2008 Utah State University Combined Research and Extension Annual Report of Accomplishments and Results

Status: Accepted
Date Accepted: 06/08/09

2008 Utah State University Combined Research and Extension Annual Report of Accomplishments and Results

I. Report Overview

1. Executive Summary

Land Use and Sustainable Communities -

The Utah Agricultural Experiment Station (UAES) and Utah Cooperative Extension Service (UCES) have been involved with an evaluation of the socio□economic impact of land policies affecting public and private lands in the western United States. Various market failures explain why lands were retained by the federal government. These failures also suggest why the management of these lands remains contentious. These controversies center around three basic issues: 1) who has access to federal lands, 2) what can people do that have access and 3) who obtains the rents associated with the use of these lands. There has been a long standing problem in the West, which is expected to continue until there is a long□term resolution of the property rights associated with both public and private land and land□based resources.

Extension and UAES are also involved in various trials to determine alternative energy sources might be available to any of the state's rural areas. Other issues involving UCES and Experiment Station work include issues of open space (greenbelt), Ag/urban interface, invasive weeds, zoning issues, animal husbandry, public land use, and general resource management.

Many of the new rural Utah population moved for the open space and "small town" feel, but they also want big city amenities. These contradictory thoughts cause many emotional discussions with little substance or real understanding of the issue. Research conducted by the UAES suggests that conflicts are often introduced by new rural residents who do not always realize the impact they have on local communities (i.e., medical, public schools, etc.). The results of other research show that new residents who spend at least 10 years in the local community are less likely to move out of an area. This holds true for all nationalities except Latinos.

Small Acreage Workshops continue to be held by USU to help small land owners learn how to get benefit from their small acreages. These workshops were based on data generated by UAES scientists.

UAES and CES have worked together to assist in the development of water conservation measures.

The UCES Business, Entrepreneurship and Rural Economic Development Programs continue to help Utah communities, business and individuals to make choices and decisions regarding growth, employment and development alternatives. UCES provides assistance to communities and businesses to help them evaluate the advantages and disadvantages of development strategies such as entrepreneurship, business retention and expansion, business recruitment and new business start□ups. UCES was involved in developing a training curriculum on Effective Professional and Interpersonal Communication in

The Manufacturing Extension Program continues to have a significant impact on Utah's manufacturing community. The MEP is ranked as one of the top 5 MEP Centers nationally for Economic Impact on Manufacturers.

Sustainable Plant Communities -

The Sustainable Plant Communities programs can be summarized in several main areas. Nested within these areas, activities such as publications, workshops, meetings, utilization of media, and field days can be found. UCES and the Experiment Station enjoy a good reputation in Utah and have access to a wide range of media for dissemination of current research□based recommendations and educational programs.

Weed control in Utah is a serious concern because of its impact on productivity of wild lands, the propensity for cheatgrass to result in wildfires, and the reduction of agricultural yields. The control of weeds remains a great challenge and determination of sustainable methods of control is a top priority, especially in wild land areas where economic inputs are limited. UAES research is ongoing in this critical area though progress is often slow and much remains to be done. A highlight of the weed management program is the collaboration of UCES and UAES personnel in Cooperative Weed Management Area programs. Other major programs have included efforts to educate the public so they have an awareness of the impact of weeds, weed identification and mapping, and significant publications such as Weeds of the West. This is of extreme importance because much of the urban-to-rural migration with smaller ranchettes have introduced new weeds and reduced control of existing weeds due to a lack of knowledge of weeds and the means to control them.

The Master Gardener program continues to make a major contribution in the education of homeowners regarding sustainable methods of landscape and garden management. The Master Gardener program is very successful in directly educating the public, and indirectly through the efforts of volunteers. Management of the program state□wide has been facilitated through the development of a Master Gardener coordinator charged with bringing uniformity and coordination to the program. UAES research data are the basis for many of these articles, books, and UCES□type outlets.

Since many of the plant communities in the west are dependent upon irrigation, sustainable irrigation practices in the form of water conservation through efficient water use are essential to the sustainability of the plant communities themselves. Research and UCES programs conducted during the past year include improved management of irrigation to reduce

the number of applications per year, determination of optimum irrigation for commercial fruit production, demonstrations of water conserving crops (safflower) and landscape plants, improved irrigation water measurement techniques, and Water Check landscape water conservation programs in several counties in northern Utah. Research programs examining the use of native plants have resulted in four demonstrations gardens, development of the WDC□011 working group, an aerial survey for selection of landscape plants, propagation of plants by Master Gardeners for use at the Utah Botanical Center, and continued cooperation with the green industry.

Integrated Pest Management (IPM) encompasses all practices which enable plant production while minimizing the cost and economic impact of pest control (the essence of sustainability). These practices have resulted in direct support of the commercial fruit, vegetable, ornamental and agronomic crops, in addition to supporting home owners and landscape managers throughout the state. County agents and specialists are also heavily involved in collaborating with the Utah Department of Ag and Food in presenting pesticide applicator workshops for certification of applicators. This training insures that applicators are aware of alternative pest management options and the proper use of pesticides when needed.

A key tool in all IPM programs is plant diagnosis. Currently, several counties have local diagnostic clinics enabling home owners and professionals to bring samples in for diagnosis. Twelve counties are also linked to the Utah Plant Pest Diagnostic Laboratory located on the campus at Utah State University through a system of digital imaging microscopes. The cameras allow agents or master gardeners to take pictures of disease symptoms or insects they are unfamiliar with and send them to campus for either diagnosis or verification. The system has reduced response time and has been the key to the quick identification of serious problems such as the Utah County Japanese beetle infestation. Effective training has not only led to diagnosis of problems, but has resulted in recommendations that fit IPM goals and provide the most sustainable control options.

Monitoring of pest populations is a critical part of the IPM program. Using trapping and modeling of pests, coupled with an effective notification program, has allowed growers to time pest control procedures to optimize their efficacy and minimize excess pesticide application.

UCES and the UAES have participated in the High Value Specialty Crop Pest Management program which allows minor use registration of pesticides for the $98 million minor crop industry in Utah.

Research conducted through the UAES is underway on acceptable fruit rootstocks for Utah, primarily apples. Studies on plant production in controlled environmental systems have provided much needed data for the U.S. Space program. Extensive research has been undertaken in attempt to control plant pests with their associated damages. Plant breeding programs are underway to enhance feed and food grains.

Sustained Livestock Production -

UCES and UAES are involved in a wide array of studies and programs related to animal management systems. Producers report that research□based information provided by UCES will help them plan their livestock marketing strategies as well as their cropping strategies. Information and training in QuickBooks, balanced rations, control of noxious weeds, and cost/benefit analysis have helped farmers to cut costs and improve production. As a result of these activities farmers attending UCES programs are spending more time looking at their operations and finding ways to cut costs and improve production.

Master Beef Manager classes were held by UCES. Topics taught were livestock handling and facilities, bio□security, and financial and production record keeping. Beef producers learned relevant topics for sustained and profitable production. Results from the Master Beef Managers Program pre□ & post□workshop self□assessed understanding has shown that for a majority of workshop topics statistically significant learning has taken place ($p<.05$). Eighty□nine percent from a mail survey report they are better able to identify and manage those risk factors taught during the management workshops at their location.

A survey of participants at the Range and Pasture Management Workshop showed that 100% of respondents rated the information received as good or excellent. Eighty percent of respondents felt that UCES's range and pasture information was extremely valuable.

UCES field days, producer meetings and workshops conducted throughout the state are a means to provide current and timely information to bee producers in the state. We are impacting how producers conduct their business and this is having far reaching benefits for the state.

BQA continues to be one of UCES's major beef programs in the state of Utah. The NCBA beef audits have determined that if beef producers utilized specific management practices as outlined by the BQA program they could capture up to $125 more per animal. In Utah this could provide millions of dollars into local economies.

UCES and the UAES are involved in veterinary programs; poultry diseases; animal disease case investigations; disease pathogenesis in farmed fish species; emerging and exotic infectious disease; bovine mastitis and mastitis resistance to enhance dairy food safety; and epidemiology. These efforts will most certainly require long□term investments in research and outreach.

In 2008, over 9,000 cases were accessed at the Utah Veterinarian Diagnostic Lab, which required 120,000 individual assays. In addition to the written reports, most cases required at least one, and often more, phone contacts. This means that USU personnel had direct one□on□one contact (often repeated) with almost 8,000 Utah citizens.

Plant, Animal and Microbial Genomics -

Gene duplication is a primary source of new genes that have arisen through evolution. The purpose of this study is to investigate how new gene functions arise after gene duplications. Because our proposed research is so basic in nature, we have made relatively minor contributions to the knowledge of the consequences of gene duplication. Nevertheless, these studies are

essential for long□term fundamental improvements in our knowledge of gene duplication events. Long□term collaborations are being built with the USDA, ARS, Forage and Range Research Lab. These groups investigate locally important rangeland grasses and plants that have also undergone whole genome duplications and are directly related to the proposed research.

Gastrointestinal nematode parasitism is arguably the most serious constraint affecting ruminant production world□wide. Genetic markers associated with parasite resistance/susceptibility will improve an animal's resistance to gastrointestinal nematode infection, reduce the need for anthelmintics, and improve overall production efficiency. This project will provide information on genetic regions controlling parasite resistance in sheep. Results could lead to genetic markers for selection of resistant sheep or treatment of parasite burdens in ruminants.

Relatively few genes controlling traits in livestock species are known. Knowledge of the genetic region containing important genes will lead towards the genetic selection of animals with favorable combinations or manipulation of these genes to enhance animal performance. Many researchers are establishing projects to identify economic trait loci (ETL) in livestock, including sheep. The development of genomic resources for sheep will greatly enhance the identification of genetic regions influencing economically important traits. The International Sheep Genome Consortium (ISGC) is composed of scientists, commodity organizations and funding agencies from Australia, France, Kenya, New Zealand, United Kingdom and United States, including the NAGRP Sheep Genome Coordinator. The ISGC emphasizes the development of public genome resources that contribute to the sheep genome map and ultimately lead to a completely sequenced ovine genome.

Radiation hybrid mapping is a method for producing high resolution genome maps, which can then be used for determining gene order. In this way, knowledge of the genome organization of a species is integrated with other species maps. The comparative map of the ovine genome that will result from this project can be orientated with respect to the genome maps of humans, mice and cattle, thereby facilitating identification of genes controlling important traits in sheep. The comparative map of the sheep genome that will result from this project can be orientated to the genome maps of humans, mice and cattle, thereby facilitating identification of genes controlling important traits in sheep.

An essential component of genomics research is the development of high□resolution, genome□wide physical maps. A physical map of a genome is created by systematically organizing cloned fragments from a large□insert library into overlapping segments or contigs. The resulting "map" of DNA fragments becomes a guide for identifying the location of any gene or marker in the genome. So far it has been demonstrated that limited sequencing of sheep BAC clones combined with positioning on the well assembled human genome such as humans can yield extensive, detailed subgene□level maps useful for isolation of genes and genetic markers in sheep.

Bluetongue virus is a worldwide disease in domestic animal and wild ruminant and recently being considered as a bio□terrorist agent. DNA vaccine and the use of BTV NS□2 protein against this disease are being developed. NS□2 protein can also be used to develop two kits that can make definitive diagnosis of BTV□infected or vaccinated animals and specific isolation of all ss□RNAs for genomic investigation. The SPIBE Immunoassay using synthetic peptides representing the dominant antigenic determinants of both the NS□2 and VP7 protein instead of native proteins can further be developed into a rapid and more accurate assay and a potential commercial diagnostic kit that will can easily determine and distinguish whether animal is infected by BTV or vaccinated with BTV vaccines. Once it is developed into the high throughput system (HTS), it will also provide more accurate results for global import and export of livestock as well as to trace the spread of BTVs. The two potential anti□BTV drugs that have been identified might have potential future uses to inhibit BTV infection in domestic cattle and wild ruminants in the near future.

The purpose of some of these studies is to identify key mechanisms responsible for reprogramming bovine adult cell nuclei into a state mimicking that of a normal fertilized embryo.In addition, these studies will provide insight into identifying unique metabolic factors that are critical to three stages of preimplantation embryonic development: a) fertilization, b) maternal to zygotic transition, and c) first stages of differentiation. Knowledge gained from these studies will have a significant impact on our understanding of how to reset the gene expression profile of adult nuclei into that of an undifferentiated or pluripotent state.

Economic success for the US dairy industry is largely dependent on manufacture of natural cheese. Flavorful cheese has premium value, and Lactobacillus helveticus (LH) is widely used to intensify cheese flavor notes. This project will utilize the LH genomic sequence to establish the role of specific enzymes and metabolic pathways in cheese flavor development. Results will allow industry to more predictably enhance flavor of Cheddar, Italian, and Swiss cheeses. Transformation of bland curd into delicious mature cheese is a complex and dynamic process whose intricacies are scripted by the milk composition, the cultures and enzymes present, and the manufacturing and ripening conditions. Since flavorful cheese has premium value as a food or food ingredient, there is great industrial interest in technologies to accelerate ripening. Research has shown that lactic acid bacteria (LAB) present in cheese have a central role in flavor development, so effective strategies to accelerate or intensify cheese flavor can be derived from a more fundamental understanding of LAB physiology in milk and cheese environments. Lactobacillus helveticus CNRZ32 is a strain that is widely used by industry to intensify and modulate cheese flavor development. Because L. helveticus does not grow in Cheddar cheese, we are also performing parallel experiments with Lactobacillus casei, a bacterium that grows to high numbers in ripening cheese and has also been shown to impact flavor development. This research will boost development of desirable flavors during cheese aging, thereby enhancing competitiveness of US□made cheeses in the multi□million dollar global cheese market.

Production and Safety of Food Products -

New and improved foods have a tremendous ability to positively affect human health. Projects at USU focus on improving

nutrition and adding bioactive properties to foods. Projects include minimizing trans□fatty acids, utilizing whey proteins, and examining the nutrition of milk fat in food systems. Polyunsaturated fatty acids and milk fat blends were examined to replace trans□fatty acids in foods. The effect of processing conditions and the stability of fats have been partially characterized. Another project seeks to provide a better understanding of how bifidobacteria respond to stress conditions commonly encountered in food systems, and identify potential strategies to enhance long□term cell survival. Findings reinforce our fundamental understanding of the genetics and physiology of these bacteria in foods. Whey□based fiber was examined as a replacement for cornstarch in snack foods. Data indicates the possibility to incorporate dietary fiber at levels of approximately 20%.Lastly, milk fat globules were examined for better characterization. Initial results indicate there are at least two different classes of milk fat in relation to triglyceride content. Further research is being conducted to determine any nutritional benefits. Through research in this area, consumers will be provided with an improved selection of high quality, low cost, safe, and nutritious foods. Food production and processing to meet the needs of today's consumers will enhance health and well□being and improve the nation's economy. Understanding the structural and functional relationships among various components of foods will allow better control and enhancement of food quality during processing, storage distribution, and preparation for consumption.

The Centers for Disease Control and Prevention (CDC) estimates that 76 million foodborne illness cases occur in the United States every year. This may cost as high as 40 billion dollars annually due to lost productivity and direct health expenses. While most people believe that manufacturers are the main source of foodborne illness the truth is that greater than 70% are caused in food service and in the home. Furthermore, Utah is disproportionately high, compared to the rest of the county, in consumers that participate in home food preservation and storage. UAES researchers and UCES staff have major programs aimed at home food safety and retail□foodservice food safety. Both programs are addressed at the state level and at the county level. The home food safety program includes home food preservation, storage, and food preparation. Each County provides direct educational programming based on research□based results, such as seminars, to consumers to increase food safety knowledge and change behavior. Educational programs include safe hand washing, safe home canning, safe food storage, and safe food preparation (cook, clean, chill, and separate). In addition, state and local personnel answer several thousand direct consumer inquiries annually via telephone and email.

For retail and foodservice food safety, USU provides a Food Safety Manager's Certification Course. Exams are bilingual to assist Spanish□speaking foodservice managers. Each county in Utah supports the course and provides access to materials and testing. Safe food behaviors at the consumer and retail□foodservice level will reduce foodborne illness cases annually. Safe and proper canning will save a few lives of persons that otherwise may have contracted botulism. Educated and knowledgeable food service managers play a vital role in the safe food production at this level of the farm□to□fork food chain. The CDC has determined that foodservice operators who have passed a Food Safety Manager's Certification are less likely to engage in foodborne illness risk behaviors.

UAES scientists have developed new meat and dairy products that reduce the likelihood of foodborne contaminants and ensure relevant new foods enriched in vitamins and minerals, while adding less fat. Research efforts are also underway to identify means of various metabolic processes so as to enhance human health.

Water and Soil Conservation and Uses -

Satellite□derived remotely sensed data (Landsat and ASTER) and digital elevation models were shown to be useful for mapping soils in the Needles District of Canyonlands National Park, and in mapping 200,000 acres of rangeland in Beaver County, Utah, and 20,000 acres of rangeland in southern Nevada in a research□UCES effort. This has the potential to significantly reduce vegetation identification costs for large and small areas. This mapping procedure has also allowed large areas of at least 3 national forests to be screened for weeds and other vegetation types.

The "On□Target" program helps implement simple, low□cost instruments and methods that can identify surface oil carbon percentages from space, airborne, and tractor□mounted platforms to "benchmark" growers. One Benchmark farmer estimated the savings on their farm to be at least $17 per acre, over 2000 acres of irrigated farmland. Testing of Fassio Farms Compost by USU has helped them to secure an OMRI certification as an organic fertility amendment. They now have a new market open to them in the distribution of their product.

Education and research results on landscape irrigation and particularly turfgrass irrigation are being conveyed directly to federal and state agencies as well as water purveyors. Since 2004, these findings have helped to generate a 13% decrease in statewide water use.

A project examining the value and safety of using compost as a soil amendment for crops and conditions present in Utah demonstrate that disposal of animal wastes on agricultural land is likely to continue as the primary beneficial mode of using the resource. Current estimates of organic/transitional producers in Utah are 150 operations. Current market value of compost in Northern Utah is approximately $25 per ton for bulk agricultural use to $65 per ton for wholesale bagged product for the retail market. Annual production of compost on Utah livestock operations ranges from 100 tons to 10,000 tons.

The affirmation of 30□year old average estimates of crop water use in the Snowville area is significant in that state agencies are using Et values from UAES research in water resources planning and water rights management throughout Utah. Work in estimating Et in other parts of Utah will further refine data for state and local water planning efforts.

Various nurseries have incorporated the pot□in□pot production approach into their respective operations due to ongoing research and UCES efforts. If low maintenance turf grasses these can be grown economically and successfully transplanted, the grass mixtures we identified will be used in a variety of urban landscapes, providing diversity as well as lower inputs of water and

labor.

Many farmers in western Emery County have converted from furrow to sprinkler irrigation in the past five years through participation in the Colorado River Salinity Program. Participating farmers report water savings of 40 to 50%, and yield increases of up to 30% when converting from furrow to sprinkler irrigation.

The Utah Master Naturalist Program, on average, nearly doubled the knowledge of the participants and they strongly agreed that the UMNP has inspired them to learn and explore more of Utah's natural world.

Best management practices to reduce nutrient inputs to water bodies cost between $500,000 and $1,000,000 each year. Research□based riparian loading models and UCES training on more effective monitoring will result in more targeted and effective use of these funds with measurable improvements in water quality. Citizen monitoring of 24 Utah lakes will allow the state to protect these lakes from over fertilization.

Beaver County water quality educational programs have made a difference in Beaver County. Fifty□five percent of the farmers in the Beaver River Watershed have participated in one or more of our cost share or educational programs. A rancher (and County Commissioner) in Rich County who modified his irrigation schedule for the soil type and wheel line nozzle size based on information in an UCES Electronic Fact Sheet increased his production by 30 □ 920 lb bales on a 200 acre alfalfa field. Water conservation methods (both in transport and in use) and water quality enhancement guidelines have proven very effective in enhancing Utah's waterways and water sources.

Natural Resources Systems and Environment Programs -

Invasive weeds are one of the greatest threats to range resources in the West. The USU wildfire and weed management program provides inventory and mapping techniques, evaluation of potential control methods and an emphasis on early detection and rapid response (EDRR), all important elements in controlling these weeds. Recommendations from the latest Utah□Montana□Wyoming Weed Management Handbook provide hundreds of Utah land managers with guidance for designing effective control programs against specific invasive weed problems. One of the largest existing (and expanding) invasive weeds is cheatgrass. Research continues on the best approach for cheatgrass and other invasive species by the UAES.

USU rangeland efforts include studies of application of bio□solids. In Tooele County, forage production was increased from 84 lbs/acre for control plots to as much as 664 lbs/acre for one of the treatments. Forage quality was increased as well from 10% crude protein for control plots to 20% for treatments. Application of bio□solids to disturbed rangelands has also increased water retention, soil organic matter, stocking rate and species diversity.

Attendees at UCES's Professional Tree Care Workshops learn better tree and forest management techniques which are passed on to over 143,000 clients a year who work on or with over 85,000 trees. This program produces high quality and well used materials including a web article, "Landscape Trees and Global Warming", which is listed as number one or two using a Google search for "trees global warming."In addition, "Firewise Landscaping for Utah" has been distributed to over 10,000 individuals and is now on its second printing of 5,000 copies. Much of this work is based on UAES research.

Assistance to family forests helps protect up 20 percent of Utah's forest land. Urban forestry programs, which are a product of both research and UCES efforts, include educating cities on tree plantings that reduce fire hazards and improve value of homes. UCES's utility pruning outreach efforts help reduce costs associated with power outages (estimated to cost the U.S. economy $119 billion annually).

To enhance wildlife management recreational opportunities and alternate incomes from private lands, USU wildlife UCES program facilitated the establishment of the Cooperative Wildlife Management Program Unit (CWMU) and a business association of over 200 farm and ranch operations encompassing over 2 million acres of private rangeland in Utah. Annually, the Cooperative Wildlife Management Unit program generates over $15 million in new revenue for Utah landowners and provides free access to over 3,000 Utah hunters annually to high quality big game hunting opportunities.

To protect and keep Sage Grouse habitat in Utah, USU's Wildlife UCES and Experiment Station have organized local work groups which have taken the lead in protecting sage grouse habitat. This has increased Sage Grouse numbers and avoided the need to list the species as threatened or endangered. USU's leadership is essential, allowing the group to identify issues, concerns and management strategies; to build group consensus; to schedule and organize meetings; to prepare and distribute meeting minutes; to write drafts of local conservation plans and agreements; and to help implement and monitor management actions identified in the documents. As a result, stable and increasing Sage Grouse populations are now being seen in multiple counties across the state.

Utah Gunnison's prairie dog and white□tailed prairie dog conservation plan involved extensive public input, facilitated by USU wildlife's UCES program. County supports for these programs include Wayne and Piute Counties. A twenty acre parcel of irrigated pasture was seeded to species preferred by listed prairie dogs and another twenty acres was tilled and seeded to livestock/prairie dog forage. Another rancher, Piute County and USFWS agreed to cooperatively improve 15 acres of existing prairie dog habitat that is being invaded by rabbit brush. Three other cooperators have completed the following practices: 1) land preparation and seeding of twenty acres of dry land grass and forbs; 2) establishment of new irrigation system and soil preparation for 40 acres of prairie dog/sheep/cattle pasture; 3) installation of irrigation system to produce prairie dog/cattle pasture. In a Sage brush thinning and demonstration/research treatment, herbicide granules were successfully applied to one thousand acres of critical prairie dog and grouse habitat.

Family Nights at Utah Botanical Center introduce members of the local community, to the values of natural resources, wetlands and horticulture. Over 3,800 K□12 students visited the Utah Botanical Center and gained knowledge about the natural

world and is based on UCES outreach and Experiment Station research efforts.

USU's water quality program provided over 6,500 kids with water quality educational activities (at least an hour in length) through classroom visits, field days and camps and increased the skills of 250 educators, who each will relay these messages to hundreds of children each year. Follow up surveys with educators indicate that about 30% continue to use these methods in their classrooms, reaching thousands of additional students each year. Research and UCES activities have also contributed to a cleaner Bear River drainage system which runs through Rich, Cache, and Box Elder Counties.

Additional social benefits have been derived from the centralization of historical and current weather and climate data. Such data enable better weather forecasting models and are also extremely helpful in identifying long□run climate data in response to concerns about global warming and its potential impacts on the Intermountain West.

Research has been done in the area of behavioral studies of animals, including domestic livestock (BEHAVE Project).Results suggest that if sufficient plant variety is available for grazing, livestock will graze in such an area in such a manner as to self□medicate for various toxins found in different plat groups. This further suggests that grazing of livestock (and more generally, animals) should be done in areas of increased plant diversity and that grazing plant monocultures does not provide optimal health or gains.

Production, Market, Trade, and International Economics -

Farmers and ranchers face and must manage each of the primary sources of risk (production, price/marketing, human, institutional/legal and financial). UCES provides educational programs based on UAES and other research□based data designed to assist farmers and ranchers in evaluating and managing these risks. Participants in the Master Beef programs consistently indicated that their understanding of risk and risk management principles had statistically increased as a result of attending the workshops that were presented. Essentially every person that attended a record keeping workshop implemented the use of the materials that were presented (e.g., over 50 copies of QuickBooks are being used by program participants). Many of those that attended the fire and drought workshops made significant changes in their operations as a result of the material that was presented or distributed.

Entrepreneurship is a great way to increase the vitality of communities growing our own businesses has a larger multiplier and gives counties more employment and will allow them to create a more diverse economy rather than relying on one or two firms to supply the jobs. However, there are business management skills that are needed for people to assess ideas and create successful businesses. To teach these skills UCES held the 5th Annual Diversified Agriculture Conference, Women Entrepreneurs Workshop, presented at the Utah Green Industry Conference, and the Utah Pesticide Applicators and Lawn Care Maintenance. UCES also organized sessions for the Utah Green Industry Conference and helped them start a new business track to focus on management considerations and gathered and disseminated materials compiled by others on water rights and taxation Producers attending the Diversified Agriculture Conference indicated that the materials were of value and they were going to use them in their operations to make changes. The women Entrepreneurs workshop also had good evaluations and will be continued. The Utah Green Industry Conference is now going to include a track that will focus on business management. These various conferences were based on materials generated by UAES researchers.

UCES has been involved in studies and activities on enhancing the competitiveness of U.S. Red Meats; the emergence of supply chains and their potential impact on Utah's food and agriculture; cattle marketing and ranch management; crop marketing; and wholesaling and retailing non□traditional agriculture products in Utah.

Through these studies cattle producers in Utah and surrounding states are kept abreast of changing market conditions. This year the impact of ethanol on feed prices and the resulting implications for the livestock industries was a major educational focus. Before and after tests at the Beehive Master Beef Manager Program showed that producers' knowledge was increased. Some producers make management and marketing decisions based on information from the UCES website, which in turn, is based on research□based data analysis activities. Bankers and farmers have gained a better understanding of the current market forces impacting prices and returns to various crops.

In a 2005 program planning survey, expanded markets and profitability for agricultural products was rated high by 96% of respondents. The Farmers' Market at the Utah Botanical Center continued to grow as the second year of the market was completed. Over 3100 people attended the farmers' market at the Utah Botanical Center. One hundred copies of the Farm Produce Stands publication were distributed to encourage purchasing of locally grown produce.

Extensive research conducted under the auspices of the UAES has been undertaken on both domestic and international trade. Domestic trade research has been primarily directed toward the price discovery process and the role of niche markets. International trade research has focused on Utah's trade internationally, as well as the trade impacts of NAFTA. NAFTA has yielded a positive net benefit to U.S. Agriculture in general, though some specific segments have been harmed. Additional research has been undertaken in the area of valuing nonmarket resources. Effective methods of nonmarket evaluation depend significantly on the type of good being valued, the study design, and the models used (i.e., contingent valuation attribute estimation, etc.).

Individuals, Families, and Communities -

Utah has 238,000 low income residents. Low income individuals are at high risk for food insecurity. The Food Stamp Nutrition Education Program and the Expanded Food and Nutrition Education Program are federally funded programs designed to educate low income families and individual on food budgeting skills, nutrition knowledge and food preparation skillsParticipants

showed positive behavioral changes in all 17 measures.

Financial resource management and bankruptcy prevention education is seen as priority programming by local advisory councils and county residents. Financial resource management concepts were provided to residents through office visits, phone calls, workshops, classes, special events, publications, news columns and newsletter articles. Finance workshops, courses and special events conducted, included Take Charge of Your Money Financial Fitness course, Earned Income Tax Credit education, Earn It Keep It Save It program, Utah Saves Campaign, Volunteer Income Tax Assistance (VITA) program, Individual Development Account (IDA) classes, Youth Finance Camps, and a Financial Wellbeing/Health Fair.

UCES offers many of the educational workshops and classes within the Utah Saves campaign. These courses and activities are based on work done in the UAES, as well as other research□based sources.

Utah Individual Development Account Network, a national program was originally brought to Utah by Utah Issues and is currently housed with AAA Fair Credit Foundation. UCES fostered a partnership with Utah Issues, AAA Fair Credit, and others to have UCES as the financial educators of this program. An eight to ten hour basic financial course is a requirement for UIDAN applicants. This financial course is taught to low□income, working adults who qualify into this national program to build wealth. The individual saves money towards a home, a secondary education or a small business and their money is matched 3 to 1.

Stepfamilies are becoming an increasingly common family formation in Utah. There are, however, few educational programs that help couples prepare for remarriage and/or enhance their relationships in the context of stepfamily□living. Research is underway in an effort to determine if urban stepfamily relationships are significantly different from rural stepfamily situations.

Total Actual Amount of professional FTEs/SYs for this State

Year:2008	**Extension**		**Research**	
	1862	**1890**	**1862**	**1890**
Plan	158.0	0.0	37.5	0.0
Actual	187.0	0.0	203.2	0.0

II. Merit Review Process

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

- External University Panel
- Combined External and Internal University Panel
- Expert Peer Review

2. Brief Explanation

The scientific peer-review process within the agricultural experiment station has involved two steps. The first step included a review by two scientists requested by the principal investigator (PI). These two scientists provided written comments regarding the proposal which were then returned to the PI for evaluation and response. Prior to submission to the experiment station, the PI's department head also reviewed and signed off on the proposal. Once the proposal reached the station, two additional scientific peer reviews were obtained from subject matter experts, either from other on-campus faculty (if the expertise exists) or off-campus faculty (if on-campus expertise does not exist). These external reviews were returned to the experiment station and the PI's were subsequently asked to respond to issues raised by these reviewers. The PI then modified her/his proposal to address the issues raised by the "outside" reviewers before resubmitting it to the experiment station for funding consideration. The practice of sending reviews off-campus to qualified subject matter experts was used approximately 15% of the time.

III. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged their participation

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey of the general public
- Survey specifically with non-traditional groups
- Survey specifically with non-traditional individuals
- Survey of selected individuals from the general public

Brief Explanation

The media sources are frequently used by Utah counties to encourage county residents to participate in public meetings and listening sessions 71% of reporting Utah counties reported using this methodology. Use of the local newspaper and radio through public service announcements and paid advertisements are the two primary techniques applied in media use. Targeted invitations to groups are more the norm with 21 out of 28 counties responding that they targeted traditional stakeholders through letter/poster invitations to participate in public meetings and listening sessions. Such announcements are often placed in public places, on bulletin boards, and other locales frequented by non-traditional audiences. Non-traditional stakeholder groups were also invited to participate in public meetings and listening sessions although to a lesser extent with 54% of counties indicating that they utilized this methodology. Inviting individual stakeholder and non-traditional stakeholder individuals to participate in public meetings and listening sessions is also a significant means for engaging them in discussions with 93% and 64% respectively of reporting counties utilizing this process. Surveys serve as another means for contacting stakeholders. 43% of counties reported utilizing surveys to traditional stakeholder individuals and less than 21% utilized surveys to the general public. Utah Extension and Utah Agricultural Experiment Station apply the practice of all reasonable effort by engaging stakeholders in face-to-face invitations to encourage participation in meetings where input for program planning is desired.

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

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments
- Use Surveys

Brief Explanation

The Utah Agricultural Experiment Station uses an advisory group that meets as needed to provide much needed input from the public and private sectors. Utah Extension utilizes advisory committees as the primary means of identifying stakeholder individuals and groups to collect program input. Principle council and advisory groups utilized included such groups as teen councils, horse and livestock councils, Workforce Services, Interagency Coalitions, community religious leaders, United Way, Utah Saves Advisory Boards, Utah Fair Boards, Utah Farm Bureau and Farmers Union, afterschool coalitions and previous recipients of Extension programs have been utilized. Over 96% of reporting counties (28) utilized this contact methodology.About a half of reporting counties (28) indicated that they used focus groups and open listening sessions as means to identify groups and individual stakeholders. Over 46% of reporting counties (28) indicated that the use of needs assessments and surveys provided another primary means of identifying individuals and groups though whom input was collected.

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

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Survey of the general public
- Meeting specifically with non-traditional groups
- Survey specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Survey specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public

Brief Explanation

Utah Extension and Utah Exeriment Station find that meeting with traditional stakeholders, often times in expansion and review settings and in advisory councils are effective method for identifying program and administrative issues important to county residents. Over 89% of reporting counties (28) utilized the method of meeting with traditional stakeholders and also meeting with them individually was an effective method for getting input. Some counties continued to report face-to-face interviews with stakeholders with Limited English Proficiency (LEP) using native speakers to conduct a "wants and needs" analysis. Half of all reporting counties (28) indicated that they surveyed traditional stakeholder groups and individuals. 43% indicated that they has met specifically with non-traditional groups and individuals and held meetings with invited selected individuals from the general public. 29% of the counties reported utilizing open meetings advertised to the public as a means of obtaining input. The methodologies used less than 18% of the time included the use of surveys with specifically non-traditional individuals. Nearly half - 46% said that they met with selected invited individuals from the general public to receive programmatic input.

3. A statement of how the input was considered

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

Brief Explanation

The input received from stakeholders was utilized most to gather information on emerging issues (96%) to redirect extension programs (79%) and to set priorities as an Extension organization (68%).With an ever growing metro population along the Wasatch Front in Utah this input has been valuable in redirecting program emphasis areas to reflect the needs of metropolitan populations.To a lesser extent input was applied to the Extension programs in redirecting research programs (25%) in the hiring of staff (36%) and in the action plans of the county (46%). These inputs frequently inform Extension through influencing recruitment and hiring practices and inform Extension on the types of research that stakeholders perceive as critical to their need. The Experiment station uses stakeholder input provided by Extension and advisory group input to make changes in the research program.

Brief Explanation of what you learned from your Stakeholders

Stakeholder input sessions assist Extension and the Experiment Station in learning to design position descriptions to hire faculty that can meet the needs identified by stakeholders. Better advertising with clearer expectations of potential employees has resulted in better hires. ~ Farmers in general have a preference for Extension and Experiment Station programs which provide "hands on" training in the field coupled with educational research plots that help them more clearly visualize the impacts of new and improved practices in their local environments.~ Extension programs must become more effective at developing and offering programs to serve the needs of small acreage farm and ranch owners particularly those who are in metropolitan settings. ~ Extension 4-H and youth programs are critical to strengthening the fabric of the community as traditional families disintegrate and as youth need leadership mentors to help them in a changing world. ~ Focused programs in horticulture such as the Master Gardener program are critical to an ever increasing urban/suburban population in Utah with sessions being offered in evenings and weekends to meet clientele needs. ~ Natural resources Research and Extension programs which focus on water quality and conservation are increasingly important to Utah populations. ~ Programs which strengthen families through personal/family finance, health, nutrition, diabetes education, nutritious and economical food preparation, home buyer education and aging are critically important to Utah stakeholders.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
1491095	0	1868992	0

2. Totaled Actual dollars from Planned Programs Inputs

	Extension		Research	
	Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
Actual Formula	1491093	0	2881195	0
Actual Matching	1849147	0	10613766	0
Actual All Other	0	0	7089506	0
Total Actual Expended	3340240	0	20584467	0

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

Carryover	0	0	1195759	0

V. Planned Program Table of Content

Program #1

V(A). Planned Program (Summary)

1. Name of the Planned Program

Sustainable Plant Communities

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms	10%		10%	
202	Plant Genetic Resources	10%		10%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	10%		10%	
204	Plant Product Quality and Utility (Preharvest)	10%		10%	
205	Plant Management Systems	10%		10%	
211	Insects, Mites, and Other Arthropods Affecting Plants	10%		10%	
212	Pathogens and Nematodes Affecting Plants	10%		10%	
213	Weeds Affecting Plants	10%		10%	
215	Biological Control of Pests Affecting Plants	10%		10%	
216	Integrated Pest Management Systems	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	33.0	0.0	8.7	0.0
Actual	50.0	0.0	30.4	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
398689	0	1061185	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
494424	0	3341776	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	4070138	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

1. Conduct research experiments with plants and plant material.
2. Publish studies and make presentations related to plant propagation and production.
3. Conduct workshops and meetings to educate local, state, and regional stakeholders concerning progress in producing plants that are economically viable and environmentally friendly.
4. Deliver educational resources through various media
5. Release new plant varieties relative to this program area under plant variety protection (PVP) status.
6. Expand use of Integrated Pest Management (IPM).
7. Provide "Orchard Pest Advisories" on over 15 insect, mite, and pathogen pests of tree fruit and small fruit crops (commercial and home garden).
8. Provide pest diagnostic assistance and management information to county agents, state and federal partners, commercial agriculture and horticulture producers, and the general public through the Utah Plant Pest Diagnostic Laboratory.
9. Certify or recertify Pesticide Applicator Training (PAT) for pesticide applicators to apply restricted use pesticides and to comply with the Utah Pesticide Control Act and the Federal Insecticide, Fungicide, and Rodenticide Act.
10. Coordinate efforts with other states and the Western Region Pest Management Center (WRPMC).
11. Enhance the USU Master and 4-H Junior Master Gardener Programs.
12. Conserving water in the landscape through appropriate landscape management and plant selection with regard to turfgrass management.
13. Develop a manual that would meet the needs of industry professionals seeking certification as a Utah Certified Nursery Professional
14. Collaborate with the Utah Nursery and Landscape Association in an annual conference and trade show to illustrate "best management practices."
15. Continue the Western SARE Program.
16. Expand the Geospatial Extension Program.
17. Utilize multiple demonstrations/applied research plots to manage weeds in agronomic crops with results reported at field days, workshops, or annual meetings.

2. Brief description of the target audience

The target audience for this work would be other scientists, agricultural producers, landscapers, general public, home owners, green industry officials, professional landscape managers, turfgrass sod producers, other private businesses, and government entities that conduct work in this area.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	85000	1052460	2900	35907
2008	82990	949190	15644	173625

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	15	
2008	0	33	33

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of variety or seed releases

Year	Target	Actual
2008	1	2

Output #2

Output Measure

- Number of peer-reviewed journal articles and books/chapters in books extensively peer reviewed

Year	Target	Actual
2008	18	33

Output #3

Output Measure

- Number of intermediate publications and presentations (i.e., refereed proceedings)

Year	Target	Actual
2008	2	13

Output #4

Output Measure

- Level of contract/grant funding

Year	Target	Actual
2008	100000	3973771

Output #5

Output Measure

- Number of graduate students or post-doctorate's trained

Year	Target	Actual
2008	2	22

Output #6

Output Measure

- Number of PVP's (Plant Variety Protection) established

Year	Target	Actual
2008	1	2

Output #7

Output Measure

- Number of undergraduate students involved in research

Year	Target	Actual
2008	2	0

Output #8

Output Measure

- Number of theses/dissertations completed

Year	Target	Actual
2008	3	3

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Number of clients (growers, government agency personnel, home orchardists, and others) increasing their knowledge of sustained plant production.
2	Number of times clients (growers, government agency personnel, home orchardists, and others) implement one or more sustained plant production practice(s).
3	Percentage increase in crop cash receipts (based on 1999-2004 average aggregate receipts).
4	Percentage increase in overall crop productivity (based on 1999-2004 average aggregate output).

Outcome #1

1. Outcome Measures

Number of clients (growers, government agency personnel, home orchardists, and others) increasing their knowledge of sustained plant production.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	25500	68496

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
202	Plant Genetic Resources
216	Integrated Pest Management Systems
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
213	Weeds Affecting Plants
201	Plant Genome, Genetics, and Genetic Mechanisms
212	Pathogens and Nematodes Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
215	Biological Control of Pests Affecting Plants

Outcome #2

1. Outcome Measures

Number of times clients (growers, government agency personnel, home orchardists, and others) implement one or more sustained plant production practice(s).

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	12750	44573

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

More than 35 minor food crops and a large variety of nursery and landscape crops are grown in Utah. The total value of Utah minor crops is $98 million. It is important to protect these crops from damaging pests.

What has been done

The high value specialty crop pest management program is a government and land- grant university sponsored program to develop the data necessary for submitting minor crop pest control options to the EPA for approval. This program has expanded to include ornamentals and also, biopesticides including microbials like bacteria and viruses, and biochemicals like pheromones and growth regulators. This program works with farmers, agricultural scientists, commodity organizations, and extension personnel to provide pest management solutions to growers of minor crops.

Results

This program has helped in securing clearances for registration of certain pesticide uses on these Utah crops: alfalfa, apple, apricot, asparagus, bean (dry), broccoli, Brussels sprouts, cabbage, cane berry, canola, cantaloupe, carrot, cauliflower, cherry (sweet), cherry (tart), clover, field corn, honey and beeswax, honeydew melons, lettuce, onion (dry), pasture grass, peach, pear, plum, potato, pumpkin, range grass, raspberry, safflower, snap bean, spinach, squash (winter/summer), sweet corn, tomato and watermelon. Potential economic losses of $11,900,000 are estimated without this program. It is important to secure minor use registrations for agricultural producers for legal reasons and also to increase grower productivity and profitability.

4. Associated Knowledge Areas

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants
211	Insects, Mites, and Other Arthropods Affecting Plants
201	Plant Genome, Genetics, and Genetic Mechanisms
212	Pathogens and Nematodes Affecting Plants
205	Plant Management Systems
216	Integrated Pest Management Systems
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
202	Plant Genetic Resources
213	Weeds Affecting Plants
204	Plant Product Quality and Utility (Preharvest)

Outcome #3

1. Outcome Measures

Percentage increase in crop cash receipts (based on 1999-2004 average aggregate receipts).

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:
Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	2	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
202	Plant Genetic Resources
213	Weeds Affecting Plants
212	Pathogens and Nematodes Affecting Plants
215	Biological Control of Pests Affecting Plants
211	Insects, Mites, and Other Arthropods Affecting Plants
205	Plant Management Systems
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
216	Integrated Pest Management Systems
204	Plant Product Quality and Utility (Preharvest)
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #4

1. Outcome Measures
Percentage increase in overall crop productivity (based on 1999-2004 average aggregate output).

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:
Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	2	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
202	Plant Genetic Resources
212	Pathogens and Nematodes Affecting Plants
211	Insects, Mites, and Other Arthropods Affecting Plants
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems
201	Plant Genome, Genetics, and Genetic Mechanisms
213	Weeds Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
216	Integrated Pest Management Systems
215	Biological Control of Pests Affecting Plants

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought,weather extremes,etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)
- Other (weeds, biofuels)

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Key Items of Evaluation

Program #2

V(A). Planned Program (Summary)

1. Name of the Planned Program

Land Use and Sustainable Communities

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
131	Alternative Uses of Land	15%		15%	
608	Community Resource Planning and Development	60%		60%	
610	Domestic Policy Analysis	10%		10%	
803	Sociological and Technological Change Affecting Individuals, Families and Communities	15%		15%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	0.0	2.9	0.0
Actual	13.0	0.0	7.5	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
103659	0	116812	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
128550	0	522573	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	874936	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

1. Conduct research experiments and/or develop theories that can be used to explain (a) causes for public land conflicts and potential solutions, (b) solutions to the urban expansion into rural areas and open space, and (c) conditions for continued rural community economic viability. 2. Publish studies and make presentations related to these areas of concern. 3. Conduct workshops and meetings to educate local, state, and regional stakeholders concerning these issues. 4. Deliver educational and informational services through various media. 5. Develop educational resources related to rural economic viability for community leaders and other stakeholders. 6. Provide for local training in principles developed that are related to this area of study. 7. Conduct design activities (for a park, a Main Street revitalization, etc.) that will typically yield a design of variable specificity (some might be conceptual drawings, others might be more extensive). 8. Provide consultations regarding land use planning policies and their implications on growth.

2. Brief description of the target audience

The target audience for this work will be community leaders, community, state and federal policy makers, at-large public, academic units, private land holders, public land users, businesses, and local, state, and regional political leaders. Establishing joint efforts with public and private interests in the community will be important in establishing the needed credibility for adoption of recommended practices or acceptance of alternative designs.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	1800	2272	0	0
2008	103370	101510	4126	2951

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	10	
2008	0	19	19

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of peer-reviewed journal articles and books/chapters in books extensively peer reviewed

Year	Target	Actual
2008	10	19

Output #2

Output Measure

- Number of intermediate publications and presentations (i.e., refereed proceedings).

Year	Target	Actual
2008	4	7

Output #3

Output Measure

- Level of contract/grant funding

Year	Target	Actual
2008	20000	189874

Output #4

Output Measure

- Number of graduate students trained

Year	Target	Actual
2008	3	10

Output #5

Output Measure

- Number of undergraduate students involved in research

Year	Target	Actual
2008	2	0

Output #6

Output Measure

- Number of theses/dissertations completed

Year	Target	Actual
2008	3	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Number of clients gaining land use and sustainable communities knowledge.
2	Number of clients who implement land use and sustainable communities practices
3	Number of communities preserving desirable community attributes
4	Increase in local area protection expressed in percentage terms for those areas implementing protection.
5	Maintenance of rural community services expressed by the expenditures of communities assisted.
6	Improvement in rural community vitality as measured by convergence of urban/rural family-level income (i.e., closure in differences expressed in percent/year terms).

Outcome #1

1. Outcome Measures

Number of clients gaining land use and sustainable communities knowledge.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	540	6933

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
131	Alternative Uses of Land
803	Sociological and Technological Change Affecting Individuals, Families and Communities
610	Domestic Policy Analysis

Outcome #2

1. Outcome Measures

Number of clients who implement land use and sustainable communities practices

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	270	3221

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Utah rural communities lack the planning personnel and skills to adequately develop provisions for comprehensive planning and design. They often lack personnel with needed skills for designing community entrances, parks, public areas, sidewalks, streets etc., and to develop and put into operation community master plans, subdivision ordinances, and to explore additional options to maintain the health, welfare and safety of community residents.

What has been done

USU Extension worked with Zion Canyon Corridor, the National Park Service to revise the 2004 Lions Park Master Plan, and developed for Cedar City concept alternatives of Botanical/Demonstration Gardens. USU Extension participated with Envision Utah's Vision Cache workshops, Central Utah Pioneer Heritage Center Master Plan, Logan Downtown and Cache Valley's Main Street, Teton Creek Environs, Fillmore Main Street/Downtown Master Plan, and Price City Downtown Master Plan.

Results

With the aid of the 2004 Master Plan, NPS successfully applied for and received a $100,000 grant to cover costs of a consultant (to produce construction documents), hire a grad student intern, and pay expenses for master plan revisions. Other communities and organizations have plans that are being used to guide land use projects.

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
803	Sociological and Technological Change Affecting Individuals, Families and Communities
608	Community Resource Planning and Development
610	Domestic Policy Analysis

Outcome #3

1. Outcome Measures

Number of communities preserving desirable community attributes

Not reporting on this Outcome for this Annual Report

Outcome #4

1. Outcome Measures

Increase in local area protection expressed in percentage terms for those areas implementing protection.

Not reporting on this Outcome for this Annual Report

Outcome #5

1. Outcome Measures

Maintenance of rural community services expressed by the expenditures of communities assisted.

Not reporting on this Outcome for this Annual Report

Outcome #6

1. Outcome Measures

Improvement in rural community vitality as measured by convergence of urban/rural family-level income (i.e., closure in differences expressed in percent/year terms).

Not reporting on this Outcome for this Annual Report

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Key Items of Evaluation

Program #3

V(A). Planned Program (Summary)

1. Name of the Planned Program

Sustained Livestock Production

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals	10%		10%	
302	Nutrient Utilization in Animals	20%		20%	
303	Genetic Improvement of Animals	10%		10%	
305	Animal Physiological Processes	10%		10%	
306	Environmental Stress in Animals	5%		5%	
307	Animal Management Systems	20%		20%	
311	Animal Diseases	10%		10%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	5%		5%	
402	Engineering Systems and Equipment	5%		5%	
722	Zoonotic Diseases and Parasites Affecting Humans	5%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	17.0	0.0	3.7	0.0
Actual	34.0	0.0	13.6	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
271108	0	642144	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
336209	0	1779301	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	170119	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The Utah Agricultural Experiment Station will:

1. Conduct research experiments and develop theories that can be used to enhance livestock production in an environmentally friendly manner.
2. Publish studies and make presentations related to this research.
3. It is expected that this research will eventually result in one patent issued in year 2011/year.

Extension will outreach to adult and youth producers and provide educational training, farm and ranch visits, and in-depth applied information on:

1. Dairy management and related topics
2. Beef Quality Assurance principles to beef producers
3. Master Beef Managers
4. Master Livestock Managers
5. Understanding and ability to keep and use farm records
6. Optimal production techniques for year round turkey production
7. The threat of foreign animal diseases and the role and methods of biosecurity for control and prevention
8. Disease and pest control
9. Agrarian and equine needs of small acreage owners
10. Sheep and goats

2. Brief description of the target audience

The target audience for this work would be local and regional livestock (primarily beef, dairy, and equine) producers, small acreage owners, 4-H youth, veterinarians, USDA, state policy makers, academic units, businesses, and local, state, and regional political leaders.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

Year	Direct Contacts Adults Target	Indirect Contacts Adults Target	Direct Contacts Youth Target	Indirect Contacts Youth Target
Plan	26000	54577	15000	31487
2008	24035	145157	2808	9927

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	1

Patents listed

Induced Sludge Bed Anaerobic Reactor

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	40	
2008	0	20	20

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of peer-reviewed journal articles and books/chapters in books extensively peer reviewed

Year	Target	Actual
2008	40	20

Output #2

Output Measure

- Number of intermediate publications and presentations (i.e., refereed proceedings).

Year	Target	Actual
2008	10	15

Output #3

Output Measure

- Level of contract/grant funding

Year	Target	Actual
2008	100000	0

Output #4

Output Measure

- Number of graduate students or post-doctorate's trained

Year	Target	Actual
2008	2	6

Output #5

Output Measure

- Number of undergraduate students involved in research

Year	Target	Actual
2008	2	0

Output #6

Output Measure

- Number of theses/dissertations completed

Year	Target	Actual
2008	2	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Number of agricultural animal owners increasing their knowledge of sustained animal production practices.
2	Number of times agricultural animal owners implemented one or more sustained animal production practices.
3	Improvement in livestock productivity (i.e., pounds of beef or milk produced per animal per year, expressed in percentage terms).
4	Improvement in cash receipts from livestock production relative to average of 1999-2004 production years.

Outcome #1

1. Outcome Measures

Number of agricultural animal owners increasing their knowledge of sustained animal production practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	7800	21519

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
303	Genetic Improvement of Animals
722	Zoonotic Diseases and Parasites Affecting Humans
307	Animal Management Systems
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
306	Environmental Stress in Animals
301	Reproductive Performance of Animals
311	Animal Diseases
305	Animal Physiological Processes
402	Engineering Systems and Equipment
302	Nutrient Utilization in Animals

Outcome #2

1. Outcome Measures

Number of times agricultural animal owners implemented one or more sustained animal production practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	3900	5311

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Animals are very important to the Utah economy for the utilization of plant production and for the income generated, especially for rural Utah. Animal producers need improved production efficiency and management techniques to remain competitive.

What has been done

USU Extension helped operate the Utah Beef Improvement Association Performance Bull Test for several years. The Beef Quality Assurance (BQA) program continues to be one of our major beef programs in the state of Utah. The NCBA beef audits have determined that if beef producers utilized specific management practices as outlined by the BQA program they could capture up to $125 more per animal. In Utah this could provide millions of dollars into local economies.

Results

In 2008, 90 of the 91 bulls offered at the 2008 UBIA Performance Bull Test Sale were sold for an average sale price of $2,410 which represented a 27% increase in bull values over the 2007 sale. Much of this increase came as a result of the full implementation of the marketing plan USU Extension helped the Association develop which was implemented by their newly hired marketing director.

4. Associated Knowledge Areas

KA Code	Knowledge Area
306	Environmental Stress in Animals
402	Engineering Systems and Equipment
311	Animal Diseases
303	Genetic Improvement of Animals
307	Animal Management Systems
302	Nutrient Utilization in Animals
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
722	Zoonotic Diseases and Parasites Affecting Humans
305	Animal Physiological Processes
301	Reproductive Performance of Animals

Outcome #3

1. Outcome Measures

Improvement in livestock productivity (i.e., pounds of beef or milk produced per animal per year, expressed in percentage terms).

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	3	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
722	Zoonotic Diseases and Parasites Affecting Humans
302	Nutrient Utilization in Animals
301	Reproductive Performance of Animals
303	Genetic Improvement of Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems

Outcome #4

1. Outcome Measures

Improvement in cash receipts from livestock production relative to average of 1999-2004 production years.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	2	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
307	Animal Management Systems
306	Environmental Stress in Animals
303	Genetic Improvement of Animals
302	Nutrient Utilization in Animals
311	Animal Diseases
301	Reproductive Performance of Animals
722	Zoonotic Diseases and Parasites Affecting Humans
402	Engineering Systems and Equipment
305	Animal Physiological Processes

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought,weather extremes,etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)
- Other (Diseases)

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Key Items of Evaluation

Program #4

V(A). Planned Program (Summary)

1. Name of the Planned Program

Plant, Animal, and Microbial Genomics

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms	25%		15%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	5%		5%	
301	Reproductive Performance of Animals	15%		15%	
303	Genetic Improvement of Animals	20%		25%	
304	Animal Genome	20%		25%	
305	Animal Physiological Processes	5%		5%	
501	New and Improved Food Processing Technologies	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	**Extension**		**Research**	
	1862	**1890**	**1862**	**1890**
Plan	0.0	0.0	7.9	0.0
Actual	0.0	0.0	48.5	0.0

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

Extension		**Research**	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	528076	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	183556	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	22531	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

1. Conduct research experiments and develop theories that can be used to enhance plant and animal productive efficiencies.
2. Publish studies related to these areas of concern.
3. Conduct workshops and meetings for other scientists involved in this area of research.
4. Develop applications for the research on plant and animal genomics to directly benefit producers, youths, and other scientists.

2. Brief description of the target audience

The target audience for this research will primarily be other scientists involved in genomics work but the gains achieved will eventually be available to the general public as these technologies become commercialized. Other interested parties include numerous businesses related to this area of research. The eventual end-user, i.e., the producer or food processor, will realize benefits from the research long term.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	**Target**	**Target**	**Target**	**Target**
Plan	30	60	20	40
2008	0	0	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	40	
2008	0	66	66

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of peer-reviewed journal articles and books/chapters in books extensively peer reviewed

Year	Target	Actual
2008	40	66

Output #2

Output Measure

- Number of intermediate publications and presentations (e.g., refereed proceedings)

Year	Target	Actual
2008	3	12

Output #3

Output Measure

- Level of contract/grant funding

Year	Target	Actual
2008	500000	373928

Output #4

Output Measure

- Number of graduate students or post-doctorate's trained

Year	Target	Actual
2008	3	0

Output #5

Output Measure

- Number of undergraduate students involved in research

Year	Target	Actual
2008	2	0

Output #6

Output Measure

- Number of theses/dissertations completed

Year	Target	Actual
2008	2	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Increase in productivity (plant and animal) per year (expressed in percentage terms) due to enhanced genetical capacity.

Outcome #1

1. Outcome Measures

Increase in productivity (plant and animal) per year (expressed in percentage terms) due to enhanced genetical capacity.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
305	Animal Physiological Processes
303	Genetic Improvement of Animals
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
304	Animal Genome
201	Plant Genome, Genetics, and Genetic Mechanisms
301	Reproductive Performance of Animals

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals,group,organizations) and non-participants

Evaluation Results

Key Items of Evaluation

Program #5

V(A). Planned Program (Summary)

1. Name of the Planned Program

Production and Safety of Food Products

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies	20%		20%	
511	New and Improved Non-Food Products and Processes	15%		15%	
701	Nutrient Composition of Food	15%		15%	
702	Requirements and Function of Nutrients and Other Food Components	20%		20%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.	10%		10%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	20%		20%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	11.0	0.0	3.3	0.0
Actual	2.0	0.0	15.3	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
15948	0	236959	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
19777	0	1458058	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	227359	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The experiment station will:

1. Conduct experiments and develop theories that can be used to develop a safer food supply from production, through processing, and to the final consumer.

2. Conduct experiments and develop theories that can be used to develop new food products or improve existing food products.

3. Publish studies and make presentations related to these two areas of concern.

Extension will outreach to Utah residents, family consumer scientist agents, small and medium sized food processors, restaurant food safety managers to provide educational training and in-depth information on:

1. Safe food handling practices
2. Safe food preservation and storage practices
3. Certification to food safety managers
4. Safe food handling practices for processors
5. 4-H nutrition and health safety curricula and programs

2. Brief description of the target audience

The target audience will include food processors, agricultural producers, general consumers (both within and without Utah), family consumer science agents, at risk groups and their families,4-H youth, and other scientists.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	**Target**	**Target**	**Target**	**Target**
Plan	24000	33043	700	963
2008	3828	9946	1910	327

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	1

Patents listed

Alkali and alkaline earth methal levulinates as antimicrobial agents

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	15	
2008	0	20	20

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of peer-reviewed journal articles and books/chapters in books extensively peer reviewed

Year	Target	Actual
2008	15	20

Output #2

Output Measure

- Number of intermediate publications and presentations (e.g., refereed proceedings).

Year	Target	Actual
2008	2	6

Output #3

Output Measure

- Level of contract/grant funding

Year	Target	Actual
2008	50000	776073

Output #4

Output Measure

- Number of graduate students or post-doctorate's trained

Year	Target	Actual
2008	2	20

Output #5

Output Measure

- Number of undergraduate students involved in research

Year	Target	Actual
2008	2	0

Output #6

Output Measure

- Number of theses/dissertations completed

Year	Target	Actual
2008	2	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Number of clients who increase their knowledge of production and safety of food products.
2	Number of clients who implement positive food safety practices.
3	Number of cases per 100,000 population of food borne illness in Utah less than the 2005 UIBI-PH indicators for campylobacteriosis (expressed as percentage of population).
4	Number of cases per 100,000 population of food borne illness in Utah less than the 2005 UIBI-PH indicators for E. Coli (expressed as percent of population).
5	Number of cases per 100,000 population of food borne illness in Utah less than the 2005 UIBI-PH indicators for salmonella (expressed as percentage of population).

Outcome #1

1. Outcome Measures

Number of clients who increase their knowledge of production and safety of food products.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	7200	4376

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Improper food handling and preparation of food in food service establishments and in the home contribute to food borne illnesses. U.S. citizens have the broadest selection of food products in history. With these new food products, as well as with traditional food items, food safety has become a more critical topic in light of recent food safety issues or events, i.e., E coli and other bacteria recently found in many foods.

What has been done

Food Safety Manager Course (FSMC) training provides the core food safety information used to help retail and foodservice venues produce safe foods for their consumers. Manager Certification is mandatory in Utah. The FSMC program was dramatically updated in 2007. The materials were updated and reorganized to reflect changes in the US FDA Food Code. A DVD was completed by USU Multimedia and plans are underway to release it Jan. 2008. With the change-over from Web CT to Blackboard all of the online materials were updated to reflect the textbook and DVD materials.

Results

As of Dec 6, 2008 there were 254 students who completed the FSMC certification exam and 165 students enrolled in the FSMC Course. Educated and knowledgeable food service managers play a vital role in the safe food and food production at this level of the farm-to-fork food chain.

4. Associated Knowledge Areas

KA Code	Knowledge Area
701	Nutrient Composition of Food
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.
702	Requirements and Function of Nutrients and Other Food Components
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
501	New and Improved Food Processing Technologies
511	New and Improved Non-Food Products and Processes

Outcome #2

1. Outcome Measures

Number of clients who implement positive food safety practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:
Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	3600	2128

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
511	New and Improved Non-Food Products and Processes
701	Nutrient Composition of Food
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
702	Requirements and Function of Nutrients and Other Food Components
501	New and Improved Food Processing Technologies

Outcome #3

1. Outcome Measures
Number of cases per 100,000 population of food borne illness in Utah less than the 2005 UIBI-PH indicators for campylobacteriosis (expressed as percentage of population).

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:
Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	12	11

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area

712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
501	New and Improved Food Processing Technologies
702	Requirements and Function of Nutrients and Other Food Components
511	New and Improved Non-Food Products and Processes
701	Nutrient Composition of Food
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.

Outcome #4

1. Outcome Measures

Number of cases per 100,000 population of food borne illness in Utah less than the 2005 UIBI-PH indicators for E. Coli (expressed as percent of population).

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
511	New and Improved Non-Food Products and Processes
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #5

1. Outcome Measures

Number of cases per 100,000 population of food borne illness in Utah less than the 2005 UIBI-PH indicators for salmonella (expressed as percentage of population).

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:
Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	14	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
501	New and Improved Food Processing Technologies
511	New and Improved Non-Food Products and Processes
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Key Items of Evaluation

Program #6

V(A). Planned Program (Summary)

1. Name of the Planned Program

Water and Soil Conservation and Uses

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	10%		10%	
102	Soil, Plant, Water, Nutrient Relationships	20%		20%	
103	Management of Saline and Sodic Soils and Salinity	5%		5%	
104	Protect Soil from Harmful Effects of Natural Elements	5%		5%	
111	Conservation and Efficient Use of Water	20%		20%	
112	Watershed Protection and Management	10%		10%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	10%		10%	
205	Plant Management Systems	10%		10%	
213	Weeds Affecting Plants	5%		5%	
605	Natural Resource and Environmental Economics	5%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	8.0	0.0	3.3	0.0
Actual	25.0	0.0	8.9	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
199344	0	97050	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
247212	0	1223254	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	625504	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Experiment station faculty will:

1. Conduct experiments and develop theories that can be used to enhance water efficiencies for agronomic areas and urban areas.

2. Conduct experiments and develop theories that can be used to develop a safer, more reliable supply of water for agricultural and urban consumption.

3. Publish studies related to these two areas of concern.

4. Conduct workshops and meetings to educate the "educators" concerning these issues.

Extension will outreach and partner with agricultural producers and the public to provide educational training, problem solving, and in-depth applied information on:

1. Animal Waste Management

2. Alternative methods of dealing with animal waste such as composting or digestion, especially for those animal owners with small acreages.

3. Partnering to facilitate rehabilitation of degraded watersheds and to enhance the management and water yield of specific watersheds.

4. Protecting and managing watersheds and water resources.

5. Preserve reservoirs, aquifers and other waters.

6. Conserve, manage and enhance efficient water use by agricultural, residential, commercial, and business users.

7. Derive efficient irrigation strategies and technologies.

8. Implement water-wise landscaping practices, including xeriscape use.

9. Initiate landscape water auditing.

10. Evaluate and promote plants that require less water and are drought tolerant.

11. Educate youth and adults on their role in preserving and enhancing water quality.

12. Monitor, identify problem waters, and facilitate improvement of quality through partnering efforts.

13. Enhance quality, capture, and use of storm-water.

14. Facilitate knowledge, methods, and use of gray-water.

15. Demonstrate potential of new technology for improving quality or reclaiming water.

16. Expand the knowledge of soil types and selection of appropriate plants for various types of soils, along with the amount of water available.

17. Identify areas of current or potential soil loss or reduced soil fertility and partner with other agencies to reduce and control these problems.

18. Educate producers on the important interactions of soil and irrigation as well as soil and plant type or variety, especially with respect to soil salinity.

19. Provide information on soil nutrient deficiencies and cost effective soil quality and fertility improvements.

20. Continue demonstration projects – salt levels, soil types, alkalinity, non-traditional soil fertility amendments, fertilizer formulation efficacy, organic matter use and management.

2. Brief description of the target audience

The target audience is extension agriculture and horticulture agents, agricultural producers, home and garden owners, small acreage owners, professional landscape managers, the general public, elected officials, federal and state water and soil management agencies.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	**Target**	**Target**	**Target**	**Target**
Plan	6720	2589	10200	3930
2008	15904	45771	3286	1897

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	50	
2008	0	36	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of peer-reviewed journal articles and books extensively peer reviewed.

Year	Target	Actual
2008	40	36

Output #2

Output Measure

- Number of intermediate publications and presentations (i.e., refereed proceedings).

Year	Target	Actual
2008	3	2

Output #3

Output Measure

- Level of contract/grant funding

Year	Target	Actual
2008	50000	247029

Output #4

Output Measure

- Number of graduate students or post-doctorate's trained

Year	Target	Actual
2008	2	22

Output #5

Output Measure

- Number of undergraduate students involved in research

Year	Target	Actual
2008	2	0

Output #6

Output Measure

- Number of theses/dissertations completed

Year	Target	Actual
2008	2	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Number of clients (agricultural producers, home owners, small acreage owners and the general; public) increasing their knowledge of soil and/or water conservation.
2	Number of clients (agricultural producers, home owners, small acreage owners and the general public) implementing soil and/or water conservation practices.)
3	Decrease the percent of assessed impaired miles of rivers and streams below a given percentage.
4	Decrease the percent of assessed impaired acres of lakes, ponds, and reservoirs below a certain percentage.

Outcome #1

1. Outcome Measures

Number of clients (agricultural producers, home owners, small acreage owners and the general; public) increasing their knowledge of soil and/or water conservation.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	2016	12329

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems
104	Protect Soil from Harmful Effects of Natural Elements
102	Soil, Plant, Water, Nutrient Relationships
605	Natural Resource and Environmental Economics
112	Watershed Protection and Management
101	Appraisal of Soil Resources
111	Conservation and Efficient Use of Water
103	Management of Saline and Sodic Soils and Salinity

Outcome #2

1. Outcome Measures

Number of clients (agricultural producers, home owners, small acreage owners and the general public) implementing soil and/or water conservation practices.)

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	1008	6517

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Agricultural producers and agribusinesses have a pressing need for research-based information on sustainable practices and techniques.

What has been done

Western Sustainable Agriculture Research and Education (SARE) is a regional competitive grants program to educate and help the agriculture industry become more profitable, protect natural resources/the environment, and improve the quality of life for producers and consumers. Research/education projects funded by Western SARE included over 84 refereed scientific journal articles and over 235 other publications or products.

Results

The number of separate SARE-impacted farms and ranches which increased profits and/or reduced costs was documented as at least 1,452. Adjacent farms and ranches totaled over 3000, impacting 4,178,000 acres. Of these farms and ranches, 82% reported sustained usage of the research-based idea or practices tested. Finally, across the 5-year life-span of this Cooperative Agreement, and across the entire Western Region, a positive economic impact of over $500 million has been quantified.

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics
103	Management of Saline and Sodic Soils and Salinity
104	Protect Soil from Harmful Effects of Natural Elements
101	Appraisal of Soil Resources
112	Watershed Protection and Management
111	Conservation and Efficient Use of Water
213	Weeds Affecting Plants
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems

Outcome #3

1. Outcome Measures

Decrease the percent of assessed impaired miles of rivers and streams below a given percentage.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	26	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

205	Plant Management Systems
101	Appraisal of Soil Resources
605	Natural Resource and Environmental Economics
103	Management of Saline and Sodic Soils and Salinity
213	Weeds Affecting Plants
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
104	Protect Soil from Harmful Effects of Natural Elements
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants

Outcome #4

1. Outcome Measures

Decrease the percent of assessed impaired acres of lakes, ponds, and reservoirs below a certain percentage.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	30	32

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
103	Management of Saline and Sodic Soils and Salinity
104	Protect Soil from Harmful Effects of Natural Elements
605	Natural Resource and Environmental Economics
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
102	Soil, Plant, Water, Nutrient Relationships
213	Weeds Affecting Plants
101	Appraisal of Soil Resources
205	Plant Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Key Items of Evaluation

Program #7

V(A). Planned Program (Summary)

1. Name of the Planned Program

Natural Resource Systems and the Environment

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
112	Watershed Protection and Management	10%		10%	
121	Management of Range Resources	20%		20%	
122	Management and Control of Forest and Range Fires	5%		5%	
123	Management and Sustainability of Forest Resources	20%		20%	
125	Agroforestry	5%		5%	
134	Outdoor Recreation	5%		5%	
135	Aquatic and Terrestrial Wildlife	10%		10%	
136	Conservation of Biological Diversity	5%		5%	
141	Air Resource Protection and Management	10%		10%	
605	Natural Resource and Environmental Economics	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	13.0	0.0	5.1	0.0
Actual	4.0	0.0	12.8	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
31895	0	94422	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
39554	0	1303116	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	748782	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Work will be undertaken that attempts to identify principles and practices that maximize the overall benefits from range and forest use/nonuse. Additional research will be undertaken that focuses on air quality–both protection and management of said resource. Finally, economic studies involving environmental issues, primarily management of natural resources, will be continued in order to identify potential economic strategies that will enhance the quality of life and maintain viable environments.

Extension will outreach to livestock producers, general public including youth, private land forest owners, agency personnel, special interest groups and green industry professionals to:

1. Conduct projects consultations, and workshops focusing on the role of outdoor recreation and natural resource-based tourism in relation to community development.
2. Provide information, resources, research, and expertise related to the development of outdoor recreation and natural resources-based tourism opportunities to assist in the diversification of local economies, especially in rural Utah.
3. Partner with others in education and use of resources to rehabilitate the sagebrush steppe environment.
4. Educate and partner to enable the recovery of the sage grouse, pygmy rabbit and others to avoid listing as endangered species.
5. Continue to facilitate and assist the establishment and success of local Conservation Resource Management (CRM) groups, for more local control of decisions on natural resources.
6. Educate the public with respect to the principle causes of air pollution and their role in prevention.
7. Partner with others to enable agriculture producers to meet the requirements of the EPA.
8. Provide training in practical weed inventory and mapping techniques to state and federal land managers.
9. Establish herbicide demonstration/research plots to evaluate the efficacy of these products under local conditions.
10. Determine management options that slows or stops the cycle of cheatgrass and fire on previously burned areas through range rehabilitation, seeding programs and nontraditional approaches to grazing management.
11. Educate producers and agency personnel on the need for continued range evaluation, monitoring, and management improvements and the role of grazing management in sustainable resource management.
12. Educate the public on responsible use and the value of multiple uses on rangelands.
13. Demonstrate the need for controlled logging, thinning and cleaning of some forests to reduce the fire danger and enhance the re-establishment of aspen groves.
14. Illustrate the need for management and control of pinion-juniper forests to restore watershed, wildlife habitat and forage values on rangelands.
15. Educate landowners on how to have timber harvested from their lands in a manner that increases their income while maintaining or enhancing the forest resource.
16. Provide information to landowners and users on grazing management of graze able woodlands.
17. Provide information on how to manage these areas to reduce or control the invasion of harmful insects and invasive weeds from public forests into their private forest lands.
18. Partner with and educate city foresters, green industry professionals, and citizens on health and management trees in urban settings.
19. Partner with and educate livestock producers and agency personnel on the identification and methods of control of the specific noxious and invasive species.
20. Educate developers, home owners, small acreage owners, outdoor recreationists, youth, and others interested in public lands on their critical role in preventing, reporting, and even helping to control these plants.
21. Emphasize the strategic elements of early detection and rapid response as outlined in the most recent National Invasive Species Management Plan.

2. Brief description of the target audience

The target audience includes the general public (including youth), users of various environments (agricultural producers, extractive industry representatives, environmentalists, recreationists, green industry professionals, etc.), small acreage owners, private forest owners, federal and state government officials, extension agricultural agents, and other academics and resource managers.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	25800	17473	13000	8804
2008	16244	247698	22213	56743

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	50	
2008	0	60	60

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of peer-reviewed journal articles and books/chapters in books extensively peer reviewed.

Year	Target	Actual
2008	50	60

Output #2

Output Measure

- Number of intermediate publications and presentations (e.g., refereed proceedings).

Year	Target	Actual
2008	8	0

Output #3

Output Measure

- Level of contract/grant funding.

Year	Target	Actual
2008	50000	500000

Output #4

Output Measure

- Number of graduate students or post-doctorate's trained.

Year	Target	Actual
2008	3	77

Output #5

Output Measure

- Number of undergraduate students involved in research.

Year	Target	Actual
2008	3	0

Output #6

Output Measure

- Number of theses/dissertations completed.

Year	Target	Actual
2008	3	2

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Number of program participants who gain knowledge on natural resource systems and the environment.
2	Number of program participants who implement positive natural resource systems and the environmental practices.
3	Percent of permitted acres maintained at appropriate land conditions and water and air standards.

Outcome #1

1. Outcome Measures

Number of program participants who gain knowledge on natural resource systems and the environment.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	7740	12559

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
122	Management and Control of Forest and Range Fires
125	Agroforestry
123	Management and Sustainability of Forest Resources
112	Watershed Protection and Management
141	Air Resource Protection and Management
136	Conservation of Biological Diversity
605	Natural Resource and Environmental Economics
121	Management of Range Resources
134	Outdoor Recreation

Outcome #2

1. Outcome Measures

Number of program participants who implement positive natural resource systems and the environmental practices.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	3870	6711

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Invasive and noxious weeds have become an increasing menace to the productivity of rangeland and forest due to increased traffic and seed transfer over long distances. Once established in a new area many of these are very difficult to control and almost impossible to eradicate. Non indigenous (invasive) weeds disrupt the delicate ecological balance of UtahÃ,'s native plant and wildlife communities, posing perhaps the single greatest threat to natural ecosystems in the West. Very few professionals within federal and state land management agencies currently have any formal weed science training, and yet they are expected to effectively manage invasive weeds.

What has been done

The USU wildfire/weed management model remains a core element of national weed management plans of the Forest Service, Bureau of Land Management, Fish and Wildlife Service, and the National Park Service. The model also has been adopted by all National Park Service Exotic Plant Management Teams and all U. S. Fish and Wildlife Service Invasive Species Strike Teams. Special emphasis is being paid by these agencies on the model's elements of early detection and rapid response (EDRR).

Results

The Utah Noxious Weed Act was revised to include a 3-tiered list of noxious weeds, with emphasis on Early Detection and Rapid Response. Similar changes have been made recently in the weed laws of Idaho, Colorado, and several other western states. The importance of early detection is emphasized nationally in the agency-wide weed management plans prepared by the Forest Service, BLM, National Park Service, and the Fish and Wildlife Service.

4. Associated Knowledge Areas

KA Code	Knowledge Area
125	Agroforestry
135	Aquatic and Terrestrial Wildlife
122	Management and Control of Forest and Range Fires
112	Watershed Protection and Management
605	Natural Resource and Environmental Economics
136	Conservation of Biological Diversity
134	Outdoor Recreation
121	Management of Range Resources
141	Air Resource Protection and Management
123	Management and Sustainability of Forest Resources

Outcome #3

1. Outcome Measures

Percent of permitted acres maintained at appropriate land conditions and water and air standards.

Not reporting on this Outcome for this Annual Report

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Key Items of Evaluation

Program #8

V(A). Planned Program (Summary)

1. Name of the Planned Program

Production, Marketing, Trade, and International Economics

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
601	Economics of Agricultural Production and Farm Management	10%		10%	
602	Business Management, Finance, and Taxation	5%		5%	
603	Market Economics	15%		15%	
604	Marketing and Distribution Practices	15%		15%	
605	Natural Resource and Environmental Economics	15%		15%	
606	International Trade and Development	10%		10%	
607	Consumer Economics	5%		5%	
608	Community Resource Planning and Development	5%		5%	
609	Economic Theory and Methods	15%		15%	
611	Foreign Policy and Programs	5%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	7.0	0.0	1.2	0.0
Actual	3.0	0.0	3.4	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
23921	0	93839	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
29665	0	317813	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	81375	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Under the auspices of the experiment station, market tests will be conducted in order to determine the price premium associated with alternative production and marketing programs. Models will be built to quantify the impacts associated with international trade. Work will continue in the area of risk reduction for agricultural producers. Research and extension efforts will be needed to more thoroughly analyze the impacts of alternative, risk reducing strategies. Finally, firm-level analyses will continue so as to identify specific changes that might be made on individual farms and ranches that would enhance net returns.

More specifically, extension will outreach to agriculture businesses, small manufacturers, and entrepreneurs to provide educational training and in-depth information on:

Small business management
Home-based businesses
Main street community programs
Business retention and expansion
Rural and heritage tourism
Rural and economic development activities.
E-commerce programs
Community entrepreneurship programs
Marketing (Market feasibility, research, customer relations/service, pricing)
Finances (recordkeeping, raising capital, growing/expanding financial issues)
Business plans for potential business owners
Patents/trademarks/copyrights
Insurance, zoning, and legal requirements
Identifying business opportunities
Developing a youth entrepreneurship program

2. Brief description of the target audience

The target audience for this planned program will include Utah communities, business owners, manufacturers, entrepreneurs, agricultural producers, agribusiness firms, state agencies, local governments, small acreage producers, policy makers, and the general public (including youth).

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	10000	11861	500	593
2008	10051	56325	124	1298

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	10	
2008	0	12	12

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of peer-reviewed journal articles and books/chapters in books extensively peer reviewed.

Year	Target	Actual
2008	10	12

Output #2

Output Measure

- Level of contract/grant funding.

Year	Target	Actual
2008	50000	0

Output #3

Output Measure

- Number of intermediate publications and presentations (i.e., refereed proceedings).

Year	Target	Actual
2008	3	2

Output #4

Output Measure

- Number of graduate students trained.

Year	Target	Actual
2008	3	5

Output #5

Output Measure

- Number of undergraduate students involved in research.

Year	Target	Actual
2008	2	0

Output #6

Output Measure

- Number of theses/dissertations completed.

Year	Target	Actual
2008	2	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Number of clients who increase their knowledge of marketing trade, and economic development.
2	Number of clients who implement positive marketing, trade, and economic development practices.
3	A 1% 12 month increase in manufacturing employment in Utah.

Outcome #1

1. Outcome Measures

Number of clients who increase their knowledge of marketing trade, and economic development.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	3000	6263

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
603	Market Economics
611	Foreign Policy and Programs
608	Community Resource Planning and Development
607	Consumer Economics
605	Natural Resource and Environmental Economics
609	Economic Theory and Methods
604	Marketing and Distribution Practices
602	Business Management, Finance, and Taxation
601	Economics of Agricultural Production and Farm Management
606	International Trade and Development

Outcome #2

1. Outcome Measures

Number of clients who implement positive marketing, trade, and economic development practices.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	1500	1796

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The manufacturing sector plays a major role in Utah's economy. Ninety-nine percent of Utah manufacturing firms employ less than 500 people, and 92 percent employ less than 100 people. Manufacturers have nearly three times the impact on the local economy as compared to other employment sectors. Small and medium sized manufacturers confront major problems in responding to increasing global competition. These problems encompass a broad range of issues, only some of which relate directly to technology. Inadequate resources - people, money, expertise, information, and insufficient time - are reasons that many small industrial firms are not improving their manufacturing performance.

What has been done

The MEP co-sponsored the Northern Utah Manufacturing Alliance (NUMA) Expo. This event had good attendance from Northern Utah Manufacturers. Also, approximately 250 high school students from the Weber/Ogden School Districts attended this event. MEP Utah also was a major contributor to the Operations Managers Lean Certification Program. This program runs for 12 weeks and has participation from 20 different Weber County companies. This year we worked directly with just under 4300 individuals. Our events continue to focus on 'Transformation' events. These events are made up of training and consulting that is focused on assisting the manufacturers to improve overall performance and profitability.

Results

The MEP is ranked as one of the top 5 MEP Centers nationally for Economic Impact on Manufacturers. Eighty seven percent of the companies MEP worked with reported impacts. Bottom-line impacts amounted to $35,298,350, Total investment impacts were $26,527,100. There were 817 jobs created or retained by companies utilizing MEP services.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
601	Economics of Agricultural Production and Farm Management
609	Economic Theory and Methods
606	International Trade and Development
611	Foreign Policy and Programs
604	Marketing and Distribution Practices
608	Community Resource Planning and Development
603	Market Economics
607	Consumer Economics
605	Natural Resource and Environmental Economics

Outcome #3

1. Outcome Measures

A 1% 12 month increase in manufacturing employment in Utah.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	1	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
603	Market Economics
611	Foreign Policy and Programs
607	Consumer Economics
606	International Trade and Development
604	Marketing and Distribution Practices
609	Economic Theory and Methods
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development
605	Natural Resource and Environmental Economics

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

The manufacturing and financial services industries experienced job losses in 2008, as

both were heavily influenced by the national economic downturn

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Key Items of Evaluation

Program #9

V(A). Planned Program (Summary)

1. Name of the Planned Program

Individuals, Families, and Communities

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
701	Nutrient Composition of Food	10%		10%	
702	Requirements and Function of Nutrients and Other Food Components	5%		5%	
703	Nutrition Education and Behavior	15%		15%	
704	Nutrition and Hunger in the Population	5%		5%	
801	Individual and Family Resource Management	20%		20%	
802	Human Development and Family Well-Being	15%		15%	
803	Sociological and Technological Change Affecting Individuals, Families and Communities	10%		10%	
806	Youth Development	20%		20%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	65.0	0.0	1.5	0.0
Actual	56.0	0.0	2.5	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
446529	0	10708	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
553756	0	484319	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	268762	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The faculty affiliated with the experiment station will:

1. Conduct research with respect to human nutrition, family finances, bankruptcy, and community development.
2. Publish studies and make presentations related to individuals, family finances, and community well-being.

Specialists and agents will conduct workshops and meetings, deliver activities, develop new curricula, write newsletters and news releases and post Internet fact sheets. They will provide training in a variety of mediums–face-to-face, satellite, group discussions, demonstrations, conferences and workshops, via DVDs, CDs, fact sheets, newsletters, and other media.

Individual and family financial activities will include: Take Charge of Your Money, Power Pay and Power Saves, Utah Saves Education and Outreach, Individual Development Account, First Time Homebuyer Assistance, Financial Education for Bankruptcy Filers (USU is certified by the Department of Justice to offer debtor education classes), Living Well on Less, Money Sense for Your Children, and Earned Income Credit assistance.

Teaching methods of The Utah Food Stamp Nutrition Education include individual, group classes, DVD video series, and an on-line course. FSNE Nutrition Education Assistants will provide other nutrition education opportunities to FSNE participants via demonstrations, newsletters, fact sheets, etc. as determined by Food Stamp Eligible needs in each county. Additionally, printed materials and educational displays will be available at local employment centers and other places where low-income people gather. Several counties will continue conducting cooking schools in cooperation with the local employment center; some will continue distribution of newsletters to participants.

The Nutrition Education Assistants will use the "Give Your Body the Best" curriculum developed in 2005 by USU to teach individuals or groups of low income persons. They will also teach lessons on chronic diseases; on food allergies, intolerance, and poisoning; and lessons on getting to know foods and enjoy them.

Community development specialists and extension personnel who are knowledgeable in community assessment will increase the capacity among other extension personnel to participate in or lead community self-assessments that lay the groundwork for subsequent project activities. These assessments come in various forms (SWOT analyses, asset mapping, search conferencing, surveys, etc.) and typically participatory, drawing upon the values and knowledge of local residents. They will also develop capacity in extension personnel to conduct activities identified as priorities through the community self-assessments.

2. Brief description of the target audience

The target group is the general population of Utah (including youth), with a special emphasis on Native Americans, Latinos, African Americans, Asians/Pacific Islanders, and low income families with children at or below poverty levels, food stamp program eligible individuals, and individuals facing bankruptcy. A subgroup of the audience targets is pregnant teens and teen mothers.

Elected officials, appointed officials, general population (including youth), and at-large community opinion leaders and influential people are targeted for community development.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	45000	10637	220000	694600
2008	75497	396801	40522	98304

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	25	
2008	0	14	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of peer-reviewed journal articles and books extensively peer reviewed.

Year	Target	Actual
2008	25	14

Output #2

Output Measure

- Number of intermediate publications and presentations (i.e., refereed proceedings).

Year	Target	Actual
2008	5	4

Output #3

Output Measure

- Level of contract/grant funding.

Year	Target	Actual
2008	35000	0

Output #4

Output Measure

- Number of graduate students trained.

Year	Target	Actual
2008	3	42

Output #5

Output Measure

- Number of undergraduate students involved in research.

Year	Target	Actual
2008	2	0

Output #6

Output Measure

- Number of theses/dissertations completed.

Year	Target	Actual
2008	2	3

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Number of clientele who gain knowledge about healthy and financially secure individuals, families, or communities.
2	Number of clientele who implement practices for healthy and financially secure individuals, families, or communities.
3	Percentage of Adult Graduates Who Reported Seven or More Days Physical Health NOT Good in the Past 30 Days. (Less than or equal to the 2004 Utah IBI-PH Indicator, Income less than $20,000.)

Outcome #1

1. Outcome Measures

Number of clientele who gain knowledge about healthy and financially secure individuals, families, or communities.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	21700	178797

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families and Communities
801	Individual and Family Resource Management
702	Requirements and Function of Nutrients and Other Food Components
806	Youth Development
704	Nutrition and Hunger in the Population
703	Nutrition Education and Behavior
802	Human Development and Family Well-Being
701	Nutrient Composition of Food

Outcome #2

1. Outcome Measures

Number of clientele who implement practices for healthy and financially secure individuals, families, or communities.

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	12000	55579

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

There is an increasing gap between income and the cost of basic needs (housing, transportation, energy, education, etc) in this country, and with Utahns historically low income this gap is a huge concern amongst educators and the charitable sector. Currently, one-third of all Utahns live at or below 200% of the federal poverty line (which is defined as unable to meet the basic needs in life). Real median income in the United States was lower in 2005 than it was in 1999, and nearly a quarter of all workers in the U.S. are earning below poverty level wages. While living costs are rising, median debt as a percentage of median income has increased by 30% to 108.4%, the highest figure since the Federal Reserve began measuring this indicator.

What has been done

Qualifying and successful applicants for Utah Individual Development Account Network (UIDAN) funding are eligible to receive a 3 to 1 match for funds saved during a one-to three-year period. This national program was originally brought to Utah by Utah Issues and is currently housed with AAA Fair Credit Foundation. USU Extension fostered a partnership with Utah Issues, AAA Fair Credit, and others to have USU Extension as the financial educators of this program. Eighteen FCS Agents teach these courses.

Results

In 2008 there were 1257 savers who saved $231,063. Their savings were matched with $693,188 from the UIDAN program for a total accumulation of $924,250.32 in eighteen of UtahÂ's counties. Four years after starting the program, we have 23 people in homes, forty-six people going to a university, a college, or obtaining vocational training, and seven have started small businesses.

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families and Communities
703	Nutrition Education and Behavior
701	Nutrient Composition of Food
704	Nutrition and Hunger in the Population
702	Requirements and Function of Nutrients and Other Food Components
801	Individual and Family Resource Management
806	Youth Development
802	Human Development and Family Well-Being

Outcome #3

1. Outcome Measures

Percentage of Adult Graduates Who Reported Seven or More Days Physical Health NOT Good in the Past 30 Days. (Less than or equal to the 2004 Utah IBI-PH Indicator, Income less than $20,000.)

2. Associated Institution Types

•1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	23	27

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
704	Nutrition and Hunger in the Population
702	Requirements and Function of Nutrients and Other Food Components
701	Nutrient Composition of Food
806	Youth Development
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families and Communities
703	Nutrition Education and Behavior

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

Key Items of Evaluation