot diseases in Africa.

emphasis will be on technology transfer (VegNet and AlliumNet web sites) of pest biology and management to clientele.

Results

The legume industry representing the following non-soybean pulse crops (2000-2009 records from USDA-ERS) has been impacted by the Legume ipmPIPE grant of $350,000 plus participant resources of $500,000 per year with a conservative return of 5 percent ($48 million or an annual Return on Investment of 50 to 1) by reducing losses from diseases and pests affecting: Common Beans - 1,570,000 Acres valued at $461 million, Snap Beans - 100,720 Acres valued at $296 million, Cowpeas - 33,000 Acres valued at $18 million, Lima Beans - 32,000 Acres valued at $29 million, Chickpeas (Garbanzos) - 97,000 Acres valued at $27 million, Lentils - 300,000 Acres valued at $61 million, and Peas (dry, snap) - 560,000 Acres valued at $88 million.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest 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

Colorado's on-line planning and reporting system does not furnish data in percentages. Therefore, all previously planned outcomes noted in percentages are not reported.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Wheat Collaborative On Farm Trials (COFT) - 2012 Evaluation: Extension Agents in Colorado's High Plains region worked with farmer cooperators in conducting the States 32 Collaborative On-Farm Trials (COFT) for wheat in 2012. Jerry Johnson provides leadership for this program. Bruce Bosley, Ron Meyer, John Deering, and Wilma Trujillo, and Thaddeus Gourd provide necessary farmer cooperator contact and variety trial work through the wheat production season (Seed delivery & Planting through final trial harvest). This crew also worked with these same farmers in planting six wheat varieties this fall (2012) in 34 Collaborative Trials across eastern Colorado.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Natural Resources and Environment

☑ Reporting on this Program

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	25%		9%	
111	Conservation and Efficient Use of Water	25%		8%	
112	Watershed Protection and Management	10%		0%	
121	Management of Range Resources	0%		5%	
123	Management and Sustainability of Forest Resources	0%		9%	
132	Weather and Climate	10%		0%	
133	Pollution Prevention and Mitigation	0%		6%	
136	Conservation of Biological Diversity	20%		6%	
204	Plant Product Quality and Utility (Preharvest)	10%		0%	
205	Plant Management Systems	0%		11%	
206	Basic Plant Biology	0%		5%	
216	Integrated Pest Management Systems	0%		21%	
307	Animal Management Systems	0%		5%	
605	Natural Resource and Environmental Economics	0%		15%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	30.0	0.0	11.0	0.0
Actual Paid Professional	44.0	0.0	16.7	0.0
Actual Volunteer	225.0	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**
777672	0	945791	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
777672	0	945791	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1810267	0	10040920	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

This Planned Program - Natural Resources - in Extension includes three Work Teams: Environmental Horticulture (HORT), Native Plant Education (NPE), and Water Resources (WR).

•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 (estimated time spent responding to questions in HOURS = 434)

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	566558	8111725	11176	1258

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

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	4	136	140

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

Year	Actual
2012	33516

Output #2

Output Measure

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

Year	Actual
2012	8799278

Output #3

Output Measure

- Number of Master Gardener and Wildlife Master volunteer hours

Year	Actual

2012	49571

Output #4

Output Measure

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

Year	Actual
2012	1003813

Output #5

Output Measure

- Number of volunteers supporting this program.

Year	Actual
2012	4163

Output #6

Output Measure

- Number of partnering agencies supporting this program.

Year	Actual
2012	113

Output #7

Output Measure

- Number of new technologies adopted by producers.

Year	Actual
2012	10

Output #8

Output Measure

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

Year	Actual
2012	32136

Output #9

Output Measure

- Number of curriculum pieces developed and/or reviewed in support of this planned program. Not reporting on this Output for this Annual Report

Output #10

Output Measure

- Number of Small Acreage Workshops Delivered
  Not reporting on this Output for this Annual Report

Output #11

Output Measure

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

Year	Actual
2012	247

Output #12

Output Measure

- Number of field days conducted to share research and outreach results
  Not reporting on this Output for this Annual Report

Output #13

Output Measure

- Number of individual producers and/or landowners receiving consultation to address local problems.
  Not reporting on this Output for this Annual Report

Output #14

Output Measure

- Number of Native Plant Master Volunteer Hours
  Not reporting on this Output for this Annual Report

Output #15

Output Measure

- Value of Native Plant Masters' volunteer time (at $20.25/hour)
  Not reporting on this Output for this Annual Report

Output #16

Output Measure

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

Year	Actual
2012	62384

Output #17

Output Measure

- Number of acres impacted by planting of natives in a sustainable landscape

Year	Actual
2012	153441

Output #18

Output Measure

- Number of acres impacted by alien weed control efforts.

Year	Actual
2012	291401

Output #19

Output Measure

- Dollar amount saved by residents from their planting of natives in a sustainable landscape.

Year	Actual
2012	20662

Output #20

Output Measure

- Number of land managers and residents who reported they retained their current job, got a promotion or got a new job as a result of their program participation.

Year	Actual
2012	32

Output #21

Output Measure

- Dollar amount saved by land managers and residents from control of alien weeds.

Year	Actual
2012	136736

Output #22

Output Measure

- WR: Number of water quality sampling and analysis performed in a manner meaningful to the user and regulating agencies.

Year	Actual

2012	28

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	Colorado Master Gardener (CMG) volunteers gain knowledge in home gardening (soils, plant selection, planting and management, BMPs, identification, diagnostics and problem-solving) and gain competence in areas of leadership, organizational, and other life skills, allowing them to be more proficient in providing the public with research-based gardening knowledge.
7	Environmental Horticulture (HORT): Home gardeners and green industry professionals report enhanced plant health and more efficient use of labor, water, fertilizer and pesticides when creating and maintaining landscapes
8	LOCAL FOOD Availability and quality of locally produced food increases (more home gardens, community gardens, school gardens, prison gardens); support of CSAs and Farmers' Markets is increased (as measured by visits, vendor participation, dollars spent).
9	WATER RESOURCES (WR): Understanding the consumptive use of water for different crop types and varieties for agriculture under regional conditions throughout Colorado.
10	NATIVE PLANT EDUCATION (NPE): Number of land managers and residents who began or increased weed control efforts.
11	Systems for measuring and managing consumptive water use
12	Control of invasive species
13	Adoption of cropping systems to improve crop water productivity

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

Colorado Master Gardener (CMG) volunteers gain knowledge in home gardening (soils, plant selection, planting and management, BMPs, identification, diagnostics and problem-solving) and gain competence in areas of leadership, organizational, and other life skills, allowing them to be more proficient in providing the public with research-based gardening knowledge.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	6274

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Professional landscape management and homeowner gardening activities contribute significantly to the economy of Colorado. According to a study conducted by Colorado State University (Thilmany et al., 2008; http://www.greenco.org/downloadables/GreenCO-ExecSumFinal08.pdf), entitled The Economic Contribution of Colorado's Green Industry: A 2008 Update, Colorado household and business expenditures on garden, landscape and lawn products and services (including linkage industries such as irrigation systems, botanical gardens, lawn and garden equipment and maintenance services) have averaged almost 10% annual growth since 1993, for a 2007 total of $1.8 billion. The $1.8 billion directly contributed to the Colorado economy increases to $3.3 billion when its impact on broader economic activity and employment generation in the Colorado economy is considered.

What has been done
Around the state, county CMG volunteers report helping Coloradans improve the quality of their lives through gardening. From teaching young children and families how to grow their own food, to demonstrating water-saving solutions for residential landscapes, CMG volunteers extend research-based information that helps people make informed choices regarding resource issues.

Results
-CMGs help families and individuals learn to grow their own food, develop self-sufficiency skills, adopt healthy lifestyles and stretch dollars during tough economic times.
-CMGs assist communities in strengthening local food systems and addressing regional food security by helping improve local food production and donating produce to food banks.
-CMGs promote economic development and increase access to local foods through farmers' markets and food-based community events that celebrate local food and seasonal harvests and

attract thousands of citizens.
-CMGs promote and share environmentally responsible gardening solutions via water-wise, low precipitation xeric gardens and appropriate pesticide use; homeowners save money, conserve resources and improve property values.
-CMGs help youth develop ecological understanding, lifelong gardening skills, an ethic of community service and a taste for nutritious foods.
-CMGs provide opportunities for youth and adults to overcome physical or social challenges to quality of life.
-The number of Coloradans with access to gardening expertise, information and assistance has increased from new media initiatives, annual symposia, community festivals and an expanded CMG volunteer base.

4. Associated Knowledge Areas

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

Outcome #7

1. Outcome Measures

Environmental Horticulture (HORT): Home gardeners and green industry professionals report enhanced plant health and more efficient use of labor, water, fertilizer and pesticides when creating and maintaining landscapes

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	20892

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The quality of a landscape design and maintenance is a major factor in the home and property values. The average household in Colorado spends over $1,000 annually on landscape care and gardening supplies (http://www.greenco.org/images/downloadables/GreenCO-ExecSumFinal08.pdf). Landscaping yields an average of a 109% return on every dollar spent, much more so than other home improvements. (http://ellisonchair.tamu.edu/emphasis-areas/marketing-economics/economic-benefits-of-plants/).

What has been done
Colorado Garden & Home Show
PlantTalk Colorado?
Plant Select®
Demonstration gardens
LawnCheck

Results
One Example: 45 stated they agreed/agreed strongly that the drip irrigation class increased their knowledge of how to design and build a drip irrigation system. COMMENTS: When asked, "As a result of today's class, I plan to ...." 16 replied they planned to try/install/switch to drip irrigation for containers and vegetable gardens; 31 stated they agreed/strongly agreed that the turf care class will save them money by using water and fertilizer more effectively for a healthier lawn.

4. Associated Knowledge Areas

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

Outcome #8

1. Outcome Measures

LOCAL FOOD Availability and quality of locally produced food increases (more home gardens, community gardens, school gardens, prison gardens); support of CSAs and Farmers' Markets is increased (as measured by visits, vendor participation, dollars spent).

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1603

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In recent years, Colorado citizens have become increasingly more interested in the source and quality of their food, availability of local and sustainably produced foods, and community food security through strengthening local food systems. Commonly asked questions regarding the food

they purchase include: Is it organic? Is it GMO? Is it from a family farm? Is it locally produced? What is its carbon footprint? Programs and movements including Ark of Taste, Farm-to-Table, Slow Food USA have captured the interest of a growing number of consumers. This demand is creating opportunities for new and existing food producers to engage in higher-value markets. However, challenges exist that need to be addressed to grow the local foods movement. CSU Extension can play a role in providing guidance and education in the areas of local food production, processing, distribution, and consumption as where communities are working to develop affordable, diverse, healthy, and just local food systems.

What has been done
Interest in local food production is reflected in growing popularity of farmers' markets and community gardens. A number of counties are involved in the direct organization and/or operation of local farmers? markets, while other counties participate in them as venues for providing consumer education in areas like home gardening, food preservation, and healthy eating. Some markets offer workshops and demonstrations on good nutrition, safe food preparation, home gardening, plant problem diagnostics, etc.

Results
-Farmers' Market administration - FM coordinator and other Extension staff (hours) (629)
-Farmers' Market administration - agent hours (595)
-Farmers' Market estimated attendance (63332)
-Farmers' Market gross sales ($633546)
-Farmers' Market number of participating vendors (134)
-Farmers' Market-specific volunteer hours (2453)

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

Outcome #9

1. Outcome Measures

WATER RESOURCES (WR): Understanding the consumptive use of water for different crop types and varieties for agriculture under regional conditions throughout Colorado.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	105

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Adequate supplies of clean water are essential to the health and wellbeing of Colorado citizens, agriculture, industry, wildlife and the economic vitality of the State. With shifting demographics, a growing population and a more integrated global economy, Colorado communities are increasingly faced with losing irrigated agriculture to growing municipal and industrial demands. Many residents and visitors to Colorado also value the state's recreational and environmental water uses putting additional pressure on the state's scarce water supply.

What has been done
Agriculture, industry, homeowners, water providers, and agencies in addition to other educational and research institutions 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. Extension is not the only institution with outreach expertise. Extension's value is in bringing the credibility and continuity of science based land grant institution.

Results
105 participants reported increased understanding of the consumptive use of water for different crop types and varieties for agriculture under regional conditions throughout Colorado.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water

Outcome #10

1. Outcome Measures

NATIVE PLANT EDUCATION (NPE): Number of land managers and residents who began or increased weed control efforts.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	172

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Colorado is a dry state. According to the Colorado Climate Center, statewide average annual precipitation is only 17 inches. Sustainable landscapes using site-appropriate native plants can reduce the need for water and maintenance. A five year study of homes that converted non-native turf to water-efficient native and non-native plants in Las Vegas, Nevada found a 39 percent reduction in average summer monthly water use and a 33% reduction in maintenance costs in addition to the water savings. (Source: http://www.snwa.com/assets/pdf/about_reports_xeriscape.pdf Xeriscape Conversion Study. Sovocool, K. 2005.)

Native plants can also be beneficial because they are environmentally adapted, hardy, provide food and shelter for wildlife and maintain local biological diversity.

Invasive, non-native weeds are a 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. About 42% of the species on the Threatened or Endangered Species lists are at risk primarily because of alien invasive species. Nonindigenous species in the United States cause major environmental damage and losses totaling approximately $120 billion per year. (Source: http://www.sciencedirect.com/science/article/pii/S0921800904003027 Update on the Environmental and Economic Costs Associated with Alien-Invasive Species in the United States, Pimentel et al., Feb. 2005.)

Noxious weeds are moving into valued ecosystems displacing natives at an alarming rate. Invasive plants are found on 133 million acres in the US (as big as California and New York combined), in federal, state, and private ownerships. Each year, invasive species advance by 1.7 million acres. (Source: http://www.fs.fed.us/projects/four-threats/facts/invasive-species.shtml Invasive Species. U.S. Forest Service, 2006.)

What has been done

Colorado State University Extension created the Native Plant Master (NPM) education and volunteer program 16 years ago, to raise awareness about native plants, sustainable landscapes and threats to native ecosystems, including invasive weeds.

Jefferson County Extension launched the state's first NPM training in 1997. Today, 14 Extension offices around the state offer hands-on courses taught by county agents and other NPM trainers. Each course is divided into three sessions which cover:

Plant identification using a key along with a botanical field guide;
Ecological relationships between noxious weeds, native plants and insects, birds and wildlife;
Landscape and other human uses for Colorado native plants.

Results

Educational programs provide research-based information on native plants suitable for sustainable landscaping and noxious weed management that has enabled residents to make informed choices. Their choices can result in cost savings from reduced inputs such as water and maintenance and a positive impact on the environment through control of alien invasives that threaten native plant communities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
136	Conservation of Biological Diversity

Outcome #11

1. Outcome Measures

Systems for measuring and managing consumptive water use

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Growers need an irrigation water management tool that utilizes localized crop ET estimates, weather, and soil information for efficient use of irrigation water. In the Arkansas Valley, such information is necessary for resolving the Colorado/Kansas water dispute.

What has been done
An irrigation-scheduling spreadsheet (Excel) tool has been developed. Two versions of the tool are available: one for annual crops and another for hay crops (e.g., alfalfa hay). Daily crop consumptive water use is estimated from reference crop evapotranspiration (ET) calculated by CoAgMet and adjusted with a daily crop coefficient for the specific crop. The hay crop version incorporates alfalfa hay crop coefficients developed from the lysimeter studies at Rocky Ford, CO. Hourly and daily consumptive water use of alfalfa hay was collected using two weighing lysimeters at Rocky Ford, CO during the 2012 growing season.

Results
Information on the consumptive water use of alfalfa hay in the Arkansas River Valley of southeast Colorado was presented to approximately 120 water professionals (water managers, irrigators, water lawyers) in Colorado. Also, a newly-developed irrigation scheduling spreadsheet tool gives users that have Internet access the capability of tracking the daily soil water balance of individual irrigated fields calculated from evapotranspiration and rainfall data from the Colorado Agricultural Meteorological Network (CoAgMet) and field-specific soils information from USDA-NRCS Web Soil Survey. The irrigation scheduling tool was delivered to Colorado NRCS for use at their field offices in Colorado.

4. Associated Knowledge Areas

KA Code	Knowledge Area

102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
132	Weather and Climate

Outcome #12

1. Outcome Measures

Control of invasive species

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The non-native invasive shrub, tamarisk, (Tamarix sp.) is one of the most significant threats to aquatic and riparian ecosystems in the arid western U.S. This non-native tree has the potential to crowd out native vegetation and modify river flow patterns and habitat quality for native species. In Colorado, resource managers are particularly concerned with potential impact of tamarisk on endangered fish species in the Colorado River basin and with the impact of this noxious weed on native plant species and wildlife.

What has been done
We have been examining the impact of a biological control agent of Tamarisk, Diorhabda carinulata. This research has demonstrated: A) When established, repeated defoliation of tamarisk by the biological control agent results in smaller tamarisk trees, reduced flowering and seed set, and in some cases tree death. B) Extensive defoliation of tamarisk by the biological control agent does not reduce the abundance or richness of other arthropods occupying tamarisk. C) Tamarisk collected from northern portions of the weed's US range are less resistant to D. carinulata feeding but are more tolerant of defoliation by either the beetle or a defoliating herbicide.

Results
The results of this research will be used by resource managers to develop better management practices for this invasive weed. Biological control is having a substantial impact on tamarisk over most populations of tamarisk in Colorado, and should have a relatively greater impact on tamarisk

performance in more northern populations than in more southern populations. Similarly, mechanical or chemical defoliation will have a greater impact on northern tamarisk populations than southern populations. Contrary to expectations, high populations of the biological control agent and associated tamarisk defoliation do not result in a reduction in the abundance of other tamarisk inhabiting arthropods.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
121	Management of Range Resources
205	Plant Management Systems
216	Integrated Pest Management Systems

Outcome #13

1. Outcome Measures

Adoption of cropping systems to improve crop water productivity

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Information and models are needed by growers for water limited agroecosystems and sustainable management of both dryland and limited-irrigation cropping systems in eastern Colorado. Field research and models are used to develop cropping systems that improve crop water productivity. The limited irrigation research has been used to identify profitable cropping systems with reduced consumptive water use of 20-50%. However, adoption of these systems depends on the acceptance by state government of approaches to verify crop water use.

What has been done
We tested three approaches: crop stress coefficients (Ks), crop water stress index (CWSI), and a model for remote sensing of evapotranspiration (RESET) using corn under multiple irrigation strategies as the model crop. ET calculated using the Ks approach tracks closely with actual ET with acceptable level of error. CWSI is based on the measurement and use of crop canopy

temperature. Crop canopy temperature is higher when a crop in under water stress and CWSI indexes the canopy temperature relative theoretical weather based limits and can be used to calculate ET. CWSI based on weekly measurements clearly identified degrees of water stress and appears to be a valid approach for ET determination.

Results

Intensive dryland cropping systems build soil organic carbon, improve soil quality, and improve both air and surface water quality because they provide high amounts of year around cover. These benefits have been realized for about 1,500,000 acres in CO that have been converted from wheat-fallow to wheat-summer crop-fallow. This conversion increased net return by $22,275,000 per year under normal precipitation conditions. Limited irrigation cropping systems based on conservation tillage practices demonstrated in this project build soil organic carbon, improve soil quality, and improve both air and surface water quality because they provide high amounts of year around cover. These benefits have the potential to affect as much as 2,000,000 acres in CO.

4. Associated Knowledge Areas

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

Colorado's on-line planning and reporting system does not give data in percentages; therefore, we are not reporting on outcomes that were written in percentages.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Colorado Master Gardener, Farmers' Market, and Native Plant Education programs collect substantial data on outputs.

Key Items of Evaluation

NATIVE PLANT EDUCATION: Thousands of Coloradans are annually educated by a few hundred Native Plant Master (NPM) volunteers. The team annually measures this impact

through a survey asking program participants to report on sustainable landscaping and weed mitigation projects they complete. In 2012, NPM participants from across the state reported a combined savings of $20,662 from reduced landscape inputs such as water, pruning and pest control as a result of planting native species on more than 150,000 acres of public and private land. NPM participants also reported a combined $136,736 in savings from improved grazing, crop output, ornamental landscapes, wildlife and tourism--resulting from weed control of invasive non-native plants--on more than 280,000 acres of public and private land. These figures indicate that CSU Extension has found a cost-effective way to increase the sustainability of Colorado's public and private landscapes while reducing invasive weeds.

WATER: Water quality samples were done in one county (Huerfano) and were of a very sophisticated nature, as the sampling was being done as a "baseline" for potential hydraulic fracturing activities in the area. Water specialists also trained participants to perform the sampling. The "Well-Educated" program at CSU has online resources devoted to this as (http://waterquality.colostate.edu/.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Community Resource Development

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
602	Business Management, Finance, and Taxation	5%		0%	
603	Market Economics	2%		50%	
604	Marketing and Distribution Practices	5%		0%	
607	Consumer Economics	5%		0%	
608	Community Resource Planning and Development	63%		25%	
610	Domestic Policy Analysis	5%		0%	
704	Nutrition and Hunger in the Population	10%		0%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	5%		25%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	5.0	0.0	6.0	0.0
Actual Paid Professional	6.0	0.0	8.0	0.0
Actual Volunteer	1.4	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**
123721	0	695356	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
123721	0	695356	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
287997	0	2337859	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

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	25646	1863338	333762	111

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

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	1	40	41

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of training opportunities for community members

Year	Actual
2012	658

Output #2

Output Measure

- Amount of grant dollars garnered to support community development research and outreach.

Year	Actual
2012	2202589

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
2012	364

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
  Not reporting on this Output for this Annual Report

Output #7

Output Measure

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

Year	Actual
2012	0

Output #8

Output Measure

- Community coalitions, collaborations, alliances, etc. formed to address a specific issue (CD + 4-H, CE, FSYS, ABM, FES, FSAFE, WOCS, and NH).

Year	Actual
2012	544

Output #9

Output Measure

- Community meetings convened, including advisory groups, councils, coalition meetings, boards, etc. (CD + NH, PM, SAM, 4-H, CE, FSYS, ABM, LR, WOCS, FES, FSAFE, and WR).

Year	Actual
2012	31263

Output #10

Output Measure

- Community meetings facilitated, including focus groups, citizen forum, round table dialogue, strategic planning process, etc. (CD + 4-H, FSYS, ABM, LR, FES, WR).

Year	Actual
2012	31263

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	Economic Development: Communities create, retain, and expand sustainable economic opportunities to contribute to community health and vitality
11	Participatory Community Processes: Community members take shared responsibility for the health and vitality of their community.
12	Leadership Development: Communities have skilled leadership and an engaged public, representative of the diversity of the community, building the health and vitality of their community. (Condition)
13	Organizational Development: Non-profit and community organizations' efforts supported and contributed to overall health and vitality of the community.

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.

Not Reporting on this Outcome Measure

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.

Not Reporting on this Outcome Measure

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.

Not Reporting on this Outcome Measure

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.

Not Reporting on this Outcome Measure

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
2012	6

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Community groups may be on-going but not fully functional, and/or community groups may coalesce around a natural disaster such as fire or flood.

What has been done
Natural Resources example: Denver Seeds Task Force Meetings were facilitated for the Mayor's office to restore order and align their strategy. The group met every three weeks throughout the year and Extension personnel facilitated all of the meetings for them. Feedback from the group was excellent and the reputation of the University throughout the City of Denver increased as a result of this effort.

Results
The Extension Emergency Response Panel was facilitated on campus during annual Extension Forum. We highlighted six counties that responded to emergencies this year. Feedback on the facilitation methods was very positive. The Community Development Work Team provided this session as a demonstration of the value we can add to community meetings.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #10

1. Outcome Measures

Economic Development: Communities create, retain, and expand sustainable economic opportunities to contribute to community health and vitality

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1543

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Communities create, retain, and expand sustainable economic opportunities to contribute to community health and vitality.

What has been done

Needs assessments, planning and action facilitated by Extension personnel.

Results
762 participants report their communities assessed community needs, assets and available resources; 359 Community members engaged in community and economic development, planning and action; 77 participants networked and partnered with others in community and economic development, planning and action; 207 participants reported their communities developed plans targeting specific interests, actions and community resources towards maintaining and growing economic base; 50 Businesses increased links to markets.

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
608	Community Resource Planning and Development

Outcome #11

1. Outcome Measures

Participatory Community Processes: Community members take shared responsibility for the health and vitality of their community.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1765

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Community engagement is essential in shaping the future of our great State of Colorado. As our state continues to grow, we shall be faced with important topics that will affect us all. The biggest issues we have been focusing on our: The State of Education, The State of Health, The State of Transportation, The State Budget and Colorado's Workforce.

What has been done
In the last two months, I have participated in TBD Colorado. These meetings have allowed me to become more educated and engaged with issues in our state and region of Colorado.

TBD stands for To Be Determined. As stated on the www.tbdcolorado.org website,TBD Colorado

is a nonpartisan, collaborative effort designed to create informed and constructive conversations among Coloradans about some of the biggest issues facing the state. TBD Colorado will begin hosting community meetings throughout Colorado in April and May. Several public summits will be held in June. No state dollars will be spent on TBD Colorado.

As you can imagine, these topics bring up strong opinions and voices of concern. As our state lawmakers look to address these issues through policy decisions, TBD Colorado offers citizens a forum to proactively give input on what will effectively be determined for our future.

As an active member of Colorado State University Extension's Community Development work team, TBD Colorado is a great example of how investing in these initiatives can move Colorado communities toward a shared vision for their future. For more information, please check out the TBD Colorado website for updated information on regional meetings and progress of the initiative.

Results
478 Community members actively influence the development of their communities through engagement in participatory community processes. (public issue deliberation, decision-making processes, action planning and evaluation); 185 Community members reported increased skill level to effectively participate in participatory community processes; 532 Community members reported increased connections with other community residents and organizations;300 Participants reported community plans were developed using participatory community processes; 18 Community plans were implemented following participatory community processes; 96 Community members were actively involved in the development of public policy to effect positive change for a healthy and vital community; 93 Community members participated in community decision making processes shaping natural and built environments; 63 Communities promoted diverse, healthy, and sustainable environments through community design and plans.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #12

1. Outcome Measures

Leadership Development: Communities have skilled leadership and an engaged public, representative of the diversity of the community, building the health and vitality of their community. (Condition)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	318

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The voices of families in decisions impacting their health and wellbeing are crucial to the development of effective systems and policies.

What has been done
The Family Leadership Training Institute (FLTI) serves as a catalyst to engage family voices. FLTI provides a training program that equips parents, caregivers, and community members with the tools to engage in shaping public policy and empowers them to work within systems to ensure positive outcomes for children and youth in health, safety, and education. Participants develop their skills in defining community needs, understanding child data, defining problems, forming coalitions, designing solutions, and evaluating programs. FLTI participants use the skills gained to develop their own community project based on their passion to initiate a positive change for children/youth.

Results
287 Community members reported increased connection to, and relationship with, local and state government; 31 Community members (these through FLTI)reported taking a new leadership role (first or progressive).

4. Associated Knowledge Areas

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

Outcome #13

1. Outcome Measures

Organizational Development: Non-profit and community organizations' efforts supported and contributed to overall health and vitality of the community.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	178

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Needs assessment for County Public Health. We have been going through the process of what the gaps are in the community, where can we get the most bang for our bucks, and where should the focus be for the next five years.

What has been done
Extension has been a key player in this community development process and we will be able to help fill the gaps in several key areas such as Radon in the community, healthy youth and outdoor activities, and gardening and produce education for the community.

Results
19 Organization members reported increased knowledge and/or understanding of effective organizational development and management; 33 Non-profits and community organizations increased partnerships and connections; 52 Non-profits and community organization increased number of volunteers involved in organization activities; 72 Volunteer community members reported they increase the effectiveness of Extension and other community programs; 20 Volunteer community members reported they increased the social, emotional, and learning skills in the audience with which they work.

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.)
- Other (new planning and reporting system)

Brief Explanation

Colorado's on-line planning and reporting system does not furnish data in percentages. Therefore, all previously planned%-age outcomes are not reported. Some action outcomes are collapsed as strategies are the same for intent to change and adopted methods.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Outputs are more easily compiled than outcomes for Community Development.

Key Items of Evaluation

CSU Extension considers Community Development to be integral in all content areas.

New research projects were initiated, peer reviewed, submitted to NIFA and approved. No results have resulted although research is underway.

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Sustainable Energy

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	100%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	3.0	0.0	0.0	0.0
Actual Paid Professional	5.7	0.0	0.0	0.0
Actual Volunteer	0.4	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**
53023	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
53023	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
123427	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Programming from the Clean Energy Work 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. Focus areas include Ag Energy, Consumer Energy, and Colorado Energy Masters.

2. Brief description of the target audience

Colorado individuals, families and communities interested in clean energy.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	7317	39040	1530	60

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

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	9	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

Year	Actual

2012	33

Output #2

Output Measure

- Amount of grant dollars generated to support clean energy

Year	Actual
2012	255002

Output #3

Output Measure

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

Year	Actual
2012	9

Output #4

Output Measure

- Number of volunteers supporting clean energy

Year	Actual
2012	9

Output #5

Output Measure

- Number of partnering agencies/organizations around clean energy
  Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of Extension Agents trained
  Not reporting on this Output for this Annual Report

Output #7

Output Measure

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

Year	Actual
2012	4

Output #8

Output Measure

- Number of curricula developed and/or disseminated for both formal and informal education. Not reporting on this Output for this Annual Report

Output #9

Output Measure

- Press/News Releases or columns submitted.

Year	Actual
2012	73

Output #10

Output Measure

- Hits to Websites (7)

Year	Actual
2012	72120

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 analyze options for cost-effective energy conservation, efficiency, and/or renewable energy measures.

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.)

   Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

   Participants analyze options for cost-effective energy conservation, efficiency, and/or renewable energy measures.

2. **Associated Institution Types**

   - 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	269

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
1. The importance of expanding education and research efforts in agricultural energy is validated in that the Association of Public and Land Grant Universities (APLU) identified "creat[ing] pathways to energy independence" as one of seven Strategic Programming Opportunities for Extension at the national level for 2010 and beyond (http://www.aplu.org/NetCommunity/Document.Doc?id=2019).
2. Energy issues have gained prominence in recent years due to the economic crisis, climate change, the BP oil spill, and otherwise. In Colorado, one of the most aggressive renewable portfolio standards in the nation has been adopted as part of the state's move toward a New Energy Economy.

What has been done
Demonstrations, classes, group discussions, news releases, newsletters, one-on-one conversations, web sites, and use of social media.

Results
Annual savings estimated from investments in energy efficiency and/or renewable energy = $2547. In addition, capital invested in energy efficiency and/or renewable energy was reported at $25,697.

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.)
- Other (new planning & reporting system)

Brief Explanation

Colorado's on-line planning and reporting system does not furnish data in percentages. Therefore, all previously planned %-age outcomes are not reported.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Various quotes from DIY Energy Assessment workshop participants (6 statewide):

- The info you gave about solar, PV, & geothermal was enough for me to NOT invest in any of them because there is a 20 year break even.
- Though we have not implemented any of the cost-effective energy upgrades or taken advantage of any financial incentives, do note that they will be made and that plenty of very strong incentives will be put into those options to better conserve energy and money based off what the class has taught us.
- We wrapped all hot water pipes with the closed cell insulation under our house. We installed a cool roof. We brought up attic insulation to R 49+ and are doing the rest of the attic to R 49.
- Had an energy audit conducted at my Denver residence and am in the process of obtaining estimates for additional insulation. Will also replace lights with CFLs. Estimated annual savings of $325.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Childhood Obesity

☐ Reporting on this Program

Reason for not reporting

Programs are integrated into Health Promotion & Disease Prevention Planned Program.

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	5.0	0.0	0.0	0.0
Actual Paid Professional	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	1890 Matching	1862 Matching	1890 Matching
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	1890 All Other	1862 All Other	1890 All Other
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

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?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2012	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: 2012

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	5	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
2012	0

Output #2

Output Measure

- Number of participants in workshops

Year	Actual
2012	0

Output #3

Output Measure

- Number of volunteers engaged in this work

Year	Actual
2012	0

Output #4

Output Measure

- Number of external grant dollars generated for this work

Year	Actual
2012	0

Output #5

Output Measure

- Number of agencies partnering in this work

Year	Actual
2012	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.

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
{No Data}	null

Outcome #2

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Public Policy changes
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 10

1. Name of the Planned Program

Health Promotion and Disease Prevention

☑ Reporting on this Program

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: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	12.0	0.0	0.0	0.0
Actual Paid Professional	41.1	0.0	0.0	0.0
Actual Volunteer	5.3	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
724649	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
724649	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1686840	0	0	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
- 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

Coloradans

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	8703	1983697	27812	475

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

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	10	10	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
2012	9542

Output #2

Output Measure

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

Year	Actual
2012	1634

Output #3

Output Measure

- Grant funding (external) received to support this work
  Not reporting on this Output for this Annual Report

Output #4

Output Measure

- Number of individuals reached by newsletters distributed on Health Promotion and Disease Prevention
  Not reporting on this Output for this Annual Report

Output #5

Output Measure

- Number of volunteers engaged with these programs.
  Not reporting on this Output for this Annual Report

Output #6

Output Measure

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

Output #7

Output Measure

- User fees generated through these programs.
  Not reporting on this Output for this Annual Report

Output #8

Output Measure

- Press/News Releases and/or Columns submitted

Year	Actual
2012	167

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	Coloradans report eating more of healthy foods, or intending to eat more of healthy foods.
4	Coloradans report eating, or an intention to eat less of foods/food components which are commonly eaten in excess.
5	Coloradans demonstrate healthy physical activity levels.
6	Coloradans will decrease chronic disease risk through radon testing and mitigation.
7	Participants show behavior change according to national goals and objectives of EFNEP.
8	Participants show behavior change according to goals and objectives of SNAP-Ed in Colorado.

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

Coloradans report eating more of healthy foods, or intending to eat more of healthy foods.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	2009

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Coloradans will practice healthy eating.

What has been done
Promoting more healthy foods such as: vegetables, fruits, whole grains, fat-free or low-fat milk and milk products, seafood, lean meats and poultry, eggs, beans and peas, and nuts and seeds;

Results

506 participants reported they are eating more of healthy foods, and 1503 reported an intention to eat more of healthy foods.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #4

1. Outcome Measures

Coloradans report eating, or an intention to eat less of foods/food components which are commonly eaten in excess.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	177

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Coloradans practice healthy eating.

What has been done
Promoting less of foods/food components that are commonly eaten in excess such as: sodium, solid fats, added sugars, and refined grains;

Results
80 participants reported eating less and 97 reported an intention to eat less of foods/food components which are commonly eaten in excess.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #5

1. Outcome Measures

Coloradans demonstrate healthy physical activity levels.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	978

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Nutrition and Health Promotion 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. Adoption of healthful behaviors may reduce the incidence of chronic diseases, such as diabetes, heart disease, obesity and cancer, thus impacting health insurance premiums, mortality rates, and employee productivity.

What has been done
Promoting levels defined by national physical activity (PA) guidelines:
A) Children - 60 minutes or more of PA daily
B) Adults - 150 minutes of PA per week

Results
121 participants reported engaging in the recommended amount of physical activity; 684 participants reported increasing their physical activity and/or reducing sedentary time; 173 participants reported an intention to increase their physical activity and/or reduce sedentary time.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

Outcome #6

1. Outcome Measures

Coloradans will decrease chronic disease risk through radon testing and mitigation.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	261

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Radon levels greater than 4.0 pico curries per liter are currently reported in two of every three homes tested in Archuleta and La Plata counties. Inhalation of radon daughters can assault lung cells resulting in mutations and eventually lung cancer

What has been done
People attending classes, initiating test, and obtaining results. Mitigation information given.

Results
261 participants reported.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

Outcome #7

1. Outcome Measures

Participants show behavior change according to national goals and objectives of EFNEP.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1541

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Nutrition and Health Promotion 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. Adoption of healthful behaviors may reduce the incidence of chronic diseases, such as diabetes, heart disease, obesity and cancer, thus impacting health insurance premiums, mortality rates, and employee productivity.

What has been done
In FFY12, CO EFNEP graduated 871 participants. Of those graduates, 85% showed improvement in Food Resource Management, 92% showed improvement in nutrition practices, 67% showed improvement in Food Safety, and 51% showed improvement in physical activity.
CO EFNEP reached 732 youth. Of those youth:
20% of 143 youth from 7 groups now eat a variety of foods,
20% of 416 youth from 20 groups increased knowledge of the essentials of human nutrition,
14% of 162 youth from 8 groups increased their ability to select low-cost, nutritious foods, and
18% of 391 youth from 19 groups improved practices in food preparation and safety.

Results
Upon completion of the class, 801 participants reported improvement in one or more nutrition practices, and 740 participants showed improvement in one or more food resource management practices.
After the MyPlate presentation, parents of Head Start preschool children responded by stating...
What is one tip that you will commit to changing in the next 2 months:
1.Change to 1% milk.
2.Change milk and include more vegetables at each meal.
3.Change milk to skim.
4.Eating more vegetables.

5.Eating fruit and no more sodas.
6.No more sodas; Eating more fruits and vegetables.
7.Stop drinking sodas and other sweetened beverages.
8.Drink water instead of sugary drinks.
9.Eat less Pizza.
10.Drink water instead of sugary drinks!
11.Reduce dressing with my meals and condiments also.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #8

1. Outcome Measures

Participants show behavior change according to goals and objectives of SNAP-Ed in Colorado.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	613

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Nutrition and Health Promotion 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. Adoption of healthful behaviors may reduce the incidence of chronic diseases, such as diabetes, heart disease, obesity and cancer, thus impacting health insurance premiums, mortality rates, and employee productivity.

What has been done
In FFY12, CO SNAP-Ed graduated 337 participants. Of those graduates, 90% showed improvement in Food Resource Management, 92% showed improvement in Nutrition, 70% showed improvement in Food Safety, and 56% showed improvement physical activity.

Results
Upon completion of the classes, 310 participants reported improvement in one or more nutrition practices, and 303 participants showed improvement in one or more food resource management

practices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

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 (new planning and reporting system)

Brief Explanation

Colorado's on-line planning and reporting system does not furnish data in percentages. Therefore, all previously planned %-age outcomes are not reported.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

In addition to national goals and objectives for EFNEP and SNAP-Ed, this Work Team evaluates participants' increase in knowledge and change is behavior. Eating more of healthy foods and less of foods or food components which are commonly eaten in excess are considered, as well as healthy eating patterns. Physical activity and knowledge of risk factors associated with chronic disease are also measured.

Key Items of Evaluation