


Colorado State University

Extension

Annual Report 2010





August 1, 2011

Almost a century ago, in the San Luis Valley, an innovative idea—born of need and hope—took root in Colorado. The need was to improve very low farm income; the hope was to do so by applying new farming techniques that would increase wealth. A local connection to a university teeming with knowledge and talent but with few means to disseminate this knowledge to local and regional entrepreneurs was a missing institutional ingredient. If a primary source of productive new ideas was the agricultural college in Fort Collins, then a local representative of that college would be a community investment in family farms and in the valley's many communities. This was the moment that CSU Extension was given life as a state and local investment in Colorado's rural and metropolitan communities. In 1912 when the first CSU Extension office was established similar higher education experiments were occurring across the nation. In 1914 Congress passed the Smith-Lever Act that connected the United States Department of Agriculture to the outreach capacity of the land grant universities and the national Extension service was established.

Today, the principles are the same. Knowledge is a primary tool in community and economic development. While Extension services are now present in many societies around the world, we are unique product of America's economy, culture and political democracy.

A year ago CSU Extension renewed the importance of grounding our organizational culture and structure in our historic mission: critical presence in Colorado's communities and regions. The severe budget cuts since 2008 have forced local governments to objectively and politically assess the reallocation of dwindling local revenue. Extension's once secure position in county budgets was at risk. Programs that were loved but that did not directly contribute to lessening the economic crisis or foster job creation were pared away.

In order to substantively reestablish Extension's local relevance we flipped our organizational structure to place renewed emphasis on the relevance of our local and regional relationships. This flip is a rededication of the critical importance of our county and area agents' engagement with Colorado's rural communities and metropolitan villages. This reorganization requires greater nimbleness across a broad range of expertise and programs. We are reinvesting in CSU's capacity to facilitate community and economic development. A new planning and reporting system is under construction which will give emphasis to locally identified priorities supported by university and USDA talent and knowledge.

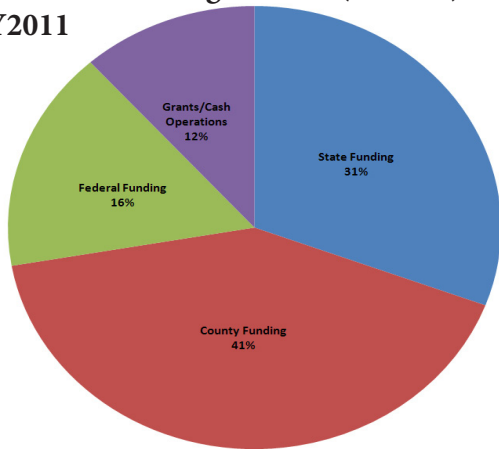
The program and funding challenges exposed by the recession are providing CSU Extension an opportunity to rededicate our energies to local and regional issues and demands. It is still too early to know if this reinvestment in communities and in our agents are the best solutions for our immediate economic realities, but we do know that our historic principles continue to be guides for our 21st century challenges. CSU Extension is blessed with great talent throughout the state and on campus. Our people and their partnerships with our communities continue to be our greatest asset.

Please take a few minutes to read about the work being done by Extension agents, specialists and support staff throughout the state. I welcome your comments and suggestions for our future work.

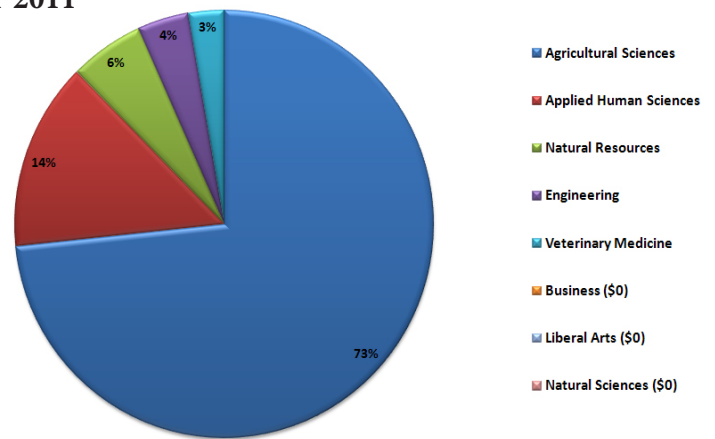
Lou Swanson
Vice President for Engagement
Director of Extension

Facts and Figures

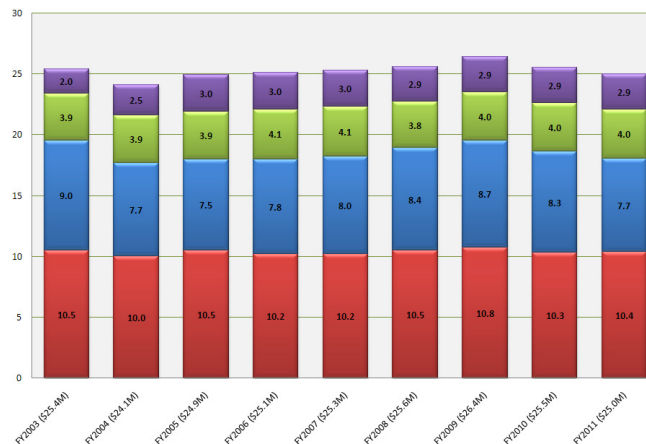
**Extension Funding Sources (\$25.0M)
FY2011**



**CSU Extension Campus Allocations by College
FY 2011**



**Extension's
Historical
Budget**



Volunteers

Certified Master Gardeners

- 1,540 CMG volunteers
- 55,230 volunteer hours contributed
- \$1,151,000 value of volunteer time
- 113,120 one-to-one contacts reported

Master Food Safety Advisors

- 34 MFSA volunteers
- 1,382 volunteer hours contributed
- \$27,948 value of volunteer time

Native Plant Masters

- 460 NPM volunteers
- 58,624 volunteer hours contributed
- \$1,187,136 value of volunteer time

4-H Youth Development

- 6,151 volunteer leaders
- 787,328 estimated hours contributed
- \$15,943,392 estimated value of volunteer time

Colorado State University Extension

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Impact

Sharing the difference CSU Extension makes in people's lives and their communities.

Study of Colorado 4-H Alumni Demonstrates the Importance of 4-H

A significant finding of this study suggests that participation in the 4-H program was the second greatest influence on the lives of the young people involved in it—second only to family influences.

Issue

The benefits of the 4-H program in Colorado have historically been communicated through anecdotal evidence and personal success stories. This type of information typically reflected the quality of the programs through the feelings of those familiar with 4-H, but did not demonstrate the public value of 4-H in quantifiable measures.

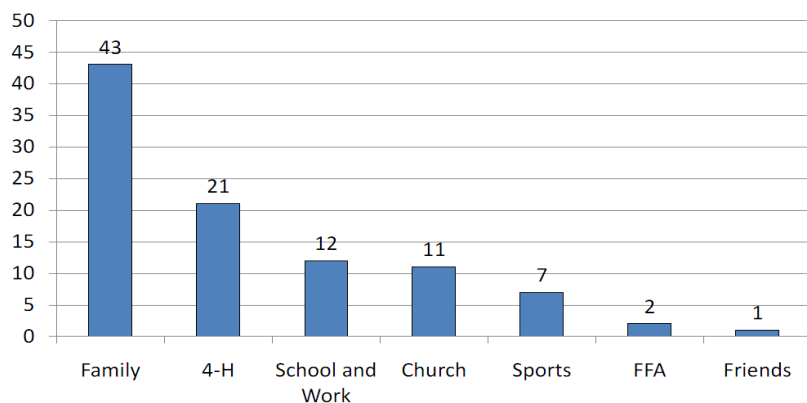
Extension's Response

In the Fall of 2008, data were collected in 35 randomly selected counties. A total of 1,750 questionnaires were distributed to Colorado 4-H alumni and non-4-H alumni. Two hundred and eighty-three Colorado 4-H alumni and 55 non-4-H alumni participated in this survey. Participants were asked to indicate the highest educational level completed.

Colorado State University graduate student Marcella Talamante completed a study in the spring of 2009 to explore and measure the impact of the Colorado 4-H Youth Development Program as perceived by Colorado 4-H alumni. The population of interest for this study was Colorado 4-H alumni (ages 25-45) who were enrolled in the Colorado 4-H Youth Development Program for a minimum of one year between 1973 and 1993.

Impact

Area of Influence Mean Score (%)



Colorado State University Extension, U.S. Department of Agriculture and Colorado counties cooperating.
Extension programs are available to all without discrimination. August 2010.

"I was encouraged to grow and improve in all my endeavors and was taught the importance of using my abilities to help others. 4-H was a big part of my formative years, and I will always be grateful for the opportunity to be part of such a great organization."

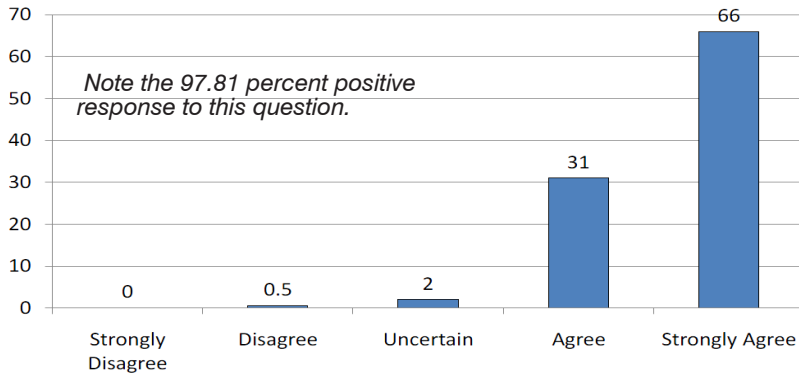
– Bazi Kanani

NBC 9News Anchor,
Denver

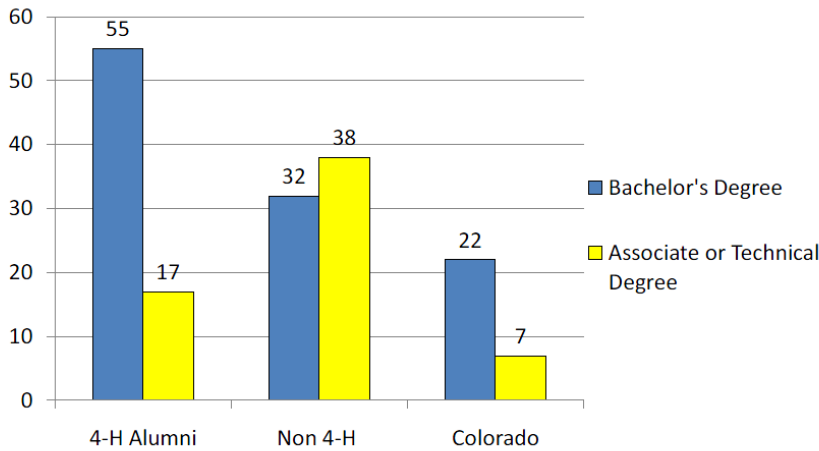
The Bottom Line

As shown on the chart (left), family had the highest mean score of 43 percent, followed by 4-H with a mean of 21 percent. School and work (12 percent) and church (11 percent) followed as did sports (7 percent), FFA (2 percent), and friends (1 percent). This is a significant finding of this study. It suggests that participation in the 4-H program was the second greatest influence on the lives of the young people involved in it—more than school, work, church, sports, or friends.

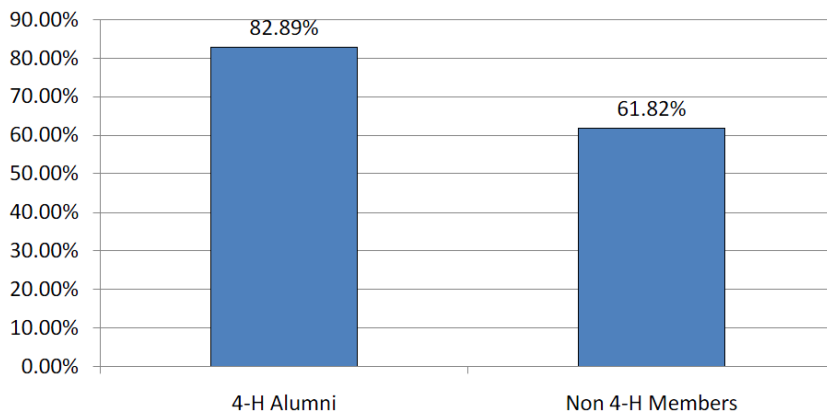
Knowledge and skills gained through 4-H have benefited me as an adult (%)



Highest Educational Attainment (%)



4-H Alumni volunteer more than non-4-H members



4-H is a community of young people across Colorado learning leadership, citizenship, and life skills. One hundred years of research-based programs and experience bear significant results. Research shows that youth involved in 4-H are more likely to develop the "five C's" (competence, confidence, character, caring and connection). Through participation in 4-H programs, youth are more likely to be at the highest level of contribution in their communities.

4-H Compared to Other Influences

4-H alumni were asked to indicate the relative impact they believed 4-H had on their life as compared to influences from family, school, church, friends, and participation in other youth organizations.

Overall Impact of 4-H

Participants who were 4-H alumni were asked to indicate the extent to which they agreed or disagreed with the following statement: "Knowledge and skills gained through 4-H has benefited me as an adult." Data drawn from the questionnaire to reflect the answer to this question is represented in the first graph to the left.

Educational Attainment

All 4-H respondents reported completing high school while a majority (55.7 percent) of 4-H respondents reported completing a bachelor's degree followed by 17 percent who had received an associate's or technical degree. Comparatively, 38.2 percent of non-4-H respondents completed an associate's or technical degree followed by 32.7 percent who had completed a bachelor's degree. The data for the state of Colorado for the same age group is also compared in the following second graph to the left.

Effect of 4-H Membership on Volunteering

Assessment of continuing civic engagement by 4-H alumni is a long-term impact of the program. Participants were asked if they are or have in the past volunteered for a youth-serving organization.

Nearly 62 percent of non-4-H responses reported being involved in volunteering activities while 82.9 percent of 4-H respondents are or have volunteered for youth-serving organizations. (left)

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Sharing the difference CSU Extension makes in people's lives and their communities.

Fueling the farm with homegrown diesel

By partnering with Extension, a start-up biofuel company found needed resources to successfully create a new model for on-farm biofuel production.

Situation

In 2008, the rising cost of diesel motivated three Southeast Colorado farmers to build a biofuel processing facility. Hal Holder, Joel Lundquist and Rick Young located their start-up operation, called The Big Squeeze, at an animal feed yard. The facility crushes oilseed into straight vegetable oil (SVO). It also produces high protein meal, a by-product of the crushing process, that can be fed to cattle on site. The Big Squeeze partners wanted to replicate their model at other feed lots. But first, they needed to fix equipment problems that limited production and test biofuel quality.

Extension's Response

Perry Cabot met The Big Squeeze operators in 2009 at the Arkansas Valley Farm/Ranch/Water Symposium and Trade Show in Rocky Ford. Cabot is a water resources specialist with Colorado State University Extension and the Colorado Water Institute. He was interested in developing winter canola, an oilseed, as a viable limited irrigation crop for Lower Arkansas Valley farmers. According to Cabot, oilseed could potentially increase local farm (see sidebar). The Big Squeeze was a critical link.

Cabot acquired more than \$56,000 in state renewable energy grants to help farmer-owners Hal Holder, Joel Lundquist and Rick Young construct needed equipment, improve SVO output rate, and test biofuel quality. The Big Squeeze farmer-owners blend the SVO with regular unleaded gas (RUG) at a ratio of three parts SVO to one part RUG. The novel fuel mixture, which they call biofuel-diesel, runs their trucks and farm equipment.¹

In particular, grants from the Colorado Department of Agriculture's Advancing Colorado Renewable Energy (ACRE) Program helped The Big Squeeze owners overhaul its filtration process, which removes particulate matter and a dark goeey sludge from the oil. Then, they fabricated a 'screw press' in nearby La Junta to refine SVO once it leaves the initial crushing press. Lastly, they purchased a high-speed centrifuge manufactured by an Italian company (Servizi Industriali) to super-clean the oil.

Secondly, Cabot connected The Big Squeeze to CSU's Engines and Energy Conversion Lab (EECL) through additional funding from the ACRE Program. The lab is conducting horsepower, engine efficiency and emissions tests on The Big Squeeze biofuel-diesel. The lab will begin an expanded battery of engine durability testing in 2011.



The Bottom Line

- Extension helped The Big Squeeze create a viable model for local biofuel-diesel production that can be replicated at similar scales.
- This model has the potential to help farmers diversify their crops, save money, and develop a new rural economy.

By the Numbers

- Total grant dollars generated by Extension: More than \$56,000
- Amount of biofuel-diesel produced by The Big Squeeze in 2010: 8,000 gallons
- Estimated amount of SVO capable of being produced in the Lower Arkansas Valley: 50-100 gallons per acre

Results

The first round of biofuel-diesel tests on a common rail engine show a 10 percent reduction in power, compared to commercial grade diesel, at maximum load. Results also show comparable emissions. According to Holder, farmers who use the blend find it a perfectly suitable alternative to diesel since they don't regularly operate machinery at maximum loads. "We have not had a single complaint of any kind. In fact, quite the opposite," Holder says. He reports getting 21 to 22 miles per gallon with his biofuel-diesel compared to 17 miles per gallon with commercial grade diesel.

With an improved production system, the operation is capable of pressing oilseed up to 24 hours a day, five days a week. Its current maximum output capacity is from 500 to 1,000 gallons per day. Since 2009, The Big Squeeze has operated as a co-op. Farmers pay \$50 per ton to have their oilseed crushed into SVO, which they can use however they choose.

Extension, through Cabot, will continue advancing SVO production by evaluating the economics of the whole farm system. The Big Squeeze partners hope to replicate their production model at other feedlots in Colorado and beyond, and expand their flagship co-op concept. "We know enough now that we can size one of these to fit the needs of any feed lot," Holder says.

The Big Squeeze model of locally producing SVO at or near a feed yard offers several economic benefits. First, improved gas mileage could lower on-farm expenses. Second, revenues from the sale of meal to the feed yard offset the per-ton fee to crush seed into oil. Third, the potential to grow canola as a dryland or limited water use crop could increase farm revenues (see sidebar). Future enterprise budgets will quantify the gains farmers can realize by growing oilseed and making biofuel rather than purchasing commercial grade diesel.

In the meantime, Cabot will continue to work with The Big Squeeze by developing decision-making tools that evaluate oilseed crop production on a per-acre and per-farm basis. In the Lower Arkansas River Valley, Extension will continue testing the potential of emerging varieties of oilseed such as camelina, as well as conducting dryland and irrigated winter canola variety trials.²

¹ Biofuel-diesel is not biodiesel. Biodiesel is made through a chemical process whereby glycerin is separated from SVO and becomes a byproduct. More specifically, biodiesel is the fuel detailed under the ASTM D6751 set of standards and specifications.

² CSU Extension conducts winter canola varieties trials around the state as part of a national variety trial program.

On the horizon: Canola

With the recent formation of the Super Ditch Company, farmers along the Arkansas River in Southeast Colorado will begin leasing their water to Front Range cities as early as 2014. The Super Ditch is the first of its kind in Colorado and offers an important alternative to 'buy and dry' agriculture, a practice that permanently fallows land and has contributed to economic decline in some rural Colorado communities. Under lease arrangements, farmers retain their water rights and agree to fallow a percentage of their land each year. However, non-irrigated land can still produce dryland crops. Extension, through Cabot and the Arkansas River Valley Experiment Station, will continue testing canola's potential as a dryland crop for at least two more years. With the availability of a local processing facility, as offered by The Big Squeeze, farmers can grow canola and turn its seed into fuel. As a result, the potential exists for farmers to receive revenue from two crops instead of one—water and canola—and fuel their farms with 'homegrown' biofuel-diesel.

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Success Stories

Colorado State University
Extension
Douglas County

Sharing the difference CSU Extension makes in people's lives and their communities.

Enhancing school science with 4-H baby chick embryology

Extension helps teachers deliver life science lessons through a meaningful hands-on classroom project.

Situation

Between assessment demands and budget cuts, elementary school teachers are limited in generating the kind of science-based learning their students would remember and enjoy. School enrichment opportunities, such as field trips to museums and natural areas, can be expensive and don't always correlate to curriculum standards. Instead, hands-on science projects based in the classroom offer a meaningful way to enhance and reinforce student learning.

Extension's Response

According to the National Assessment of Educational Progress, only 18 percent of U.S. high school seniors are proficient in science and less than 10 percent of college graduates earn degrees in science, technology or engineering. In response, 4-H seeks to engage one million new youth in science programs by 2013. 4-H school enrichment programs such as baby chick embryology, which teaches the life cycle and life science, have the potential to help meet this goal.

Since 2006, Colorado State University Extension in Douglas County has offered one of the state's most robust 4-H school enrichment opportunities through its embryology outreach program. In 2010, Mary Baldwin, Douglas County Extension 4-H youth and outreach agent, provided approximately 1,000 students in 46 classrooms across the county with 4-H baby chick embryology outreach.

The cost to participate in the four-week program is \$45 and includes two classroom visits, lesson plans, record keeping logs, incubator rental, 18 fertilized eggs, sawdust and feed for chicks. During the initial classroom visit, Baldwin introduces the project intended to raise awareness about the role of agriculture and farming in everyone's daily lives. She returns two weeks later to 'candle' the eggs by holding a bright light up to each egg so students can check embryo growth and development and witness possible movement. Chicks hatch after three weeks of incubation and are returned to the farm they came from, although students occasionally adopt chicks for 4-H projects.

To gauge program effectiveness, Baldwin issues an electronic survey to all teachers at the end of each school year (most projects take place during the spring months although a handful occurs in fall). In 2010, 10 teachers, representing 360 students, responded to the survey. In particular, Baldwin wanted to know if:

- Students were demonstrating a positive attitude, were excited about learning or showed a positive change in behavior related to their participation
- Students increased their scientific knowledge because of the embryology project



The Bottom Line

Elementary students introduced to the life cycle through the 4-H baby chick embryology outreach program learn more than basic science information. Overall they:

- Become excited about science
- Gain knowledge of life science and are able to use scientific terminology

Many students:

- Become more responsible during the project
- Are immersed in their learning
- Learn respect and compassion

Contact Information

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Results

Based on teacher responses to Baldwin's survey of embryology outreach in Douglas County, students are increasing their scientific knowledge and gaining an appreciation for living things. According to Baldwin, some increases in scientific knowledge can be related to incubator data collection. Students work in teams to take daily records of incubator humidity and temperature. By talking through data with their teachers, they begin to understand how egg embryo development requires heat, moisture, and egg rotation. Some students also learn about engineering-related facts, such as egg shell strength and design.

Baldwin says these reported gains in scientific knowledge are also directly related to the hands-on learning environment. This response from the 2010 survey reinforces that connection:

"I expect that they'll retain the information much more than if we had covered it by using a text book or just talking about it. By doing it they learned a vast amount of information and they've already taught others about what they learned. This is indicative of a higher level of understanding, something that just wouldn't have happened without the hands-on piece."

The curriculum also encourages teachers to develop additional opportunities for learning technology, math and communication skills. For instance, one first grade teacher has every child in her classroom develop a PowerPoint presentation related to the project.

Beyond science and technology, embryology projects teach students how to cooperate as they develop citizenship and leadership skills. "Students have to work together to take care of the animals," says Baldwin. As another teacher reported in the 2010 survey, "We love the program because it fits perfectly into our school's curriculum and also allows students to show responsibility, compassion for animals and to be completely immersed in their own learning."

"All of the kids were excited to watch the process unfold. The topic surprisingly excited many kids and encouraged them to seek more knowledge around farming and farm animals. They were expected to be gentle and calm with the chicks. Caring for other living creatures presented a great opportunity for them to be responsible."

– From the 2010 survey

Public Hatch

Since 2009, Douglas County Extension has hosted an annual "public hatch." In the first year, 60 community members stopped by the Extension office to see candled eggs and to watch baby chicks hatch. In the second year, Extension agent Mary Baldwin created an expanded children's program that included take-home activities on the life cycle of the chicken. Attendance between these two years nearly doubled. Several first year attendees called the Extension office to find out if the 'public hatch' was being repeated. During both years, families made repeat trips to view the eggs and chicks.

The 'public hatch' not only educated youth and adults, it attracted many first time Extension visitors who learned about the diverse programming offered through CSU Extension. The 'public hatch' is moving to a new location in 2011. Please call Douglas County Extension for more information.

Impact

Sharing the difference CSU Extension makes in people's lives and their communities.

Changing lives through family success in Adams County

An innovative family and consumer science grant-funded program is changing lives for the better while becoming a national model for assessing unique populations.

Issue

The construction boom that hit Colorado's Front Range in the late 1990s and early 2000s brought a wave of immigrant laborers and families to Adams County. The influx of newcomers shifted the county's demographics from an older, agricultural population to one that is younger and more culturally diverse. CSU Extension wondered if its programs were meeting the needs of Adams County citizens so it polled residents in 2006. We learned that food safety, health and wellness, financial management, and family and youth development were top community concerns.

Extension's Response

In 2007, Adams County Extension designed a collection of Family and Consumer Science programs to help county residents overcome many of the financial, parenting and relationship obstacles that challenged their lives. *Family Success in Adams County* (FSAC) emerged as a breakthrough effort that the U.S. Department of Health and Human Services awarded with a five-year grant.

Family Success in Adams County features eight free programs that are offered as a series of classes:

- For financial management: *Spend Some, Share Some, Save Some* and *Dollarworks2*
- For parenting: *Make Parenting a Pleasure* and *It's My Child, Too*
- For communication and relationships: *RETHINK Anger Management*, *Within My/Our Reach*, and *LoveU2*

Family Success in Adams County seeks to prove that prevention and intervention can improve the course of family lives. To show this, the FSAC project team evaluates immediate and long-term program outcomes through in-depth surveys taken by participants before and after programs and again at six, 12, 18, and 24 months. Program and follow-up evaluation measures broad concepts (e.g., stress and psychological well-being) as well as program-specific knowledge and skills (e.g., financial planning and management).



The Bottom Line

- FSAC fills a critical education gap by delivering life-changing programs in financial management, parenting and relationships.
- No other entity in Adams County has the resources and expertise to deliver programs of this nature to adults.
- Adams County Extension has become a national leader in demonstrating how family and consumer science programs can change people's lives.

By the Numbers

- 95% of participants would refer the program to a friend
- 97% of participants say the FSAC program they took was appropriate and useful
- 99% of participants say the quality of the instructors' work was excellent

Impact

Preliminary data show that FSAC programming is helping participants make profound and successful personal change. They are learning to control spending, handle anger, and become better parents and partners. These outcomes are seen in both immediate (pre and post program) and long-term (follow-up at 6 and 12 months) evaluations. For instance, immediate program outcomes from *Spend Some, Share Some, Save Some* indicate that participants have increased their understanding of financial management concepts, including the role that choice plays in making financial decisions, how to develop strategies to save money, and how to protect personal information, by nearly 21 percent.

In addition to survey data, participant feedback tells how FSAC programs are making a difference and generating overwhelming satisfaction:

- “I have hope for my future, to make more positive changes toward starting a long-term career and for myself to support my girls in a healthy way.”
- “I have learned how to maintain lifestyles and finances so we never become homeless again no matter what happens things will be ok.”
- “I have learned how to be a better parent. Listening is going to help me in the future.”

2010 FSAC Report

The FSAC 2010 Semi-Annual Report is available by request. It highlights immediate and long-term outcomes and explains the different evaluation tools used to measure program success.

Contact Information

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Impact

Sharing the difference CSU Extension makes in people's lives and their communities.

Unique lease-a-goat program increases 4-H participation, changes lives

With its affordable and easy access to raising goats and sheep, Gunnison County Extension's Get Your Goat 4-H Club offers members a unique way to participate in livestock projects.

Issue

In 1996, Ann Bertschy moved to Gunnison to raise Cashmere goats. New to the enterprise, she quickly learned that goats are easier to handle when imprinted on humans. She also learned that baby goats enjoy playing with children. As a result, Bertschy wanted to find children who were interested in raising the goats. Fortunately, Bertschy's ranch is accessible by school bus and located just three-and-a-half miles outside of town. With the ranch, barn, pens, equipment, and goat herd, the ranch is ready-made for raising animals. Instinctively, she turned to Gunnison County Extension 4-H as a resource for recruiting youth who might be interested in the project.

Extension's Response

When Bertschy approached Gunnison County Extension, they immediately saw a unique opportunity to connect town-based 4-Hers to agriculture. Young people without the means to raise animals for 4-H livestock projects miss out on developing a unique set of skills that can carry them through life. As a result, Gunnison County 4-H collaborated with Bertschy to create an afterschool livestock breeding program that has evolved into the 4-H *Get Your Goat Club*.

Through the *Get Your Goat Club*, 4-Hers lease goats and sheep for \$1 a month.¹ Younger members mostly raise baby goats or sheep and show them at fair. More experienced members often take on more responsibility by breeding their leased goat or sheep and raising an entire family. To participate, 4-Hers, their parents and Bertschy all sign a lease agreement that outlines their collective roles and responsibilities. 4-Hers commit to six hours of monthly chores such as barn and warm room cleaning, imprinting, vaccinating, hoof trimming, feeding, halter breaking, kidding, weaning, combing fiber, and learning to properly show animals. The nominal monthly fee helps Bertschy cover the cost of feed, vaccinations and other animal care needs, and makes the program affordable to all families.

Gunnison County Extension worked closely with Bertschy to modify breeding project activities and curricula so they were more responsive to the unique needs of *Get Your Goat Club* members:

- Extension adjusted the livestock project record book to more accurately reflect club member inventory and expense needs. *Get Your Goat* 4-Hers don't incur the amount and kind of animal care expenses typical of most livestock projects.
- Extension developed a special workshop on ethical animal care which complements required Meat Quality Assurance trainings.



The Bottom Line

- By collaborating with goat rancher Ann Bertschy to create an affordable animal leasing program, Gunnison County Extension 4-H expanded participation in its livestock program.
- The *Get Your Goat* club gives youth with little to no farm or ranch experience the chance to raise and breed livestock for exhibition while building skills, such as decision making, record keeping, empathy and teamwork, for life.

Impact

The *Get Your Goat Club* has increased the number of young people exposed to agriculture in Gunnison County through its affordable and convenient livestock leasing program. For the past five years, between 50 to 60 members, ages eight to 18, have annually participated in the club.

Bertschy's commitment to her club members' success has helped 4-Hers develop important life skills such as compassion, respect for self and others, and responsible decision-making. Her passion for breeding goats and producing the highest quality fiber has also helped club members do well at fairs. In 2010, a young doeling placed reserve grand champion at the State Fair. Following this success, the State Fair judge made a surprise visit to the goat ranch a few days later because he was so impressed by club members' project efforts.

For some club members, the opportunity to raise and breed animals has helped develop leadership skills, academic focus and a professional goal. Holly Mask, a sophomore studying animal sciences at Colorado State University, joined the club when she was eight years old. She says she learned to raise goats from older female members who later inspired her to take on that same mentoring and leadership role. In doing so, she gained a new appreciation for her mentors and the need for patience when working with younger members. In her 10 years with the club, Mask ran a goat breeding project with her younger sister, expanded her interests to include wool judging, and decided to become a large animal veterinarian.

“Ann is going to push you out of the nest to make you do the things you need to grow. That’s a lot of what 4-H is about. You try these new things and get acquainted with them, and you can have all the help you need from adults, but you’re also going to do it yourself and you’re going to learn.”

-Holly Mask

Sophomore at CSU studying animal sciences and former Get Your Goat Club member

¹ In 2002, Bertschy added 4 bred Shetland ewes to her operation. She now has 8 rams and 26 ewes in her flock.

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Success Stories

Sharing the difference CSU Extension makes in people's lives and their communities.

4-H animal projects find a home

4-H programs around the state are giving young people who don't live on farms or ranches the chance to raise livestock at fairgrounds and other partner venues.

Situation

Youth who live in towns and cities seldom raise an animal as part of a 4-H market livestock project. They just don't have access to the barns, pens, and space that animals need. As a result, many middle and high school-aged youth cannot play out a talent or desire for raising livestock—whether goats, steer, sheep or swine. While they can participate in other meaningful 4-H projects, they miss out on raising an animal and developing a unique set of skills that can carry them through life. They also miss out on participating in one of 4-H's most respected and popular youth development program areas.

Extension's Response

For over a decade, CSU Extension 4-H agents around the state have helped town and city-dwelling 4-Hers raise animals at county fairgrounds, community 4-H barns, and nonprofit and private ranches. Agents have secured these opportunities by building partnerships with county government, local organizations and individuals. By 2010, at least 10 Colorado counties had established an alternate venue for youth to raise animals. Here are some examples of who is helping the youth carry out their project and what they're raising:

- Adams County: 4-Hers from neighborhoods throughout the Denver metropolitan area raise market goat, sheep and swine at The Urban Farm at Stapleton, a nonprofit agricultural center.
- Baca County: 4-Hers raise pigs, goats and steers at two small farms in Springfield and Vilas. The donated land and grant-funded barns and corrals are owned and operated by FFA.
- Douglas County: 4-Hers raise goats and sheep at the Lowell Ranch, a nonprofit agricultural education center run by the Colorado Agriculture Leadership Foundation.
- Eagle County: 4-Hers raise pigs, sheep, goats and poultry at the county fairgrounds in Eagle, or a 4-H barn located on county land near the town of Gypsum.
- Routt County: 4-Hers in Steamboat Springs raise sheep and goats at the Legacy Ranch, a city-owned property leased by Yampatika, an environmental education nonprofit agency.

4-Hers raising animals at alternative venues fulfill all 4-H market livestock requirements such as Meat Quality Assurance trainings, weigh-ins, and record keeping. Youth typically pay a small, refundable deposit to the partner venue and volunteer time to clean and maintain facilities.



The Bottom Line

- County government, nonprofits, and other 4-H partners are giving youth with little or no farm or ranch experience the chance to raise market livestock for county fairs and build valuable life skills.

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Results

These partner programs demonstrate community commitment to youth development and highlight the value of the 4-H market livestock project. As it becomes more cost-prohibitive for young families to farm and ranch, alternative venues help maintain the tradition of raising livestock by connecting youth to agriculture. They learn the demands and responsibilities of raising the animals—from attending to daily duties and maintaining animal health to record keeping and making ethical decisions.

As highlighted in University of Wisconsin Extension research, middle and high school students participating in 4-H livestock projects gain more knowledge, skills and behaviors that benefit them for a lifetime than compared to their non-4-H peers. ¹

“It’s been a really positive experience for my son to have the responsibility of taking care of his project every day at least twice a day, from picking his animals out at the beginning of the year all the way to seeing them out the door as they head off to market.”

– Ed Corriveau

Parent of Hayden Town Kids 4-Her

“Hard working, responsible kids may not be as common as they used to be, so I think it’s like a breath of fresh air to see kids working with their animals in a worthwhile endeavor. Just this morning, I drove down to the barn in Eagle and there were two boys (age 10 and 12) exercising their lambs. They had ridden their bikes from home. . . .it was cool to see!”

– Jenny Wood

Eagle County Extension 4-H Agent

Participating Counties

Adams County
Baca County
Chaffee County
Douglas County
Eagle County
Grand County
Gunnison County
Pueblo County
Rio Blanco County
Routt County

¹ UW Extension. “4-H animal projects develop strong character, ethics and life skills.” October, 2006. www.uwex.edu/impacts/search/documents/120.pdf.

Success Stories

Sharing the difference CSU Extension makes in people's lives and their communities.

CSU Extension-Head Start partnership reveals success for novices and experts

Connecting Head Start families with Boulder County Master Gardeners improves nutrition, food security, family bonding, and self-sufficiency.

Situation

On a breezy, warm day in early September, Isabella is grinning as she dances through a lush garden filled with a half a dozen varieties of tomatoes. She plucks a few cherry tomatoes off the vine and pops them in her mouth.

Her grandmother, Peggy, shrugs then smiles before explaining to a visitor that they can hardly keep them on the vine, her granddaughter eats them so quickly. Isabella and her grandmother perfectly illustrated the benefits of growing and eating your own food. Gardening gives people a chance to connect with nature, with their families, all while getting exercise and eating food at its most nutritious.

Gardening has been found to reduce chronic diseases by improving dietary habits while increasing physical activity. In times of economic downturn, gardening increases food security for budget-strapped and low-income populations by providing affordable and healthy food. Encouraged by these findings, Boulder County Head Start wanted to create a mentoring program that would teach its low-income family clients how to garden. With a pool of 235 highly trained volunteers capable of offering experienced, hands-on assistance, Boulder County Extension's Colorado Master Gardener program became an instant partner.

Extension's Response

Now in its second year, the Head Start Family Garden project is a joint effort between Boulder County Head Start and the Boulder County Extension Colorado Master Gardener program. The project attracted 15 families in 2009 and 14 in 2010. (Four families from the first year have returned).

As was the case last year, Head Start recruited families who are matched with Master Gardener volunteers. From sowing seeds to harvesting, Master Gardeners provide the supplies, tools, expertise, assistance and encouragement that help Head Start families learn how to garden. From late March through May, Master Gardeners work with families to locate garden plots at their home, prepare soil, and plant seeds and seedlings that families select to grow - from tomatoes to broccoli, peppers to carrots. Through the summer, the pros helped them mulch, identify weeds, and troubleshoot.

This year, the top winners of produce the families harvested and consumed were tomatoes, squash and cucumbers, though strawberries were popular with the children. Volunteers visited families weekly the first two months, then twice a month, or as needed, for the remainder of the growing season. What the Master Gardeners discovered was that many families, especially those who had been in the program the year before, needed little help.



The Bottom Line

- By teaching Head Start families how to grow their own food, Boulder County Master Gardeners are helping families create pathways to food security and self-sufficiency.
- By successfully engaging youth and their parents, Master Gardeners are growing new generations of gardening enthusiasts.

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Extension's Response (Continued)

Nearly 43 percent of the Head Start families were experienced gardeners this year, and nearly 36 percent were somewhat experienced. Only slightly more than 21 percent of families needed a great deal of help from their mentors. Families are responsible for watering, weeding and harvesting their garden. To help Head Start families get into gardening, the Boulder County Extension Master Gardener program annually invests more than \$2,000 to provide the following supplies at no cost: compost, seeds, seedlings, tomato cages, hoses, shovels, rakes, soaker hoses, fertilizer, containers, and potting soil.

Results

Across town from Isabella, young Eddie is helping his dad weed, water and mulch their garden. Eddie is, his father Ralph says, dad's little garden companion. This second-year Head Start family is the envy of many of his neighbors. Final reports show that this is only one of the Head Start families who are successfully learning to grow their own food.

In 2009, it was clear that the majority of gardens produced an abundance of vegetables that gave families new and healthy eating choices. In 2010, the Master Gardener program has found that both the families that were involved in the program in 2009, along with new families, have been more successful year over year, as shown by numbers that track everything from success of the garden to consumption of produce. The numbers show that some of the minor problems the Master Gardeners faced in 2009 were solved this year. The proof: 100 percent of the families consume more produce than they did before the garden was harvested.

Half of the families considered weeding, watering and harvesting a project for every member of the family. Nearly 86 percent of the families who participate in the program say they'll garden again next year, equipped with the knowledge supplied by Master Gardeners. Two of the inexperienced gardeners from last year are now somewhat experienced, and one of the gardeners from last year moved from somewhat to very experienced. CSU Extension has tracked everything from the families' eating habits to their passion for gardening. These baseline assessments helped determine which family members spend the most time gardening, what they are learning, and if they are increasing their intake of healthy foods.

Among some of the findings: Older siblings of Head Start children seem to enjoy working in the garden with their parents, though the Head Start children enjoy watering and harvesting. And the grandparents of three of the Head Start gardens were very enthusiastic about creating a veggie garden, and involving their grandchildren in the process. Overall, parents and grandparents say that all of their children are motivated and delighted by gardening.

It is wonderful, parents and grandparents say, to watch a 5-year-old dash out to the garden in the morning, pluck a tomato and bite into it. It surprised two Master Gardeners that broccoli was popular with the young set. It wasn't as surprising that the four families who planted strawberries had happy children. The Head Start Family Garden project is quickly becoming a model for how Master Gardener expertise and resources can give families control over what they eat and how they spend time together. By helping families make informed gardening choices, by providing free tools and supplies, and by offering reassurance, Master Gardeners are helping families create pathways to food security and self-sufficiency.

"What surprised me was how they accepted me, and drew me in as part of the family. I helped them with the garden, but in return, they taught me so much. It was an amazing experience."

– Michael Arias
Boulder County Master Gardener

"It's been an incredible year. I've heard nothing but positive reports, so I can't tell you how much we appreciate the time these Master Gardeners put into the program."

– Deb Croteau
family services coordinator for Boulder County
Head Start

"Jo (Zeimet) was amazing. She helped tell us what would grow best where, and when we had a problem with a tomato plant, we called and she came right out. Our garden is thriving because of her."

– Noemi Contreras
mother of a Head Start child

By the Numbers

- Percent of Head Start families who plan to plant a veggie garden again next year: Nearly 86 percent.
- Head Start families who say growing a veggie garden increased their consumption of produce: 100 percent, with consumption increase ranging from 5 to 30 percent, with an average of around 19 percent.
- Percent of families who made the garden a family project: 50 percent.

Impact

Colorado State University
Extension

Sharing the difference CSU Extension makes in people's lives and their communities.

Native Plant Master education benefits natural resources and people

Extension's Native Plant Master® education program encourages Coloradans to adopt sustainable landscaping practices that can help residents save water, money and time.

Issue

Colorado's growing population increases demand for limited natural resources, especially water. Urban gardens and other built landscapes often use non-native plants that have high water needs. These plants are not adapted to Colorado's dry climate—the state averages 17 inches of precipitation annually. Native plants offer a sustainable alternative when nursery grown and planted in conditions approximating their native habitat. Homeowners, landowners, and green industry and land management professionals are seeking education about the relationship between water conservation, native plants, invasive weeds and sustainable landscapes.

Extension's Response

Colorado State University Extension created the Native Plant Master® (NPM) field-based education and volunteer program. The goal of the program is to educate people about how native plants can be used to create sustainable landscapes and the threats to native ecosystems from invasive weeds. Native Plant Master volunteers are trained to help the public understand the benefits of native plants. Jefferson County Extension launched the state's first NPM training in 1997. The program is now offered by 12 Extension offices across the state.

All NPM courses are open to the general public. To earn certification in the optional volunteer program, participants take 36 to 38 hours of hands-on coursework and agree to make at least 60 educational contacts. The program uses the natural world as an outdoor classroom to teach volunteers about sustainable landscapes. Courses are taught by county agents and other NPM trainers on trails in local open space parks and other public lands. Field learning is supplemented by CSU Extension's online Colorado Plant Database which provides research-based information on more than 1,000 Colorado plants: <http://coloradoplants.jeffco.us>.

The education program attracts a broad range of individuals from homeowners, garden center employees, landscape architects and open space planners, to natural area docents, government employees, and small acreage landowners. Each year participants are surveyed about the sustainable landscaping and weed mitigation projects they were involved in as well as their satisfaction with the overall NPM experience. On a quarterly basis volunteers catalog the number and type of educational contacts they have made.



The Bottom Line

- In one year, for every dollar Extension spent on program costs in Jefferson County, NPM volunteers generated \$8.43 in self-reported savings from sustainable landscaping and weed control efforts.
- Extension's Native Plant Master® education program encourages Coloradans to adopt sustainable landscaping practices while enhancing the job performance of many program participants.

By the Numbers

- Reported statewide economic impact: \$1,232,028¹
- Reported acreage impacted statewide: 156,149
- Estimated Cost/Benefit of NPM in Jefferson County: \$1 = \$8.43
- NPM Revenues: \$26,512
- NPM Volunteers: 625
- Direct educational contacts: 14,034

Impact

The NPM education program is a state leader in training people about the relationship between water conservation, native plants, weeds and sustainable landscapes. As a result, CSU Extension has found a cost-effective way to increase the sustainability of Colorado's backyards and commercial landscapes while reducing invasive weeds.

Results from the 2010 statewide NPM survey highlight many benefits the program brings both participants and the people they contact through paid and volunteer work. Of the 220 participants who responded to the survey:

- 99 percent increased their native and non-native plant identification skills
- 92 percent increased their awareness of the impact of alien weeds and the importance of controlling them
- 91 percent increased awareness of the value of native plants for sustainable landscaping.

As a result of these changes in knowledge and attitude, the majority of participants reported that they began or increased planting of natives in sustainable landscapes. Many said they began or expanded weed removal projects. These combined efforts occurred on over 150,000 acres of public and private land. By reducing water use and other landscaping costs and improving land productivity through weed removal, the economic impact of these efforts (as estimated by survey respondents) totaled over \$1.2 million.

Many participants also reported that NPM benefited them in the workplace. One participant explained, "I work with a lot of large and small landowners on seeding recommendations, grazing strategies and weed control. The increased ability to identify native grasses has improved my ability to assist local landowners with range monitoring and pasture management." In fact, 31 percent of the 2010 NPM survey respondents reported getting a new job or retaining their current job as a result of participating in the program.

The NPM education program has a beneficial multiplier-effect as thousands of Coloradans are annually educated by a few hundred NPM volunteers. The opportunities take the form of guided naturalist walks on public lands, on-the-job trainings, meetings and decision-making, neighbor-to-neighbor exchanges, and other outreach and learning opportunities.

Native Plant Master Mission

To educate the public about native plants in order to foster stewardship, sustainable landscaping and management of weeds that threaten native ecosystems.

¹ Economic impact stems from alien weed control efforts (resulting from improved grazing, crop output, ornamental landscapes, wildlife habitat, tourism, etc.), and planting of natives (resulting from reduced landscape inputs such as watering, pruning, pest control, etc.).

"I use what I learned from NPM daily—in making recommendations to landowners, selecting plants to seed for County revegetation projects, and as a motivator to continue working tirelessly to control and eradicate noxious weeds."

– Native Plant Master volunteer

"Since my property burned in the Fourmile Canyon Fire, I am actively participating in volunteer efforts to assemble resources for landowners to identify plants that re-grow on their burned land and to avoid an increase in exotic species invasions."

– Native Plant Master volunteer

County & Area Partners

Boulder
Custer
Douglas
Eagle/Garfield
Golden Plains Area
Jefferson/Gilpin
Larimer
Logan/Morgan
Montezuma
Pueblo
San Miguel/West Montrose
Tri-River Area

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Sharing the difference CSU Extension makes in people's lives and their communities.

Building Farmers: Helping new farmers manage risk and succeed

CSU Extension expanded its successful new farmer training program from Boulder County to the state's remote southwestern corner in 2009 to help farmers more effectively manage their business and production risks.

Issue

Durango and the surrounding La Plata County area has one of the strongest local food movements in the state, generating an estimated \$130 million in sales of locally grown food. A new generation of farmers, many with little to no agricultural background, have stepped in to meet this demand for locally grown food at farmers' markets and in schools, restaurants, and grocery stores. These newcomers often start farming without an awareness of the business risks unique to their enterprise.

Extension's Response

To help farms better manage their risks and succeed, CSU Extension created a business training program that debuted in Boulder County in 2007 as *Building Farmers*. In 2008, the program expanded to La Plata County as *Colorado Building Farmers*. Through a series of eight evening classes, farmers learned to develop and refine their business management and marketing skills while also building community. Dinners featuring locally grown food were served before class to help farmers develop a strong camaraderie so they could learn from each other in a supportive environment. At the end of the course farmers presented business plans and then received feedback from peers and teachers on the feasibility, shortfalls, and strengths of each plan.



The Bottom Line

- CSU Extension is helping a new generation of market farmers acquire the business skills and financial risk management strategies they need to succeed.
- As a result of participating in Building Farmers, new farmers are strengthening local food systems.
- Building Farmers is growing a new and vital generation of farmers at a time when fewer individuals are choosing farming as an occupation.

By the Numbers

- Total farmers trained since 2008: 29
- Percent of farmers who would recommend class to others: 100%
- Cost to participate: \$180

Impact

The first year survey results of *Building Farmers* in La Plata County show the course is providing inexperienced, direct market farmers with the skills, resources and confidence they need to succeed. One hundred percent of survey respondents indicated the class had encouraged them to implement more detailed record keeping, create or edit a business plan, and continue farming. As a result, farmers are expanding their production and management know-how, developing new markets, and making more food available for direct sale at farmer's markets and produce stands, in restaurants and schools, and through farm member shares and other venues.

Building Farmers has also created farmer-to-farmer networks that extend learning into the field where participants share expertise and resources. Collaborative networks play an important role in educating farmers and ranchers because the region's environmental extremes contribute to a short, variable, and inconsistent growing season.

In 2009, *Colorado Building Farmers* expanded to three other Colorado counties through funding from the Western Center for Risk Management Education. The program's overall success has captured national attention by receiving a three-year, \$748,000 grant from the USDA Beginning Farmer and Rancher Development Program to create *Building Farmers In The West*. The six-state *Building Farmers* program will train producers in Colorado, Idaho, Oregon, New Mexico, Nevada and Washington to successfully enter and compete in emerging markets through classroom and experiential learning.

"This is the best thing that could have happened to us. The people we met and the information we learned are going to guide us throughout this experience for many years to come."

– Paul and Krii Black
2009 Building Farmers participants

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Sharing the difference CSU Extension makes in people's lives and their communities.

Business training prepares beginning farmers for direct market success

Not all beginning farmers understand the financial and production risks of growing and selling food locally. To help new farmers in Boulder County succeed, CSU Extension has created a successful business training program that has expanded around the state and the West.

Issue

Boulder County supports one of the strongest local food movements in the state with sales from farmers' markets alone generating almost \$4 million in 2009. Demand for locally grown food both at home and in restaurants has inspired a new generation of 'market farmers'—many with no agricultural background—who grow and sell vegetables, fruit, eggs, meat, dairy and other products directly to consumers and chefs. Often, these newcomers start farming without an awareness of the financial risks unique to their business.

Extension's Response

In 2007, Boulder County conceived and debuted a new business training program to help new farmers better manage their risks and succeed. Through a series of eight evening classes, *Building Farmers—Market Farm Track* helps farmers develop and refine their business management and marketing skills while also building community. Dinners featuring locally grown food were served before class to help farmers develop a strong camaraderie so they could learn from each other in a supportive environment. At the end of the course farmers presented business plans and then received feedback from peers and teachers on the feasibility, shortfalls, and strengths of each plan.



The Bottom Line

- CSU Extension is helping a new generation of market farmers acquire the business skills and financial risk management strategies they need to succeed.
- As a result of participating in *Building Farmers*, new farmers are strengthening local food systems.
- Building Farmers is growing a new and vital generation of farmers at a time when fewer individuals are choosing farming as an occupation.

By the Numbers

- Total farmers trained since 2007: 84
- Percent of farmers who would recommend class to others: 100%
- Percent encouraged to follow their farming dreams: 95%
- Cost to participate: \$80 - \$200

Impact

Survey results from three years of *Building Farmers* in Boulder County show the course is providing inexperienced, direct market farmers with the skills, resources and confidence they need to financially succeed. As a result, farmers are expanding their production and management know-how, developing new markets, and making more food available for direct sale at farmer's markets, produce stands, restaurants, and through farm member shares and other venues.

Building Farmers has also created farmer networks that extend learning into the field where participants share expertise and resources. In fact, *Building Farmers* now includes a companion learning track, *Market Farm Mentorship*, which pairs new farmers with experienced ones who have similar scale operations to accelerate learning and foster community.

In 2009, *Building Farmers* expanded to four other Colorado counties through funding from the Western Center for Risk Management Education. Statewide, the program is now called *Colorado Building Farmers*, which offers both a Market Farm Track and a Mentorship Track. Lastly, the program's overall success has captured national attention by receiving a three-year, \$748,000 grant from the USDA Beginning Farmer and Rancher Development Program to create *Building Farmers In The West*. The six-state *Building Farmers* program will train producers in Colorado, Idaho, Oregon, New Mexico, Nevada and Washington to successfully enter and compete in emerging markets through classroom and experiential learning.

“Now doing this seems possible, if difficult and chancy. I feel I have a much better grasp of what will make my future operation successful. This has included a great deal of the skills I’ve been looking to learn and probably wouldn’t find anywhere else.”

– 2009 *Building Farmers*
Participant

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Sharing the difference CSU Extension makes in people's lives and their communities.

Connecting Small Farms with Local Customers

Through CSU Extension outreach, an annual event based on 'speed dating' has expanded La Plata County's local food system and improved business relations.

Issue

Farmer's markets are an increasingly popular way for consumers to buy locally-grown vegetables, fruit, meat and dairy. However, food buyers from schools, restaurants, caterers, and grocers have a more difficult time making connections with local producers. In Southwest Colorado's La Plata County, the disconnect was due to communication gaps, pricing, production issues, and misunderstandings. In recent years, however, Durango-based food and wellness collaboratives such as Growing Partners of Southwest Colorado and Healthy Lifestyle La Plata have led regional efforts to increase access to locally grown foods and expand the local food system.

Extension's Response

La Plata County Extension plays a key role in this initiative by developing and presenting local food and production-related events using Extension's agricultural and educational expertise. In 2008, La Plata County Extension Director, Darrin Parmenter, helped develop a food networking event called *Local Food Connection* in tandem with Growing Partners of Southwest Colorado and Healthy Lifestyle La Plata.

Parmenter modeled *Local Food Connection* after similar 'Farm to Chef' programs in the Pacific Northwest and Florida. Hosted by a local restaurant, the three-hour event creates a setting for regional growers to engage in casual conversation with food buyers from restaurants, schools, and other institutions so they can explore potential business connections. This is followed by a round of five-minute sessions similar in concept to 'speed dating'. Each buyer takes a menu or ingredient list to the table of each producer to discover possible connections. If there's a fit, the grower and buyer formalize an agreement at a later time. Attendees also learn about the Mesa Verde Guide, an online resource for producers to list, and buyers to view, current availability and cost of locally grown food.



The Bottom Line

- *Local Food Connection* is helping farmers, ranchers, and buyers discover opportunities for creating new and successful business relationships that are strengthening the local food system.
- *Local Food Connection* is increasing the amount of food that is sourced—and purchased—locally.

By the Numbers

2009 *Local Food Connection* Event

- Numbers of participating farmers and ranchers: 15
- Number of participating buyers: 14
- One or more connections reported: 16

Impact

Local Food Connection is building food networks that are expanding the local food system and thereby improving the region's food security. New investment opportunities and community buy-in are increasing access to locally grown foods—and supporting the local economy.

- Tim Turner, owner-operator of the restaurant, Zia Taqueria, made a connection to source vegetables through La Boca Center for Sustainability. Then, he invested in La Boca by donating a 2,400 square-foot greenhouse that extends the growing season.
- Krista Garand, Director of Student Nutrition for Durango School District R-9, sat down with a Fox Fire Farm representative at the inaugural 2008 event and purchased 600 pounds of organic, grass-fed ground beef. The District is now buying almost all of its beef from two local ranches.

By increasing the amount of food that is locally sourced, chefs and other buyers gain more purchasing control and delivery assurance. As a result, Extension is improving the way growers and their customers do business.

County Partners

La Plata County Extension
Growing Partners of Southwest Colorado
Healthy Lifestyles La Plata

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Sharing the difference CSU Extension makes in people's lives and their communities.

County partnership increases participation in food safety education

A county partnership and targeted marketing has expanded Larimer County Extension's efforts to train more food handlers and prevent foodborne illness.

Issue

Access to safe and nutritious food is the foundation of community health. To prevent foodborne illness, food service employees need to know how to safely prepare, store and serve food. In Colorado, county health departments enforce food safety regulations at restaurants, delis, bakeries and other food-related businesses. For years Larimer County complemented this effort by offering food handler trainings through a program called *Step Up to Food Safety*. When budget cuts eliminated the program, the county collaborated with CSU Extension to provide food safety trainings to retail food establishments.

Extension's Response

Because of CSU Extension's expertise in food safety and adult education, the county health department asked Extension to fill the education gap by teaching *Food Safety Works* in 2005. Extension nutrition and food safety specialists developed *Food Safety Works* through a grant to prepare entry-level or first time employees for jobs in the food service industry. The curriculum was developed in collaboration with the county health department. From 2001 to 2002, Extension piloted the curriculum with Colorado Work Force centers, youth correctional facilities, and high school vocational programs. The program's success allowed Extension to adapt it to training food handlers in a variety of settings: public schools, retail establishments, hospitals, and volunteer organizations such as churches and fair concessionaires.

Food Safety Works teaches food handlers how to prevent foodborne illness in the work place by properly washing hands, cleaning and sanitizing equipment, safely handling and storing food, and avoiding cross-contamination. The two-and-a-half hour class costs \$30 per person. It is offered throughout the year in four different communities and is available in English and Spanish. To help grow awareness of and participation in *Food Safety Works*, the county helps promote the training during health inspections. Since 2007, Larimer County Extension has generated nearly \$19,000 in *Food Safety Works* course fees.



The Bottom Line

- By teaching *Food Safety Works* trainings to food handlers at the county level, CSU Extension provides much-needed public health education that many county health departments can no longer offer because of staffing shortages and reduced budgets.

By the Numbers

Larimer County Food Safety Works in 2009:

- Total number of food handlers trained: 533
- Total number of FSW trainings: 33
- Percentage reporting gain in knowledge: 92%
- Total revenues generated in course fees: \$9,972

Impact

Larimer County Extension has the most robust *Food Safety Works* program in Colorado thanks to its close working relationship with the county health department. Since starting to offer *Food Safety Works* in 2005, enrollment has increased by 139 percent with the biggest gain occurring between 2008 and 2009 when Extension began mailing a quarterly food safety newsletter to 1,100 county restaurants and food-related businesses. The newsletter contains information on current issues, emerging pathogens, regulation updates, and the *Food Safety Works* training schedule, which is marketed primarily by health department inspectors who encourage restaurant participation.

Across the board, *Food Safety Works* participants gain confidence and improved knowledge about food safety topics. In feedback surveys, participants strongly indicate they plan to make changes in their food handling practices, an outcome that can help prevent foodborne illness, improve public health, and provide consumers with a safe and wholesome eating experience outside the home.

“It’s a valuable resource to be able to get folks who are in the industry to direct them to a source where they can get basic food safety education and a reasonable cost. You can’t get a better deal than you do through Extension.”

– Jim Devore

Larimer County Environmental Health Specialist

County Partners

CSU Extension family and consumer science agents offer *Food Safety Works* in over 20 counties statewide:

Bent
Boulder
Delta
Douglas
Eagle
El Paso
Fremont
Gunnison
Hinsdale
Larimer
Las Animas
Moffat
Montrose
Otero
Ouray
Pueblo
Routt
San Luis Valley Area
San Miguel
Summit
Weld

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Sharing the difference CSU Extension makes in people's lives and their communities.

County partnership helps landowners remove weeds and save money

A Russian knapweed removal program on private land in Crowley County encouraged other land owners to begin voluntary eradication of this highly invasive weed.

Issue

Russian knapweed (*Acroptilon repens*) grows on over 1,600 acres of land in southeast Colorado's Crowley County. The noxious weed commonly grows on abandoned and uncultivated farmland with alkaline soils high in salt and nitrogen. The proliferation of the weed inhibits the growth of many native perennial grasses, and as a result, spreads easily. Russian knapweed also burns hot and fast. In 2008 the weed contributed to the spread of an 8,000-acre wildfire that swept through the county killing two volunteer firefighters and destroying 24 buildings.

Later that year the Colorado Department of Agriculture awarded Crowley County with a \$10,000 High Plains Invasives grant to monitor and control the spread of Russian knapweed on private land. The grant allowed Crowley County to recruit landowners who were willing to pay a portion of the cost of an herbicide to control or treat weeds on their property. However, in order to plan and execute a successful weed control program, the County needed to partner with its area Extension agent for technical assistance backed by proven research and local knowledge.

Extension's Response

Natalie Edmundson, Range and Livestock Extension agent in both Crowley and Otero counties, worked with 14 landowners to identify a total 300 acres of previously irrigated farmland that were ideal for knapweed monitoring and treatment. Before spraying weeds with herbicide, Edmundson established 100-foot line transects on four properties and recorded at five-foot intervals the abundance and diversity of knapweed and other plants.

The 300 acres of property were sprayed in January and February 2009 with the herbicide Milestone at a rate of seven ounces per acre. The decision to spray Russian knapweed in winter was based on recommendations by CSU Extension Weed Specialist George Beck. In the early 1990s Beck found that Russian knapweed root buds become active in fall and continue spurts of growth even through winter when soils freeze. In spring, shoots emerge above ground and root buds die off. Based on research by other weed experts, Beck determined that winter treatment would attack root buds, prohibit shoot growth, and kill the plant.¹

At four months and one-year following treatment Edmundson recorded abundance and diversity along each transect. The same monitoring protocols occurred on one control plot that was not treated.



Before: The transect on the left shows ground in winter dotted with knapweed and no native grass prior to treatment. After: The same transect four months after treatment. Native grasses dominate.

The Bottom Line

- CSU Extension successfully demonstrated that winter aerial treatment is a cost-effective way to attack Russian knapweed.
- After two years of treatment, overall weed density along transects decreased by 97 percent, from 5.24 plants per square foot to 0.133.
- The results have encouraged other landowners to act—an outcome that has the potential to reduce environmental threats, like catastrophic fire, and rehabilitate the land.

By the Numbers

Decreased knapweed density along transect

- 4 months after: 91%
- 1 year after: 75%
- 2 years after: 97%

Impact

Four months after spraying, the density of Russian knapweed along transect lines had decreased by 91 percent; one year later it was reduced by 75 percent. The herbicide also decreased the height and plant cover of the weed which led to an increase in native grass populations. Control results were the same whether herbicide was sprayed in the air or from the ground. With little or no demand for crop dusters during the winter, the decision to apply Milestone reduced treatment costs to \$30 per acre. Landowners paid 25 percent of the cost.

The County was awarded a second grant for \$5,000 in 2009 to continue treating knapweed. With less money on hand, Edmundson recommended re-treating 200 of the original 300 acres of land to achieve higher rates of control and maximize spending. This time landowners paid 40 percent of the cost and spraying occurred in March, 2010.

Crowley County Invasive Weeds Project Partners

Colorado Department of Agriculture
Crowley County Commissioners
CSU Extension
USDA-NRCS
West Otero Timpas Conservation District
Farm Service Agency
Landowners

¹ Wilson, R.G. and Michiels, A. 2003. Fall herbicide treatments affect carbohydrate content in roots of Canada thistle (*Cirsium arvense*) and dandelion (*Taraxacum officinale*). *Weed Sci.* 51:299-304

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Impact

Sharing the difference CSU Extension makes in people's lives and their communities.

The Expanded Food and Nutrition Education Program (EFNEP)—Better living through nutrition education

EFNEP is a nutrition education program helping low-income Colorado families improve their food budget and nutrition.

Issue

Eating healthy on a limited budget can be challenging. Since 1969, the Expanded Food and Nutrition Education Program (EFNEP) has helped low-income families, adults and youth learn to eat healthier for less money. Funded by the USDA National Institute of Food and Agriculture and operated by Extension programs in all 50 states and U.S. Territories, EFNEP consistently improves the choices participants make regarding nutrition, budgeting, food preparation and physical activity. This happens through a series of free lessons taught by trained peer educators working at the county level. When the U.S. government released significant changes to dietary guidelines in 2005, EFNEP curricula became immediately outdated.

Extension's Response

To fill this gap, CSU Extension's EFNEP Coordinator, Susan Baker, partnered with the University of California Davis Extension (UCDE) to create a new EFNEP curriculum called *Eating Smart • Being Active*. With over 20 years experience directing EFNEP programs and writing curriculum, Baker's expertise in education helped strengthen the curriculum's nutrition-based lessons.

CSU Extension and UCDE designed *Eating Smart • Being Active* as a series of classes that teach low-income adults with children how to spend less on food, eat better and be active. Each class includes a physical activity, recipes, food preparation activity, and tips on food safety, shopping, and parenting. In eight weeks, participants learn how to increase physical activity, plan meals, read nutrition labels, shop smarter, and increase their vegetable, fruit and fiber intake. They also learn how to limit fat, sugar, and salt and choose lean sources of protein and low-fat calcium foods.



The Bottom Line

- EFNEP is a cost-effective way to teach families, adults and youth the skills and resources they need to make choices that save money, increase self-sufficiency and improve their health.

By the Numbers

In 2009:

- Number of families served: 1,071
- Number of family members reached: 3,132
- Reported average monthly food savings: \$83
- States using *Eating Smart • Being Active*: 33

Impact

According to the most recent Colorado EFNEP evaluation data obtained from *Eating Smart • Being Active* participants, 92 percent say they have made a positive change in one or more food groups, including increasing fiber intake by an average of 13 percent. They also increased their physical activity by 25 percent. With an increased awareness of food safety, 67 percent of participants improved one or more ways they store or prepare food. Participants also report saving an average \$83 per month on their food bill while 77 percent claimed improvement in one or more food management practices including meal planning and shopping skills. As a result of these improvements, 34 percent of the participants were less likely to run out of food by the end of the month.

County Partners

The following counties are currently participating in CSU Extension EFNEP programs.

Denver
Eagle
El Paso
Pueblo
Teller
Weld

Counties apply to the state EFNEP office for two years of funding and then offer EFNEP programs that meet the needs of their communities.

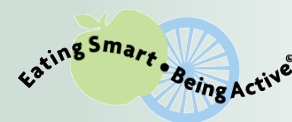
“My family is from Argentina and we eat “the meat way” there, so I’m so glad I took the nutrition classes because I learned a lot of tips that I can use to improve my family’s eating. I now check labels and understand what they are for and how to use the information for my diet. I’m sure my family is going to eat healthy now.”

– 2009 EFNEP participant
El Paso County

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Impact

Sharing the difference CSU Extension makes in people's lives and their communities.

Exploring the science of food production

A new agricultural education program for elementary school children in Eastern Colorado explores the science behind how and where food is grown.

Issue

Food production is the second largest revenue source in Colorado. In 2007, the state's top five producing counties, all located in Northeast Colorado, generated nearly \$3 billion in agricultural revenue—almost half of the state's \$6 billion total. Ironically, many young people living in these agricultural-rich areas often think food comes from the store rather than a farm. Yet, as more families in Eastern Colorado are relocating to towns and cities, children are getting more and more disconnected from how farmland is related to production agriculture. Schools are a likely forum for teaching young students about agriculture and the science behind food production. However, science lessons rarely focus on agriculture. Furthermore, teachers don't always have the time, resources or knowledge to deliver standards-based science lessons that also engage students in hands-on learning.

Extension's Response

In 2010, CSU Extension agents from across Eastern Colorado created *AgFest 2010*, a one-day, agricultural and science enrichment program for fifth- and sixth-grade students. The event featured 10 activity stations focused on a science-based learning objectives related to agriculture. Topics included:

- Microbes and bacteria
- Embryology
- Metamorphosis and pollination
- Bio Technology & Plant Science and crop production
- Ruminant digestion
- Dairy production
- Biodiesel production
- Farm and tractor physics
- Wool and natural fiber production
- Bee keeping

Extension agents designed a variety of hands-on learning activities which made challenging science concepts easy to understand. For instance, at the farm and tractor physics station, students experimented with pulleys and levers to learn about lifting loads and multiplying force. Students were also introduced to a cow's four-chambered stomach, good versus bad bacteria, hatching chicks, how a press can turn oil seed into fuel, plant germination, and insect life cycles.

Approximately 300 students from 13 school districts across Eastern Colorado attended one of three *AgFest* events held at fairgrounds and community centers in Brush, Siebert and Lamar. *AgFest* will return to these three areas in 2011.



The Bottom Line

- *AgFest* enhances science education through standards-based activities that raise student awareness about food production and farming.
- *AgFest* complements classroom learning and provides teachers an opportunity to increase their students' understanding of science concepts.

Ag Fest Contributors

The event was made possible by contributions from the Western Dairy Association, Colorado Farm Show, Southern Colorado Farm Credit, Koberstein Farms, Colorado Corn, Scottish Wright Outpost, and Northeast Colorado Shriners.

Impact

Results from surveys taken before and after *AgFest* show that students greatly increased their understanding of scientific and agricultural concepts. Results suggest that students learned the most about physics and ruminant digestion, two topics that featured some of the most interactive and engaging activities. Students also demonstrated an increased awareness that food doesn't come from the store, but is grown on a farm.

AgFest surveys asked students to write down the most interesting thing they learned that made a lasting impression. Overwhelmingly, students provided detailed descriptions of the levers and pulleys, incubating eggs, 'gross' germs, and the 'amazing' four-chambered cow stomach. The majority of students was enthusiastic about *AgFest* and expressed a desire to return because it was so much fun.

Backed by 4-H curriculum development in Science, Technology, Engineering and Math (STEM)¹, Extension agents provide the resources and expertise of science-based activities that many teachers cannot offer in their classrooms. As *AgFest* evolves, Extension agents hope to further develop station activities to give students ever-more engaging hands-on learning opportunities that develop their understanding of the agricultural, natural, physical, and life sciences while increasing their awareness of food production.

"The thing I liked the best is the levers. It was fun getting to try them. I wish we could go back and learn more. It was a great field trip and I would go there again."

– *AgFest 2010*
5th grader

"Thanks for doing this. I don't have the funding, the time, or the technical expertise to do this for my students."

– Nora Hubbell, 5th & 6th grade teacher
Hi Plains Elementary School, Verona, Colorado

County Partners

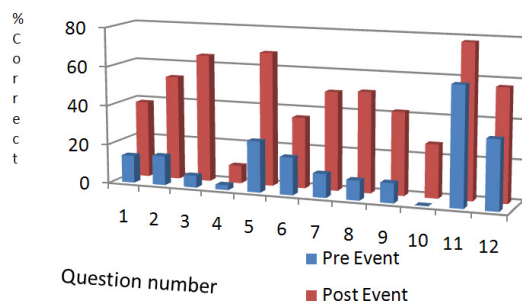
AgFest was organized and delivered by Extension agents, specialists and program associates from the following counties:

Bent County
Cheyenne County
Crowley County
Kiowa County
Kit Carson County
Lincoln County
Logan County
Morgan County
Otero County
Phillips County
Prowers County
Sedgwick County
Washington County
Yuma County

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Student knowledge of	Pre Event	Post Event
1 Embryology - 2 requirements for eggs to hatch	14	39
2 Natural Fibers - uses and resistance to flame	15	53
3 Physics - levers & pulleys	6	65
4 Dairy Production - daily production per cow	2.5	9
5 Ruminant Nutrition - compartments of the bovine stomach	26	68
6 Bio Fuels - alternate fuel sources	19	36
7 Metamorphosis - life cycle and damage	12	50
8 Microbiology - virus, bacteria and protozoa	10	51
9 Entomology - bee keeping & honey	10	42
10 Biotechnology & Plant Science	0	27
11 Where our food is produced	60	78
12 Student's Interest in Career in Ag	35	57



¹ *Science, Technology, Math & Engineering (STEM) combines the strengths of 4-H programming, non-formal experiential-based delivery modes with strong youth/adult partnerships to address content as defined by the National Education Science Standards and practice STEM abilities in order to prepare our youth to compete in the 21st century workplace.*

Impact

Sharing the difference CSU Extension makes in people's lives and their communities.

Extension expands food safety across Western Colorado

Grant funding from the Colorado Trust expanded CSU Extension's food safety education efforts to Western Colorado communities while strengthening the region's public health infrastructure.

Issue

In 2006, the West Central Public Health Partnership (WCPHP), a coalition of Western Slope county public health and environment personnel, received a \$375,000 Colorado Trust grant to improve regional health services and infrastructure. Following a needs assessment of Delta, Gunnison, Hinsdale, Montrose, Ouray and San Miguel counties, WCPHP set a goal to improve safe food preparation practices in retail establishments through food safety education. In Colorado, county public and environmental health staff typically provides this outreach. However, none of the six counties involved with WCPHP offered food safety classes. CSU Extension, which has provided *Food Safety Works* classes in Montrose since 2003, offered WCPHP a trusted teaching alternative.

Extension's Response

CSU Extension Tri River Area agents were contracted to teach 35 *Food Safety Works* classes throughout the six counties between 2006 and 2010. In 2009, Tri River Area Extension alone offered *Food Safety Works* to 485 food handlers in 13 communities. The grant subsidized the majority of the class fee so participants paid \$5 instead of \$30. It also covered costs related to agents' time, travel and supplies.

The *Food Safety Works* program has trained food handlers statewide since 2001. Food and nutrition specialists developed it to teach how to prevent foodborne illness in the work place by properly washing hands, cleaning and sanitizing equipment, safely handling and storing food, and avoiding cross-contamination. The two-hour class features fun and engaging hands-on activities that help participants understand and retain course content. The *Food Safety Works* curriculum was originally developed in partnership with the Larimer County Department of Health and Environment. It is currently taught in over 20 counties around Colorado by family and consumer science agents.



The Bottom Line

- By teaching *Food Safety Works* at the county level, CSU Extension provides much-needed public health education that many county health departments have eliminated due to budget cuts, or do not have the ability to provide.
- Extension's commitment to teaching *Food Safety Works* contributes to the future stability of public health across Colorado's Western Slope.

By the Numbers

Tri River Area Food Safety Works in 2009:

- Total number of food handlers trained: 542
- Total number of FSW trainings: 34
- Number of food handlers trained since grant began: 1,401

Impact

Upon completion of the class, 51% of participants said they would make some changes in their food handling practices, while 46% said they would make multiple changes in their practices. Follow-up evaluation over time is needed to know the long-term impact of the program.

Overall, CSU Extension has helped WCPHP meet its goal to improve environmental and public health services and infrastructure by offering a critical educational resource available nowhere else. The most rewarding outcome of Extension's involvement in the program was in 2009. Food Safety Educator Jeanne Rice taught *Food Safety Works* class to 66 employees at Crested Butte Mountain Resort. Later that same day, Rice taught a second training to 33 employees from restaurants throughout the town of Crested Butte.

Tri River Area *Food Safety Works* Partners

Delta County
Gunnison County
Hinsdale County
Montrose County
Ouray County
San Miguel County

County Partners

CSU Extension family and consumer science agents offer *Food Safety Works* in over 20 counties statewide:

Bent
Boulder
Delta
Douglas
Eagle
El Paso
Fremont
Gunnison
Hinsdale
Larimer
Las Animas
Moffat
Montrose
Otero
Ouray
Pueblo
Routt
San Luis Valley Area
San Miguel
Summit
Weld

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Growing self-sufficiency through gardening

By teaching Head Start families how to grow their own food, Boulder County Master Gardeners are helping low-income families create pathways to improved nutrition, food security, and self-sufficiency.

Issue

Reliable and affordable access to nutritious foods are cornerstones of good health. People without reliable access to fresh produce, whole grains, and other nutrient-rich foods often purchase packaged and processed foods that are less expensive yet high in fat and sodium. According to the Colorado Health Foundation, this happens most frequently among low-income, minority and rural populations. Subsequently, they suffer the highest rates of diet-related diseases.

Gardening offers an antidote by giving people a chance to connect with nature, get exercise and eat healthy, nutritious food—right out the back door. Studies cited by the Community Food Security Coalition of North America indicate that these benefits can reduce the risk of obesity and other diseases. This is good news for low-income populations, such as those served by Boulder County Head Start.¹ However, gardening can be tough without the resources and knowledge needed to succeed. That's why Boulder County Head Start created a mentoring program to teach its family clients to grow their own food. Boulder County Extension's Colorado Master Gardener program, with its pool of 235 highly trained volunteers, became an instant partner.

Extension's Response

Piloted in 2009, the Head Start Family Garden project is a joint effort between Boulder County Extension's Master Gardener program and Boulder County Head Start. The project attracted 15 families in 2009 and 14 in 2010 (four families from the first year have returned). Each year Head Start recruits families who are then matched with a Master Gardener volunteer. From sowing seeds to harvesting, Master Gardeners provide the supplies, tools, expertise, assistance and encouragement that help Head Start families learn how to garden.

Beginning in early spring, Master Gardeners work with families to scout and plan locations for garden plots at their home, prepare soil, and plant seeds and seedlings—from spinach and melon to broccoli, chili peppers, corn, carrots and tomatoes. In the early months, volunteers visit families once a week to also instill confidence, troubleshoot, and help with special projects like installing drip hose systems. Thereafter, volunteers visit families as needed.

To aid Head Start families with gardening expenses, the Boulder County Extension Master Gardener program annually invests more than \$2,000 to provide the supplies at no cost. These include: compost, seeds, seedlings, tomato cages, hoses, shovels, rakes, soaker hoses, fertilizer, containers, and potting soil.



The Bottom Line

- By teaching Head Start families how to grow their own food, Colorado Master Gardeners in Boulder County are helping families create pathways to improved nutrition, food security, and self-sufficiency.
- By successfully engaging youth, Master Gardeners are growing a new generation of gardening enthusiasts.

By the Numbers

- Average cost to establish one family garden: \$140
- Amount donated by Boulder County Master Gardener program since 2009: \$4,100
- Number of families served since 2009: 29
- Percent of Head Start families planning to garden in the future: 86

Impact

Master Gardeners report that Head Start families are successfully learning to grow their own food. Despite a few environmental and production setbacks, the majority of gardens produced an abundance of vegetables that gave families new and healthy eating choices.

In 2010, Master Gardener volunteers began tracking how much families have learned about gardening and if families are increasing their intake of health foods. Two of the inexperienced gardeners from 2009 now consider themselves 'somewhat experienced', while one of the 'somewhat experienced' gardeners from 2009 self-evaluates as 'very experienced.' Of the entire 2010 participating families, nearly 86 percent say they'll garden again in 2011.

While Master Gardener observations indicate that half of the participating families work as a team in weeding, watering and harvesting their garden, it seems that older siblings of Head Start children enjoy gardening the most. Parents say they believe their children—who otherwise might not have planted a pepper or sampled a zucchini—will be avid gardeners and veggie lovers for the rest of their lives. They wake early to water, get down on their hands and knees to inspect sprouts, and eagerly harvest and eat vine-ripened vegetables.

The Head Start Family Garden project is quickly becoming a model for how Colorado Master Gardener expertise and resources can give families control over what they eat and how they spend time. As Head Start family father Lorenzo Ramirez says, "I grew up in Mexico and worked on a farm, so I understand where food comes from. But this is something [my children] have never seen. This is teaching them so much." By helping families make informed gardening choices, covering the costs of tools and supplies, and offering reassurance, Master Gardeners are helping families create pathways to improved nutrition, food security and self-sufficiency.

¹ Head Start, a federally-funded program that began in 1965, seeks to meet the health, emotional, nutritional and psychological needs of low-income pre-school children.

"They're an amazing family. All of them are out there working in the garden every day. When I come to help, they invite me to dinner, and we've really become friends. Their kids are just great."

— Master Gardener Michael Arias
who worked with Lorenzo and Maria Ramirez

"My son put in the seeds and my daughter helped with the fence. And Vasi was always there for us. It's been an enriching experience. We make a great team."

— Humberto Hernandez
who worked with Master Gardener Vassilena Toneva

"Jo was amazing. She helped tell us what would grow best where, and when we had a problem with a tomato plant, we called and she came right out. Our garden is thriving because of her."

— Noemi Contreras
who worked with Master Gardener Jo Zeimet

Contact Information

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Impact

Sharing the difference CSU Extension makes in people's lives and their communities.

Improved plant diagnosis through advanced training

Enhanced plant diagnostic training is helping Colorado Master Gardeners more effectively resolve urban homeowner plant problems.

Issue

At county Extension offices around the state, Colorado Master Gardener (CMG) volunteers are the first to field homeowner questions about horticulture problems. However, diagnosing plant problems is not easy. Many symptoms look alike and proper identification sometimes requires advanced knowledge, skills, or even special equipment. For years, Colorado State University Extension horticulture agents have provided CMGs with advanced diagnostic workshops on garden, tree and lawn problems. Yet the inherent difficulty of plant diagnosis demands for a more structured approach to educate and organize a core group of CMGs who can better serve the needs and unique horticulture problems of Colorado homeowners.

Extension's Response

In 2009, CSU Extension received a one-year Integrated Pest Management (IPM) grant from the USDA. Part of the grant allowed Extension specialists and agents to develop a comprehensive CMG training program for advanced ornamental pest diagnostic education.¹ In 2010, an additional three years of funding was received to continue enhancing the CMG diagnostic training program. As a result, Extension specialists and agents created a two-tiered training program that progressively builds CMG diagnostic expertise of urban pest problems specific to the Front Range. In 2010, 65 CMG volunteers from eight Front Range counties participated in advanced diagnostics workshops.

In Tier 1, diagnostic volunteers complete basic CMG training and participate in the National Plant Diagnostic Network's "First Detector" training. In Tier 2, CMGs complete monthly daylong diagnostic workshops on lawns, conifers, ornamental annuals and perennials, and vegetables. Workshops typically include a morning lecture that is followed by an afternoon lab session in a classroom at one of the county Extension offices or at CSU. Some workshops feature a field trip to residential and commercial sites along the Front Range. During the lab training, volunteers use microscopes and digital equipment (when available) to observe and identify pests and diseases.



The Bottom Line

- The advanced plant diagnostics training program is growing a core group of volunteers who are trained to more effectively respond to the unique horticulture problems of Colorado homeowners.
- By advancing proper plant diagnostics through a comprehensive training program, CSU Extension is helping Colorado homeowners manage pest problems more effectively, thereby saving time and money.

By the Numbers

- Number of CMGs trained in advanced plant diagnostics: 65
- Percent of diagnostic clients who have shared what they learned with others: 76
- Percent of clients who manage landscape water more efficiently: 41

Impact

Results from workshop pre- and post-tests indicate that volunteers are improving their diagnostic knowledge and skills and learning to more confidently diagnose homeowner plant problems. According to Mary Small, Jefferson County horticulture agent, one of the benefits of the program is that volunteers see many of the same issues over and over. This repetition reinforces learning, helps build each volunteer's knowledge base and increases confidence in answering homeowner questions. Also, Small says that lab trainings increase volunteer interest in diagnostics. "They get excited when they see, for the very first time, plant problems under the microscope," Small says.

According to Tamla Blunt, CSU Extension Plant Diagnostician, homeowners often mistreat their problems when they don't know the cause. Chemicals are often used, misapplied or not needed. In a 2009 follow-up survey of previous clients who used Extension diagnostic services, over 50 percent of respondents indicated they had decreased their pesticide use. Sophisticated diagnosis can also help homeowners understand how to prevent problems from occurring in the future by correctly growing ornamental plants, trees or vegetables from the start. With improved and more sophisticated diagnostic capabilities, homeowners can make better treatment choices.

Participating Counties

Adams County: Thaddeus Gourd, Interim County Director & Agriculture Agent, and Sharon Moore, Horticulture & Master Gardener Assistant

Boulder County: Carol O'Meara, Horticulture Entomology Agent

Jefferson County: Mary Small, Horticulture Agent

Larimer County: Alison O'Connor, Horticulture Agent

Weld County: Carrie Shimada, Horticulture Program Associate

Arapahoe County: Robert Cox, Horticulture Agent, and Mae Rauen, Horticulture Assistant

Pueblo County: Linda McMulkin, Horticulture Coordinator

¹ Extension horticulture agents along the Front Range have offered CMGs advanced plant diagnostic classes for over 10 years. This grant is the first step to creating a comprehensive CMG specialization in plant diagnostics.

Colorado State University Extension, U.S. Department of Agriculture and Colorado counties cooperating. Extension programs are available to all without discrimination. January 2011. Written by Carol Busch.

"After visiting your office, we were confident in taking your advice and watching our Green Ash for any 'rebounding' that it might do through the summer. We then contacted an arborist who helped us with the necessary trimming in early fall, and we were able to reshape and save our shade tree."

– Homeowner and client
Jefferson County Diagnostic Clinic

"The training program provides practice, practice and more practice—with instant feedback. I always learn something new and practicing the diagnostics improves my skills and confidence for diagnosing plant problems in the clinic."

– Stanley Conway
Master Gardener, Jefferson County

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Impact

Sharing the difference CSU Extension makes in people's lives and their communities.

Improving wheat variety adoption through Collaborative On-Farm Testing

By helping wheat farmers make better planting decisions, Extension's on-farm testing program is improving wheat variety adoption around the state.

Issue

Wheat variety selection can be challenging. With so many good university and commercial varieties available, Colorado wheat farmers rely on a range of information sources to select seed that is well suited for soil type and that works for either irrigated or dryland farming practices. To demystify wheat selection, CSU Extension and the university's wheat improvement team annually publish results from wheat performance variety trials, hold wheat field days that highlight research findings, and conduct wheat planting decision meetings.

While objective reports, field days, and research-based recommendations can offer unbiased data and observations, these useful decision-making tools don't always change farmer behavior or help them adopt new and improved varieties. When it comes to variety adoption, word-of-mouth recommendation is sometimes more effective.

Extension's Response

In 1996, CSU Extension created the Collaborative On-Farm Testing (COFT) program to directly involve farmers in testing new varieties of wheat on their own farms, and to complement traditional wheat performance variety trials. As part of the program, Extension agents assist COFT farmers with planting seed, monitoring fields, harvesting wheat, collecting samples, determining yield, and reporting results. Seed is funded by the Colorado Wheat Research Foundation and provided by Extension.

Now in its fourteenth year, COFT complements traditional wheat performance variety trials which annually compare more than 40 varieties of experimental, new, and established public and private wheat. In these trials Extension grows wheat at 11 different dryland field sites and three irrigated trial locations across Eastern Colorado. In COFT trials, all participating farmers test the same five or six new and established varieties in long strips in one of their commercial wheat fields. They use their own management practices, resources and equipment.

The most recent COFT trial compared the performance and adaptability of three popular and newly-released CSU varieties with one promising commercial variety from WestBred and Watley Seed. In the fall of 2009, 21 COFT wheat producers planted each of these varieties. Nineteen farms produced viable harvest results while two tests failed due to severe hail damage.

Extension reports results from both traditional and COFT trails in early July immediately following harvest.



The Bottom Line

- COFT increases wheat farmer confidence in the performance of new wheat varieties and thereby speeds the overall adoption of new varieties around the state.
- COFT is unique to Colorado—no other state engages farmers in wheat development through on-farm variety testing.

By the Numbers

- Percent of CSU-bred wheat planted each year in Colorado: 70
- 2010 Colorado record yield for bushels per acre: 45
- Estimated value of the 2010 bumper crop: \$560 million
- Colorado's rank in U.S. wheat production: 4th
- Wheat is the second largest commodity crop in Colorado

Impact

Participating COFT farmers value the opportunity to test the most current wheat technology on their own farm and witness both good and bad wheat performance. By harvest, they have increased confidence in which varieties will and won't work on their farm. According to Ron Meyer, agronomy agent in Kit Carson County, that benefit alone keeps wheat producers involved in COFT, even when test yields are low.

However, Extension encourages farmers to make a variety decision not based on a single on-farm test, but by considering the results of a large number of on-farm tests, in addition to the results from traditional Colorado variety trials. It is also imperative to consider results from multiple years.

As COFT farmers follow the crop throughout the growing season, they not only share their observations with Extension agents who regularly visit COFT plots, but they also share variety strengths and weaknesses with their neighbors. In this way, trusted, word-of-mouth recommendation spreads throughout the community and adoption increases over time.

Rapid adoption of new varieties is a primary goal of COFT. Scott Haley, who leads CSU's wheat breeding and genetics program, says the value and benefit for rapid adoption comes down to economics. Since CSU released Hatcher in 2004, it has become the most planted variety in Colorado because of its consistent yield. On average, Hatcher yields 10 percent more bushels per acre than Akron, a known variety that was popular in the late 1990s. "If farmers wait four or five years to plant a new variety," says Haley, "They miss out on the opportunity to make more money." In a bumper crop year like 2010, that difference could translate into thousands of dollars.

Highlights of CSU wheat development and adoption include:

- In 2006, CSU released Hatcher, which, two years later was planted in 33 percent of wheat-producing acres in Eastern Colorado. Since 2008, Hatcher has been the most planted variety in Colorado.
- A recent survey of 297 wheat growers show COFT trial results as the top information source used by farmers in their variety selection. The four most important sources of grower information for making wheat selection decisions come from CSU & their collaborators.

Colorado is the only wheat producing state in the country that complements performance variety trials with systematic and uniform Collaborative On-Farm Testing.

Environmental variables such as precipitation, hail, and spring freeze heavily influence yearly wheat yields. Wheat variety also plays a significant role. CSU and other land grant universities, as well as private companies, develop and release new wheat varieties that resist diseases or insects, are herbicide-resistant for controlling serious weeds, or diversify wheat markets through improved quality.

CSU wheat breeding research is supported by a partnership between the CSU Agricultural Experiment Station, the Colorado Seed Growers Association, the Colorado Wheat Administrative Committee, and the Colorado Wheat Research Foundation.

Without the support of each of these groups, wheat breeding research at CSU would not be possible.

"We find in Extension that when you work with people who are the early adopters, their neighbors really do pay attention to what they do. You can make a big impact with a few because their neighbors learn from them."

– Bruce Bosley

Cropping Systems and Natural Resources Agent, Logan County

"COFT gives us hands-on, real time exposure to the varieties early in the process. This means we can make verifiable decisions sooner than if we didn't participate."

– Kent Kalcevic

COFT participant and wheat producer

County & Area Partners

Logan & Morgan County Extension
Bruce Bosley, Cropping Systems & Natural Resources Agent

Golden Plains Area Extension
Ron Meyer, Agronomy Agent
Alan Helm, Weed Science Agent

Southeast Area Extension – Prowers County
Wilma Trujillo, Area Agronomy Agent

Adams County Extension
Thadeus Gourd, Agriculture Agent & Interim Director

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Impact

Sharing the difference CSU Extension makes in people's lives and their communities.

Keeping well water safe to drink

Well users in one of Colorado's most rural regions are learning to test their drinking water and protect their health.

Issue

In Colorado's San Luis Valley, nearly one third of all residents get their drinking water from wells that are connected to an extensive, shared aquifer. Since well water does not receive the same protections that regulate municipal water supplies, well users are responsible for safekeeping their own water. In 2009 the Environmental Protection Agency (EPA) helped fund a community collaborative led by the San Luis Valley Ecosystem Council (SLVEC) and its executive director, Christine Canaly, to hold a series of forums on well water safety and hand out free water quality test kits. To be effective, the initiative required specialized technical assistance. The collaborative discovered that resource in Colorado State University Extension.

Extension's Response

The SLVEC community collaborative asked CSU Extension water specialists to help develop the educational forums. Extension had previously created several educational and management resources on well water quality for the Northern Plains & Mountains Regional Water Program, a USDA-funded, multi-state water quality partnership. The resources were a perfect fit for the SLVEC forums and included:

- Handouts on well and septic system management and drinking water quality
- A DVD called "Know Your Ground Water" (produced by Montana State University)
- An online Water Quality Interpretation Tool (see sidebar)

In addition to designing forum presentations using these resources, Extension trained the county public health nurses and SLVEC staff. These professionals then led a total of 13 forums throughout Alamosa, Conejos, Costilla, Rio Grande and Saguache counties in the spring of 2009.

In all, 337 participants attended the forums and took home test kits and educational resources. Extension paid for nitrate analyses in 100 of the 300 households that tested their water. The United States Geological Survey has previously detected nitrates from fertilizers in specific areas of the Valley's ground water supplies.¹ Extension mapped the test results (each water sample was tagged with its geographic location) to create a baseline analysis of the Valley's well water quality.



The Bottom Line

- CSU Extension educational resources encouraged problem solving at the household level by giving people the knowledge and skills they needed to ensure safe drinking water.
- CSU Extension contributed to long-term environmental health solutions that county public health nurses are now carrying forward in accordance with mandates from the Colorado Public Health Act of 2008.

By the Numbers

- Total well water test kits handed out: 337
- Total wells tested: 300
- Percentage residents reporting improved well monitoring and maintenance: 97
- Amount Extension contributed in in-kind and direct expense to improve well water quality: \$8,000

Impact

Six months following the forums, the SLVEC community collaborative conducted a follow-up participant survey.

- 97 percent of respondents reported that they were better able to monitor and maintain their well.
- 95 percent started a well record file.
- 96 percent planned to have their well tested again in the future.

Results from test kits showed the presence of bacteria in 42 percent of wells. Of these, 7 percent, or 22 out of 296 completed analyses, registered positive for coliform bacteria. Arsenic levels, which originate from natural mineral deposits, were found to exceed drinking water standards in 7.2 percent of the samples, or 12 out of 167 completed analyses. Nitrate levels exceeded drinking water standards in five out of 240 completed analyses.² Other contaminants and heavy metals were also present at varying levels. Complete test results are available through CSU Extension.

Of the respondents who used the free test kits, 17 percent had already consulted the online water quality interpretation tool to learn what their test results meant. By plugging bacterial, nitrate and heavy metal values into the online tool, users learned whether water quality problems existed and if so, the recommended treatment options. Of the 24 percent of respondents who reported finding water quality problems, 78 percent had plans to fix the problem.

As a result of CSU Extension's overall assistance:

- Valley residents learned to take control of their well water quality.
- The SLVEC collaborative was awarded additional EPA funding for continued environmental risk assessment throughout the Valley.
- The partnership created long-term environmental health solutions that county public health nurses are now carrying forward in accordance with mandates from the Colorado Public Health Act of 2008 to develop local public health plans and train and educate local public health workers.

¹ Stogner, R.W., Sr., 2005, Distribution and mass of nitrate in the unconfined aquifer beneath the intensively cultivated area north of the Rio Grande, San Luis Valley, Colorado, 1997 through 2001: U.S. Geological Survey Scientific Investigations Report 2004-5290, 62 p.

² Drinking water standards, set by the EPA, are expressed in maximum contaminant level (MCL) figures. The MCL for arsenic is 0.01 mg/L; nitrate is 10 mg/L.; and, total coliform is 0 organisms/100mL.

Bacteria Comes in Many Forms

Bacteria are mostly harmless, microscopic organisms found just about everywhere. For instance, iron-reducing bacteria found in well water can stain laundry and even clog well screens. However, some varieties of bacteria found in drinking water can cause sickness and disease. Testing water for every kind of bacteria is difficult, although most labs report coliform levels. This broad class of bacteria, which includes fecal coliform and Escherichia Coli (E. coli), lives in the digestive tracts of humans and many animals. Their presence typically indicates microbial contamination in the well. The presence of coliform should, at a minimum, demand further investigation. Possible contamination sources may be damaged septic systems or proximity to an animal waste source. It may necessary to disinfect the well through shock chlorination. Replacing the well cap, casing and seal may also be required.

Learn More

- The San Luis Valley Ecosystem Council spearheaded the community collaborative that received an EPA Environmental Justice grant to address well water quality issues throughout the area. View updates and reports at www.slvec.org.
- The Northern Plains & Mountains Regional Water Program Water Quality Interpretation Tool explains if drinking water is out of compliance with EPA contaminant levels and how to resolve the problem: <http://region8water.colostate.edu/wqtool/index.cfm>.

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Sharing the difference CSU Extension makes in people's lives and their communities.

Local knowledge helps residents grow food and plants

By expanding horticulture information through the Colorado Master Gardener education program, CSU Extension is answering the need for local solutions to the environmental challenges that have prevented residents from successfully gardening and growing food.

Issue

From Telluride to Norwood, the high mountain environment of Southwest Colorado's San Miguel Basin is a tough place to garden.¹ Many longtime residents and newcomers don't bother growing plants or food due to the short growing season, pesky critters, drought, and poor soil.

CSU Extension Master Gardeners have shown people how to overcome gardening challenges like these since 1975 when the Colorado Master Gardener (CMG) program began. For 30-plus years, San Miguel and West Montrose county residents have traveled to and from Grand Junction for hours at a time to attend volunteer training. Unfortunately, coursework has focused on gardening in the high desert, not the mountains. From 2000 to 2005 only three San Miguel residents became Master Gardeners.

Extension's Response

To help remote and high mountain communities better serve their residents with local gardening solutions, in 2007 CSU Extension developed a distance learning CMG training program. Then, in 2008 San Miguel County Extension offered its first ever CMG training which allows CMG students to attend classes locally. Geared for high-altitude gardeners, participants can interact with presenters and other students in mountain communities around Colorado via online video streaming using Adobe Connect software. The curriculum complements online classroom learning with plant identification and soils labs, pruning and diagnostics workshops, and field trips.

San Miguel County's Horticulture Extension agent Yvette Henson adapted the CMG curriculum to reflect the region's environmentally specific, high altitude gardening needs, and to emphasize local interest in food production instead of ornamental plants and lawns. San Miguel County is located more than 100 miles from major interstate highways or urban centers, and government officials and citizens have identified food security as one of the region's top concerns.



The Bottom Line

- CSU Extension is helping San Miguel Basin residents develop the skills and knowledge they need to create money-saving landscape solutions and thriving gardens.
- Colorado Master Gardener is strengthening food security throughout this rural region by teaching people how to grow food despite environmental constraints.
- The San Miguel Basin CMG program is the preferred local source for education and training of the region's green industry professionals.

By the Numbers

2009 San Miguel Master Gardener

- Volunteers: 29
- Volunteer hours: 1,078
- Educational one-on-one contacts: 1,401
- Value of volunteer time: \$22,475*

*This figure calculates hours of service times \$20.84, hourly wage equivalent for Colorado volunteers as derived by the Bureau of Labor Statistics.

Impact

As residents throughout the San Miguel Basin develop the skills and knowledge of creating money-saving landscape solutions, thriving gardens and homegrown food, it's clear that CSU Extension is helping people overcome the region's many environmental challenges. Volunteers are teaching residents research-based gardening practices that are specific to the region, such as precipitation-only gardens on water-restricted property.

Ongoing and recent service projects led by volunteers include:

- Providing diagnostic plant disease and gardening outreach at Farmer's Markets in Telluride, Norwood and Ouray;
- Enhancing community gardens in Norwood, Ridgway and Telluride; and,
- Designing and installing the Western slope's first High and Dry Demonstration Garden in Norwood, and expanding this precipitation-only model to Telluride and Naturita.

"I truly believe my garden was prettier than ever due to my Master Gardener experience with the CSU Extension. I was able to focus on the beauty of native plants, and even appreciate the grasses I once thought needed to be pulled. The knowledge I gained from the course was tremendously valuable, and it only wetted my appetite for more information."

– Master Gardener
San Miguel County

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Impact

Sharing the difference CSU Extension makes in people's lives and their communities.

Making food safe for everyone

CSU Extension leads the state in providing education to retail food handlers on preventing foodborne illness in restaurants and other food establishments.

Issue

Access to safe and nutritious food is the foundation of community health. In 2008, U.S. restaurants served more than 70 billion meals, accounting for almost half of every food dollar spent. Food prepared away from home can lead to both outbreaks and sporadic cases of foodborne illness. Furthermore, newcomers to retail food service and direct food sales are often young and inexperienced in safe food handling practices.

To prevent foodborne illness, food service employees need to know how to safely prepare, store and serve food. In Colorado, county health departments enforce food safety regulations at restaurants, delis, bakeries and other food-related businesses. Some Colorado counties complement these efforts with food handler trainings, but ongoing budget cuts have curtailed many of these. Instead, county health departments have collaborated with CSU Extension to provide food safety trainings to retail food establishment employees.

Extension's Response

In 2000, CSU Extension nutrition and food safety specialists were awarded a grant and developed a program called *Food Safety Works*. It taught entry-level or first time employees in the food service industry how to properly prepare, handle and store food. The curriculum was developed in collaboration with the Larimer County Health Department and piloted, in 2001-02, with Colorado Work Force centers, youth correctional facilities, and high school vocational programs. The program's success allowed Extension to adapt it to training food handlers in a variety of settings: retail establishments; hospitals; school cafeterias; and, volunteer organizations such as churches and fair concessionaires. CSU family and consumer science agents have taught the program in a classroom-type setting in more than 20 counties statewide.

Essentially, the *Food Safety Works* program teaches how to prevent foodborne illness through proper hand washing, cleaning and sanitizing equipment, safely handling and storing food, and avoiding cross-contamination. Fun and engaging hands-on activities help participants understand and retain course content. Trainings are offered for a fee (which varies by county) in both English and Spanish.



An Educational Manual For the Food Service Worker

The Bottom Line

- By teaching *Food Safety Works* to food handlers, CSU Extension steps in to provide much-needed public health education that many county health departments can no longer offer because of staffing shortages and budget cuts.

By the Numbers

- Classes conducted around the state in 2009: 74
- Food handlers trained around the state in 2009: 1,183
- Total food handlers trained in FSW since 2005: 3,950

Impact

Across the board, *Food Safety Works* participants gain confidence in knowing how to properly handle food. Participant surveys from across the state strongly indicate that employees plan to change their food handling practices to align with recommended safety protocols. Over time, this change in behavior will help prevent foodborne illness and improve public health.

Here are a few program highlights from across the state.

Larimer County

CSU Extension in Larimer County began offering *Food Safety Works* in 2005 when the county health department no longer had the resources to offer food handler trainings. The county helps fund an Extension agent solely dedicated to both retail and consumer food safety education. In five years, annual enrollment in Larimer County FSW programs has increased by 139 percent. In 2009, Larimer County Extension began mailing a new quarterly food safety newsletter to each area retail food establishment. The newsletter contains information on current issues, emerging pathogens, regulation updates, and the *Food Safety Works* training schedule. The publication is marketed primarily by health department inspectors who encourage restaurant participation. Since 2007, Larimer County Extension has generated nearly \$19,000 in *Food Safety Works* course fees.

Delta, Montrose, Gunnison, Hinsdale, Ouray and San Miguel Counties

In 2006, the West Central Public Health Partnership (WCPHP), a coalition of Western Slope county public health and environment personnel, contracted CSU Extension Tri River Area agents to teach 35 *Food Safety Works* classes annually until 2010. The programs were presented in six area counties. In 2009 at the four year mark, 116 classes had been held reaching a total of 1,474 participants. During the same year, this grant-funded effort expanded to Crested Butte Mountain Resorts where 66 employees were trained in *Food Safety Works* as part of the company's new staff orientation. A second training that same day served 33 employees from restaurants throughout the town of Crested Butte.

Extension is in the process of producing a training video in an effort to continue food safety training among retail food establishments once funding ends in December 2010.

Colorado Healthy People 2010 & The Colorado Trust

CSU Extension's involvement in developing *Food Safety Works* is closely tied to Healthy People 2010, a national initiative led by the Office of Disease Prevention and Health Promotion, and implemented in Colorado through The Colorado Trust. One of the initiative's goals is to improve employee behavior and food preparation practices in retail establishments that can cause foodborne illness. *Food Safety Works* helps meet that goal. Funding from The Colorado Trust has allowed Extension to present *Food Safety Works* throughout six Western Slope counties.

County Partners

Bent
Boulder
Delta
Douglas
Eagle
El Paso
Fremont
Gunnison
Hinsdale
Larimer
Las Animas
Moffat
Montrose
Otero
Ouray
Pueblo
Routt
San Luis Valley Area
San Miguel
Summit
Weld

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Impact

Sharing the difference CSU Extension makes in people's lives and their communities.

Making home food preservation safe

Extension's volunteer Master Food Safety Advisors help ensure safe food preservation practices at home while helping extend the usefulness of seasonal and local foods.

Issue

In recent years, Extension offices around the country have reported an increased interest among consumers for food preservation education. Several factors can account for this renewed trend. First, a growing number of food recalls have made consumers begin to think twice about the safety of their food. Second, a rising interest in supporting local agriculture has encouraged consumers to preserve seasonal bounties for year round enjoyment. Third, the worst economic downturn since the Great Depression has forced many consumers to stretch their food budgets. As a result, many individuals and families have begun growing—and preserving—their own food.¹

Without knowing how to properly can, freeze, dry or ferment foods for long-term storage, people put themselves and others at risk of foodborne illness. Certain preservation techniques, handed down through the generations, are no longer safe because some types of bacteria have developed the ability to grow in lower temperatures and more acidic conditions. Advances in food science and food safety mean consumers need a reliable, trusted, and current source of information for safe and successful home food preservation.

Extension's Response

In an effort to increase consumer access to research-backed food preservation and safety know-how, Land Grant University Extension programs began offering structured Master Food Preserver trainings in late 1970's and early 1980's. Modeled after the Master Gardener volunteer program the food classes were also geared for volunteers. As a result, Colorado State University Extension has maintained a successful state-wide volunteer program for more than 30 years. In 2006, CSU Extension updated the program name from Master Food Preserver to Master Food Safety Advisor (MFSA), a title that highlights the importance of food safety within food preservation.

To become a certified MFSA volunteer, participants take 30 hours of intensive training on methods of food preservation and food safety. Through lectures, discussion and hands-on demonstrations, these volunteers learn:

- How food spoils, what causes foodborne illness, and how to prevent it
- How to safely store and preserve food and make associated altitude adjustments
- How to can acidic and low-acidic foods, pickle and ferment, make preserves, freeze, and dehydrate

MFSAs annually donate 40 hours of volunteer service by fielding food preservation inquiries at county Extension offices, providing information at local farmers' markets



The Bottom Line

- Master Food Safety Advisor volunteers play an important role in preventing foodborne illness around the state by providing consumers information and education on the most current research-based practices in food preservation and food safety.

By the Numbers

- Number of counties with MFSA volunteers: 8
- Number of MFSA volunteers in Colorado:
- Number of volunteer hours contributed in 2010:
- Estimated value of MFSA volunteer service:

Impact

The MFSA program ensures that consumer confidence regarding safe food preservation practices remains high. Under the supervision of county Extension Family & Consumer Science (FCS) agents, MFSAs are the first line of response to consumer questions about canning, freezing, and storing foods. As MFSAs share their knowledge with the community, people gain access to the most current research-based practices in food preservation and food safety. And the flow of information doesn't stop there. A previous study on consumer confidence related to Washington State University's Master Food Preserver program showed that 80 percent of individuals who received information shared what they learned with at least one or two other people.²

Furthermore, MFSAs help county Extension agents keep food preservation education relevant to community needs and interests. By tying food preservation classes and workshops to seasonally available and locally grown foods, MFSAs help community members support local agriculture while increasing their self-sufficiency. For instance, in Larimer County, MFSA volunteers help teach food preservation classes from spring through fall on canning basics, high altitude food preparation, making and preserving salsa, jellies and jams, drying foods, and fermenting.

Lastly, MFSAs play an invaluable public health role by helping reduce the threat of foodborne illness. Volunteers are trained to help consumers understand how improper food storage and preservation can lead to food-related illnesses. Many food preservation inquiries focus on how to recognize the presence of botulism, what causes its growth, and how to prevent it from occurring.

County and Area Partners

Boulder County
Chaffee County
Eagle County
Larimer County
Pueblo County
Routt County
Tri-River Area

¹ *The National Gardening Association reported that 37 percent of all U.S. households, an estimated 43 million, planned to grow vegetables, fruit, berries or herbs in 2009—a 19 percent increase, or seven million households, over 2008.*

² <http://www.joe.org/joe/1987summer/iw2.php> - High Consumer Confidence, Hillers and Fox.

“”

Participant

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Impact

Sharing the difference CSU Extension makes in people's lives and their communities.

Management, networking and grants energize rural development

Extension creates new opportunities for business, government and people throughout Dolores County.

Issue

Less than 2,100 people live in Southwest Colorado's Dolores County. Its two main towns, Dove Creek and Rico, are separated by miles of mountains, mesas and small canyons. For decades, potable water, social services, business opportunities and other community amenities were few to non-existent. Dolores County needed management expertise, a network of partners and a steady funding stream to jump-start improvements.

Extension's Response

Dolores County Extension county director, Dan Fernandez, addressed this need when he joined Colorado State University Extension in 1990. The county had been working to bring potable water to its rural residents since the 1970s.

Fernandez developed strategic county relationships with the Department of Local Affairs (DOLA), the Southwest Water Conservancy District, and the Montezuma Water Company to develop a rural water project. He applied for a DOLA grant and received over \$200,000 in state and federal funding to construct two 300,000-gallon storage tanks. He then led a three year campaign to complete the project, which resulted in 66 miles of waterlines that serve almost 200 households. According to Fernandez, the success of the water project created a demand for county-wide improvements and prepared Extension for involvement in long term, community development programing.

Fernandez's position is unique compared to most CSU Extension county directors. In addition to providing Extension programming, he also fills gaps in county government by assuming certain responsibilities that county managers and planners typically handle, such as grant writing and economic development. For two decades, Dolores County Extension, through Fernandez, has provided technical assistance and oversight to over 10 boards and agencies.

Since 1990, Fernandez has also written over 140 grants to establish and enhance programs, services and business opportunities throughout the county. Significant community development projects include:

- Dolores County Fairgrounds construction and expansion: 1994-97
- Dove's Nest Early Care and Education Center, the first licensed facility of its kind serving the county: Established 1996, grants ongoing
- DCTV, a public access channel network that provides 4-H evening news, local weather, and educational programming: Established 1996, grants and sponsorships ongoing
- Community Health Clinic construction and improvements: 1998 to present
- Dick & Adele Weber Business Park: Established 2003, grants ongoing



The Bottom Line

- Dolores County Extension has improved the lives of county residents through millions of dollars in grants that support critical community services and programs.
- Dolores County Extension's management and networking expertise created long term community development.

By the Numbers

Dolores County Extension achievements since 1990:

- Number of grants written: 141
- Number of grants awarded: 116
- Amount of funding awarded: \$4,238,413
- Total grant package value: \$5,841,329
- Estimated current value: \$11,582,731

Impact

Since 1990, Dolores County Extension has generated over \$4 million in direct grant funding to support local services, programs, infrastructure and people. These projects have created new opportunities for economic development and improved residents' quality of life. Dolores County Extension also provided significant coordination, management and advisory expertise to ensure grant-funded projects succeeded. As a result, Extension helped generate a wealth of community, environmental and economic impacts, including:

Safe and reliable drinking water

- The rural water project brought potable water into people's homes and increased rural western Dolores County land values from \$100 per acre to \$700 in fourteen years.
- Town of Rico water improvements made town drinking water safe and increased storage capacity three-fold; lot values increased from \$5,000 to \$40,000 in seven years.

Family and individual stability and health

- Dove's Nest Early Care and Education Center allowed both parents to take on full-time jobs and increased the safety and education of children.
- The Dove Creek Community Health Clinic annually sees 1,400 patients, regardless of their ability to pay. It is the medically underserved region's only federally-qualified health center.
- The Senior Center guarantees the county's aging population has access to nutritious meals, safe transportation, and medical care and remains an integral part of the community.

New business opportunities

- The Nonprofit Dolores County Development Corporation established the Dick & Adele Weber Business Park in Dove Creek from 12 acres of donated raw ground. Numerous federal and state rural and economic development grants made the project possible.
- The business park has generated new opportunities for light industry and tourism, including a cement mixing company, a metal salvage operation and an antique tractor display.
- Business anchor San Juan Biodiesel, a 2.5 million gallon oilseed crushing and biodiesel production facility, developed a new dryland cropping rotation for local and regional growers. The business, now closed and for sale, employed 15 people at the height of its operation.

Community connections and a window to the world

- Dolores County Broadcasting Network (DCBN) is a UHF and cable-based public access channel that Dolores County Extension started in 1996. The network now owns one transmitter, manages three, covers Southwest Colorado and Southeast Utah and has a potential viewing audience of 40,000 residents. It broadcasts live and recorded programming via off-air antennae and cable, rebroadcasts a feed of Colorado Public Radio and streams live on the Web.
- Dolores County Extension has acquired over \$230,000 in grants to build a new studio and develop live 4-H evening news programming.
- Live and recorded programming features CSU Extension instructional workshops, church services, music, weather, Web cams, classic movies and more.
- Major contributors include Dolores County, the Southwest TV Translator Association, and Baja Cable.

Colorado State University Extension, U.S. Department of Agriculture and Colorado counties cooperating. Extension programs are available to all without discrimination. May 2011. Written by Carol Busch.

County Partners

Anschutz Foundation
Bacon Family Foundation
BOCES
Colorado Advanced Technology Institute
Colorado Council of the Arts
Colorado Department of Agriculture
Colorado Department of Transportation
Colorado State University Extension
Colorado State University Extension 4-H Fund
The Colorado Trust
Coutts & Clark Foundation
Daniel's Fund Foundation
Department of Local Affairs
Dolores County
El Pomar Foundation
Farm Services Agency
GOCO
Job Training Partners Act
Montezuma Water Company
Natural Resources Conservation Service
Region 9 Economic Development District
Social Services
Southwest TV Translator Association
Southwest Water Conservation District
State Historical Society
Town of Dove Creek
Town of Rico
USDA Rural Development
USDA San Juan RC&D
US Forest Service
Workforce Investment Act

Learn More

A complete list of grants made possible by Dolores County Extension since 1991 is available at www.extension.colostate.edu/WR/Dolores/grants.pdf.

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Impact

Sharing the difference CSU Extension makes in people's lives and their communities.

A new era of collaborative land stewardship

Extension's science-based range education program help ranchers and federal land managers establish a collaborative grazing management process that is improving the land, and relationships.

Issue

In the early 1990s, controversy over environmental impacts of grazing on public lands came to a head around the West. Ranchers, land managers, environmentalists and recreationalists held divergent opinions on grazing management and how it affected the land. In Colorado, Western Slope ranchers faced uncertainty about what land managers expected of them. Witnessing the discord and confusion, Extension saw an opportunity to help ranchers and land managers develop a science-based approach to rangeland health and management.

Extension's Response

In 1995, Tri River Area Extension Range and Livestock agent Robbie Baird LeValley created the Range Management Schools (RMS) by bringing together ranchers and public land managers from the Natural Resources Conservation Service, the U.S. Forest Service and the Bureau of Land Management. The group developed a curriculum that was based on shared needs and grounded in scientific principles.

The RMS offers Range 101, Range 501 and Range 701 courses, that all include one classroom and one field day. Through this curriculum, participants learn about the ecology of the rangeland, plant physiology, rangeland nutrition, animal behavior, rangeland monitoring, grazing responses, range health indicators, grazing plans and much more. To support learning, participants receive a resource notebook that features all classroom presentations plus research articles, reports and information from the Colorado State University's Department of Forestry, Rangeland and Watershed Stewardship. In December 1995, 62 grazing permittees, federal managers, land owners and other stakeholders participated in the first RMS Range 101 course taught by LeValley on the Western Slope.

Through the science-based curriculum, ranchers and land managers collaboratively build a grazing management plan that reflects the needs of all species that use the landscape, not just livestock. With this plan, ranchers and managers define a long-term vision for sustaining landscape health. Extension then helps ranchers create monitoring programs to assess these new management strategies.

Within three years, the RMS expanded beyond the Uncompahgre Basin and Gunnison National Forest to other Colorado regions. Courses have also been taught in Utah, Wyoming, Oregon, Montana, British Columbia and Nevada. A total of 6,450 ranchers, state and federal land managers, wildlife specialists, environmentalists, county commissioners and private rangeland owners from across the West have attended the RMS since 1995.



The Bottom Line

- For 15 years, Extension has helped ranchers and land managers increase their understanding of rangeland ecosystems, while encouraging a new, collaborative approach to grazing management.
- By working together and basing management on principles of rangeland science, ranchers and land managers are improving rangeland conditions and increasing public acceptance of livestock grazing on public lands.

By the Numbers

- Total number of RMS participants since 1995: 6,450
- Average percent increase in participant knowledge after attending the RMS: 34%

Impact

Through 15 years of instruction and collaboration, the RMS has helped improve grazing management on over 6 million acres of public land around the West. LeValley attributes these improvements to an increased understanding of landscape health, multiple-use and their interrelationships. “Grass responds the same no matter what animal—cow, elk, or grasshopper—takes a bite out of it,” says LeValley. “The RMS has taught everyone that grazing can be managed to maintain plant health and be used as a land treatment.”

Dave Bradford, Rangeland Management Specialist for the Paonia Ranger District of the Grand Mesa, Uncompaghre and Gunnison National Forests (GMUG), says that the RMS fostered a major change in the relationship between the Forest Service and grazing permittees. “We moved beyond the bureaucratic approach and began to base our management on scientific principles and what was actually happening on the ground,” says Bradford. As of 2010, all 27 grazing allotments on the Paonia Ranger District have multi-pasture, time-controlled grazing strategies and none has seen a reduction in animal numbers in the past 15 years.

Bradford cited an example: In 1996, new grazing management strategies began on the District’s 9,000-acre West Terror allotment which ranchers and the Forest Service transformed from one giant pasture into seven smaller pastures. Ranchers grazed cattle as a single herd and moved them every three to 33 days based on grazing intensity and plant growth. These changes produced immediate improvements. Early grazed pastures were allowed to re-grow and late grazed pastures grew to maximum development prior to grazing. According to Calvin Campbell, West Terror allotment permittee, this new strategy allowed the most overgrazed areas to rebound quickly. “Nobody would’ve guessed those areas were capable of producing as much, or the variety, of grass that they did,” says Campbell.

Overall, the collaborative approach used within the RMS have improved the land, how it’s managed, and the relationships among those who have a vested interest in conserving public lands around the West. Ranchers and land managers have a better understanding of why the range is improving, and what they can do to continue this trend. All parties agree that the decision to include environmentalists, local politicians, and other land and wildlife interests in the RMS program has created a global understanding of landscape health and helped dissolve an ‘us’ versus ‘them’ attitude.

“One of the Range Schools successes is that it opened up a discussion and allowed for communication between permittees and range staff that wasn’t there before. There was never any mention of policy, standards or guidelines. Sure you have to follow guidelines, but that shouldn’t really be what’s driving your influence of what can be implemented. We were there to talk about practice on the ground.”

– Calvin Campbell

Rancher and permittee, West Terror allotment

“The natural environment is complicated and our understanding of it is an on-going process. We need to continue to try to learn and base our understanding of what is happening on science and actual on-the-ground conditions.”

– Dave Bradford, Range Management Specialist

Paonia Ranger District, Grand Mesa, Uncompaghre and
Gunnison National Forests

“Range management is not an academic answer or an agency answer. It’s a partnership answer.”

– Robbie Baird LeValley

Tri River Area Extension Agent, Range & Livestock

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Impact

Sharing the difference CSU Extension makes in people's lives and their communities.

Pre-Fair livestock interview improve 4-H record keeping

A new, pre-fair interview process for livestock projects motivates Weld County 4-Hers to complete their record books and develop valuable public speaking skills.

Issue

Record keeping is a required and integral task of every 4-H project, from shooting sports and leathercraft to model rocketry and raising livestock. Record books help 4-Hers set personal and project goals, log expenses and activities, and tell a story about their experience.

4-Hers who raise livestock for exhibition assume a great deal of responsibility, especially since these animals eventually enter the food supply. 4-Hers must keep careful record of all activities and data related to their animal's health and nutrition in addition to tracking expenses, comparing market versus fair prices and generating financial summaries. As a result, maintaining an up-to-date livestock record book takes motivation and diligence. However, 4-Hers often wait until the last minute to complete their records and some don't fully understand how to keep records. In Weld County, this tendency to cut corners and general confusion became a concern.

Extension's Response

In 2008, Weld County Extension 4-H agent Keith Maxey created a Pre-Fair interview process to increase project accountability among 4-Hers raising livestock. Pre-Fair interviews give 4-Hers a chance to learn how well they keep records in over a dozen required categories. Interviews also help 4-Hers talk through any record keeping responsibilities they don't understand.

One-on-one interviews take place in early summer, before fair season begins. They are required for all Weld County 4-Hers raising livestock for market or breeding and who plan to exhibit at county fair. In 2010, a volunteer group of 4-H leaders, parents, fair board members and Extension agents conducted 465 interviews, using a score sheet that evaluates record books. To improve future record keeping, volunteers review the score sheet with 4-Hers so they are clear about what improvements, if any, are needed.

The overall record book is considered 'incomplete' if four or more categories are not up-to-date. In 2010, only 10 record books received this rating. To ease 4-Hers into this new project requirement, first year record books were allowed up to seven incomplete categories.

4-Hers whose records were rated 'incomplete' have until before the Weld County Fair to bring their records up to date. At the conclusion of their livestock project, 4-Hers submit their record book for final judging. Any 4-Her whose final submission is rated 'incomplete' cannot show at the next year's fair unless they go to a training on livestock record books.



The Bottom Line

- Pre-Fair interviews are improving the quality and completeness of 4-H Livestock record books in Weld County.
- Pre-Fair interviews provide 4-Hers the chance to share information about their project in a non-competitive environment that helps 4-Hers develop public speaking skills.

Impact

In just three years the pre-fair interview process has significantly increased the quality of livestock record keeping, as well as the success of 4-Hers. Not only are more 4-Hers coming to Pre-Fair interviews with records that are up-to-date, their records are more thorough. This suggests that 4-Hers now see a greater obligation and responsibility to the goals of their project and the welfare of their animal.

According to Maxey, success can be measured by looking at the final ratings of 4-H record books. In 2008, 18 record books were judged incomplete (volunteer judges used a point scale and rated records incomplete when they tallied 50 percent or less of the possible total). In contrast, in 2010 only 5 record books were judged incomplete. This is significant because in 2009 the standard was raised. Now record books are judged incomplete if points are less than 70 percent of the possible total.

Colleen Bartman, a volunteer interviewer, says the interview process engages 4-Hers in the 'learn by doing' aspect of 4-H. Since 4-Hers have time to revise record books using interview advice and feedback, they can produce and submit a better finished product that gets results. Bartman says the biggest advantage for 4-Hers is that they learn how to participate in an interview and are given the opportunity to ask questions about the parts of the book they don't understand. They also get to talk about their projects and show what they know.

Brechen Santeramo, also a volunteer interviewer, agrees. "I think interviews have given 4-Hers tools to present themselves better, learn more about quality and correct record keeping, and have given them confidence on completing their records on time," Santeramo says.

"As a parent, I love the idea of the interview. It motivates the kids to keep up with their records (the least favorite part of any project) rather than wait until the last minute. I think it helps them to become more organized, more careful and instills the idea that you can't fake your way through your records. More than that, I think it helps introduce pride to the whole process."

– Colleen Bartmann
Pre-Fair Interview volunteer

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Impact

Sharing the difference CSU Extension makes in people's lives and their communities.

A solid diet of onions

Extension research encouraged Eastern Colorado sheep farmers to adopt a money-saving feed source

Issue

Every year Colorado onion growers must spend time and money disposing of thousands of tons of leftover and rejected cull onions because they easily spread disease and ruin the soil. But to Tom McBride, an Adams County Extension livestock agent, cull onions were a decent source of feed. They are 90 percent water and contain nine to 12 percent protein. Since Colorado onion growers will give away culls for free, he figured sheep farmers might be able to significantly reduce their feed expenses by using the leftover onions. Widespread adoption of this practice demanded reliable, research-backed data to ensure animal health.

Extension's Response

For over a decade, McBride has conducted several studies to learn what happens when sheep eat an onion-based diet. Onions contain sulfides that cause anemia and previous research has shown that cattle become ill and can die if their feed contains more than 20 percent onions. McBride needed to find out if the same rule would apply to sheep.

McBride started feeding onions to his own sheep without issues. As word spread, questions emerged. How would feeding onions to pregnant ewes affect weight gain? Would lambing rates fall if pregnant ewes ate onions throughout gestation? Would onions affect fleece weight and quality?

CSU Extension veterinary specialist Tony Knight worked closely with McBride to answer these questions. They conducted several studies and drew data from two that evaluated the effects of feeding onions in different amounts to ewes and wether lambs.¹ Here are the details of these 2006 studies:

- **Pregnant Ewes Study:** 17 pregnant ewes were fed a diet consisting entirely of onions for the last 102 days of gestation. A control group of 17 ewes were fed a normal diet of alfalfa and grain. Blood samples were taken throughout the trial and analyzed to determine the presence of anemia. Fleece weights, pregnancy rates and lambing percentage were also determined.
- **Market Lamb Study:** 50 wether lambs were fed a diet of cull onions for approximately 60 days before slaughter to see if they would gain enough weight to reach the 130 to 150 pound target. Lambs were randomly split into five groups that were fed a ration of zero, 25, 50, 75, or 100 percent onions. At slaughter, carcasses were evaluated for USDA quality, yield, taste and tenderness.



The Bottom Line

- Extension-led research determined that cull onions are a safe food source for sheep
- Cull onions, a free and readily available source of feed, have the potential to help sheep farmers across Colorado gain a higher return on their investment

By the Numbers

- Colorado's national ranking for onion production: 5
- Colorado's national ranking for sheep production: 4
- Reported daily savings when using cull onions: \$16.80

Impact

McBride and Knight have generated results that establish cull onions as a safe alternative to traditional feed rations of hay, alfalfa and corn. Both of these studies produced data that clarifies the unique ability sheep have to process onion sulfides. Overall, findings indicate that ewes can live on a diet of 100 percent onions while lambs headed for slaughter do better on a ration of 50 percent onions.

Specifically, ewes rapidly adapted to eating cull onions. Unlike cattle that can develop a fatal anemia from eating too many onions, sheep presented a mild transitory anemia regardless of how many onions they ate. After a week to ten days, however, red blood cells regenerated and the sheep recovered. They continued eating cull onions without hesitation. Furthermore, ewes did not appear adversely affected when compared to the control ewes, who ate no onions. In fact, onion-fed ewes had comparable body condition scores and fleece weights. Most importantly, there was no significant difference in pregnancy or lambing rates. Therefore, it appears that pregnant ewes can be fed a pure onion diet with minimal detrimental effects.

On the other hand, data indicates that a 100 percent onion diet is not recommended for finishing market lambs. At most, lambs can eat a diet of 25 to 50 percent onions and still reach an acceptable market weight. Lambs fed a diet of 75 and 100 percent onions showed minimum weight during the finishing period. Remarkably, onions fed at any percentage ration did not adversely affect meat quality or flavor.

These results have also helped McBride successfully establish mutually beneficial relationships between sheep farmers and onion growers. Onion growers are eager to give their onions away for free; some even deliver culls directly to sheep farmers during their season of availability (roughly September to March). As a result, onion growers report breaking even on disposal costs.

Sheep farmers, on the other hand, can significantly reduce feed expenses by supplementing rations with onions. Total savings depends on:

- the percent of onions in the daily feed ration,
- cost and type of feed normally given, and
- the duration of onion feeding.

For instance, one farmer reported spending approximately 84 percent less on feed every day, or \$3.20 instead of \$20.00, by feeding his 80-head sheep a mostly onion diet between September and March. Cull onions have the potential to help sheep farmers across Colorado gain a higher return on their investment, especially as the cost of livestock inputs (primarily fuel and feed) continue to rise.

¹ Whether lambs are young, castrated male sheep.

“It’s amazing what Tom Mc Bride has been able to determine about the benefits of feeding onions to sheep. All the cull onions that we have now are going to big sheep feeders. You feel much better that you’re not crushing onions and plowing them under. It has some kind of value to somebody.”

– Bob Sakata
Owner and farmer, Sakata Farms

Learn More

- Results and other information about Adams County Extension cull onion research projects are available at: www.colostate.edu/Depts/CoopExt/Adams/ag/sheep_main.htm.

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