Utah FY 2006

Report of Accomplishments and Results (1999-2004 POW, 2005-2006 Amendment)

UTAH STATE UNIVERSITY

Utah Agriculture Experiment Station

and

Utah State University Extension

March 2007

Issued in furtherance of Cooperative Extension and the Utah Agricultural Experiment Station work, in cooperation with the U.S. Department of Agriculture and Cooperative Extension Service and Agricultural Experiment Station, Utah State University, Logan, Utah.

A. Programs

Utah State University Extension (CES) and Utah Agricultural Experiment Station (UAES) have integrated programs, as well as independent programs. Generally, the UAES programs provide research-based information that CES incorporates into programs delivered to constituents. Some integrated programs also involve Specialists on campus partnering with county agents to conduct research using land, facilities, and/or clientele from counties appropriate to the research. A third area of collaboration involves joint stakeholder meetings held throughout Utah where CES and UAES gather input from citizens about their community needs. Each of the Goal areas provide a brief overview, then descriptions and impacts of integrated UAES and CES programs, and finally descriptions and impacts of other CES and UAES programs/projects.

Goal 1: An agricultural system that is highly competitive in the global economy.

Utah State University Extension (CES) and Utah Agricultural Experiment Station (UAES) Progress Report on Plan of Work Goals: 2006

Overview

USU's cooperative extension and the agricultural experiment station enables producers to remain competitive by providing tools to help them select improved plant varieties, manage their farms and ranches, and control pests and weeds. USU scientists and personnel conduct field trials to determine which variety is best suited to a given climate and geography. The return is further compounded when the product is fed to animals or processed for the enhanced value.

Production of vegetables is an excellent area for niche marketing of high quality produce. Onions, melons and tomatoes are just some of the current farm produce available from the state's producers. Both CES and UAES have provided information to improve and protect production that enables producers to prosper.

Cattle and calves provide the greatest contribution of all agricultural cash receipts in Utah. As a whole, agriculture contributes more towards the economy in Utah than any other single sector. Providing timely and relevant information and service to beef producers is imperative for their continued viability.

The competitive nature of turkey marketing is forcing more Utah growers to move toward year round production. In order to become efficient, proper ventilation techniques of turkey houses must be applied. Extension assisted by assessing and estimating ventilation/heating needs on farms on a building by building basis to enable them to be competitive in year round turkey production.

The marketing of farm products is risky business and producers need to take advantage of all the tools available to reduce those risks. CES and UAES personnel have been very active in researching and educating producers about the tools available and how to use them wisely and it has resulted in reduced risks. Traceability of food products is an issue recognized as important and USU is taking leadership in this area.

Gardens are an important source of fresh produce for Utah's families. Information provided by CES and UAES on what to grow and when to grow it ensures that gardeners and gardens are successful and productive. The Master Gardner program enables many volunteers to make valuable contributions of their knowledge to other gardeners.

State Assessment: The programs offered with Goal 1 address critical issues in Utah. CES and UAES faculties on campus and in the counties are responding very well to local and statewide needs.

CES Total Expenditures and FTE:

Smith-Lever: $527,996
State Match: $516,411
FTE: 15.13

UAES Total Expenditures and FTE:
Hatch: $323,252
State Match: $1,816,728
FTE: 5.6

Integrated Programs

Program Title: Production Based Agriculture: Developing enhanced methods of agricultural production and marketing through scientific-researched based methods of investigation

Key Theme: Agricultural Competitiveness

Description: Alfalfa is the most-widely grown field crop in Utah, representing 55% of total Utah cropland area and approximately 9% of total Utah agricultural cash receipts. It contributes directly, and beyond reported cash receipts, to the success and value of Utah beef and dairy production enterprises. Research and outreach work is being done in the forage area with primary emphasis on alfalfa production since over 400,000 acres of irrigated cropland in the state of Utah are devoted to alfalfa production. Nonbloating alfalfa and various grass varieties (both cold and warm season) are being examined to enhance grazing practices and usable forage yield.

Impact: New varieties can increase net returns for alfalfa hay producers by at least $60/acre. Yields of some of the cool season grasses are consistent with or even higher than for alfalfa (i.e., 6-8 tons/acre), but there is some remaining concern about seasonal production patterns for these grasses. Higher-performing varieties in alfalfa trials typically yield at least 0.75 ton/acre more alfalfa hay than lower-performing varieties which provides a potential increase in economic returns of at least $60/acre or $24 million annually to hay growers statewide.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT, Intermountain West, U.S.

Key Theme: Agricultural Competitiveness

Description: Beef production has been enhanced using a well-established crossbreeding program. Calves from these cows are being marketed for slaughter less than 365 days in contrast to the typical calves that require up to 16 to 18 months to finish.

Impact: This translates into reduced feeding costs for cattle producers, though there is still some concern with respect to the quality grades (too small a percentage grade out as choice). Beef cattle are also being fed low quality forages to reduce winter feed costs and the experiments have proven successful reducing costs from 10% to 15%.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT, Intermountain West, U.S.

Program Title: Production Based Agriculture: Utilizing Biotechnology and Genomics to Improve Agricultural Productivity and Profitability

Key Theme: Agricultural Competitiveness

Description: Biotechnology and genomics are being used to enhance crop and livestock output and quality. Work is underway on beef cattle, dairy cattle, and sheep on the livestock side. Double muscling traits of

certain sheep breeds have been identified and the ability to pass that trait on has been improved, though there is some concern about meat tenderness at this point. Genomics is being used to enhance cattle breeding and cloning of high quality animals. Genomics is also being used to identify genes involved in disease transmission with the expected outcome being enhance meat and food quality, leading to better returns. Work continues using genomics in various forage species. Extension's role to this point has primarily been to explain the role of genomics in animal and plant production.

Impact: It is anticipated that the double muscling will enhance producer returns as more "meat" is actually being produced for similar levels of feed. Cloning has been successful for cattle and work continues to perfect that process. The overall goal is to enhance animal and plant productivity through increasing yields or by reducing the negative impacts of diseases and other problems contributed to by the genetic structure of plants and animals.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT, Intermountain West, U.S.

Program Title: Production Based Agriculture: Controlling Invasive Species through Research and Outreach Activities

Key Theme: Agricultural Competitiveness

Description: Invasive species are a critical problem to both private and public land owners. This has been ranked as one of the most significant problems facing the West. Research and extension are working hand-in-hand to develop techniques (natural, biological, and chemical) that can be used to control the invasive species, both plant and animal pests. Extension's primary role thus far has been to increase public awareness of the nature and extent of the problem. Literally thousands of acres are being adversely impacted by these invasive species.

Common mallow and foxtail barley are encroaching on many of the crops in Utah. With particular emphasis on irrigated pasture and alfalfa these two weeds are becoming some of the most significant weeds in the state. In Utah it has been shown that the addition of safflower to the wheat-fallow-wheat rotation can effectively control jointed goatgrass. In addition, the new crop, safflower, add more income to the wheat producer and does not require them to purchase new equipment. The summary data supporting this conclusion is available in a new publication title Best Management Practices for Control of Jointed Goatgrass in the Intermountain Region.

In 2006 county weed supervisors were trained in weed mapping and each county supervisor received a new GPS unit and taught a method of keeping better records of the existing weeds in their counties and how to record the arrival of new and invading weeds. This will provide important historical data for the future efforts to track weeds in Utah. Roundup Ready plots were established to evaluate the use of the RR feature in alfalfa in Utah in 2005. RR alfalfa is one of the most significant events in crop production in Utah. To know how the alfalfa performs, its quality, and related cultural practices is crucial to the success for RR alfalfa producers. Where weeds in alfalfa are a serious problem the introduction of RR alfalfa makes effective management possible.

Impact: The potential savings to Utah agriculture through invasive species control is at a minimum $25 million annually. Conservative estimates put annual yield and quality losses in agronomic crops alone, due to invasive species in Utah, at over $50 million.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT, Intermountain West, U.S.

Key Theme: Weed Control

Description: Weed management in agronomic crops in Utah includes educational and demonstration activities in alfalfa, corn, small grains (wheat, barley, oats, triticale), and irrigated pasture. The need for

effective (efficacious) weed control is critical for enhanced crop production, economic return on investment, and time savings in farm operations. Appropriate weed management education and demonstration enables county agents and others interested in weed management to develop a suitable control strategy.

Impact: Musk thistle seeds are reported to live about 10 years in the soil. After 14 years of spot-treatment with picloram herbicide musk thistle populations have been reduced on average 74%. The best sites have been reduced by 91% and the poorest by only 48%. This long-term project has cost about $9.00 per acre each year. It appears that the investment is not worth the final control and consequently we plan to move biological control agents into the area in 2006.

Sources of Funds: Smith-Lever, State
Scope of Impact: UT, Intermountain West

Program Title: Production Based Agriculture: Develop and Deliver Current, Research-Based Information on Economically-and Environmentally- Sound Agricultural Production Practices

Key Theme: Agricultural Competitiveness

Description: Various methods of enhanced agricultural production and marketing are being examined in an integrated fashion. These include work on vegetables, grains, forages (i.e., alfalfa hay and alternative grasses), dairy and beef cattle, and sheep. This is a major area of emphasis between the CES and UAES as evidenced by the number of projects available for this area. Research and outreach activities have been directed toward vegetable crop production for those farmers near the larger cities or in historic areas of production.

Impact: Increases in production of 5% to 20% have been shown, while reducing water consumption by up to 25%. New varieties of grains, particularly wheat and barley, have also been produced which are more resistant to diseases and drought, production levels are increased from 5% up to 25%. New varieties are the real foundation to continued profitable grain production.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT, Intermountain West, U.S.

Program Title: Agronomy/Crop Production

Key Theme: Agricultural Competitiveness

Description: Crop varieties common throughout the region such as alfalfa, corn silage, grass hay, pasture, cereal grains cut for hay, barley, wheat, oats and grain corn were field tested under regional environments. Improved practices and better yields is the major goal of the program. Extension published and presented information about Spring Cereal Forage trials conducted in Richfield, Delta, and Morgan at the Utah Crop Improvement Meeting and at a Sevier County producers meeting. Information was also distributed in an agriculture newsletter and to other Extension Agents. Extension conducted test plots in 4 counties with sunflower, canola, safflower, and camelina for oil yield and bio-diesel production.

Impact: Extension's efforts improved clientele's crop production.

- Eighty-two percent of participants' evaluations on an Extension Crop and Water School showed producers increased their profits. Half indicated their profits increased 5-10 percent, 29 percent increased their profits 10-15%, and 21 percent increased their profits by 5 percent or less.
- Extension efforts improved production costs by reducing at least one pesticide application on over 7,000 acres of commercial orchards and crops for a savings of at least $280,000. Additional pesticide savings by home owners would also be realized.
- Through IPM training over 300 citizens and melon, alfalfa, and tomato producers increased production valued at over $500,000 due to reducing pest pressure.

- Data provided to seed companies and Extension Agriculture Agents from silage corn hybrid testing provided a basis for selection of hybrids that met growers' targets. Silage hybrids rank very differently for forage production than for forage quality (energy).
- The USU Barley variety Goldeneye was shown to be equal to or better than the industry standard and most commonly grown variety, Steptoe in forage tons and quality. The information provided to Sevier County producers was timely and allowed them to purchase the variety in its first year of certified seed release. The information also allowed the seed producer to sell seed directly to producers and realize a selling price of $13 per cwt or $7 per cwt above wholesale seed price.
- Spring Cereal Forage trials demonstrated the utility of newly released USU Barley Varieties Goldeneye and Aquila. Oil seed crops were shown to grow in Central Utah and agricultural producers were given options to produce their own fuel source.
- Extension gathered almost $32,000 to match the federal funds for spraying 96,000 acres that were infected with Mormon Crickets.
- Producers cooperating with Extension have dramatically increased cattle carrying capacity through inter-seeding alfalfa hay with perennial forage grass and annual vegetable crops with winter triticale.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT, Intermountain West

Program Title: Horticulture – Commercial Fruit and Vegetable Production

Key Theme: Agricultural Competitiveness

Description: An expansion of the fruit and vegetable production capabilities of Utah will be implemented in this program. Concentration will be on developing increased commercial production of onions, sweet corn, melons and pumpkins. Extension established 5 raspberry variety trials representing a cross section of the state. Locations were in Rich, Cache, Davis, Utah and Washington counties. Extension organized the first meeting of the newly organized Utah Berry Growers Association. Attendees represented a good portion of the Utah berry industry. Extension also promotes high tunnels in Utah as a new, alternative production strategy for local markets. There is the potential for very good farm prices due to production out of season and high local demand for local produce

Impact: Extension has expanded the fruit and vegetable production capabilities in Utah.
- Extension worked with tribal staff and with representatives of the Bureau of Reclamation to design, plan and establish a demonstration orchard on the Goshute Indian Reservation. Orchard includes apple, plum and raspberry. The Goshute tribe now has a new orchard with locally adapted plants, and a robust irrigation system to serve their long term needs.
- Scientifically verified information on locally adapted raspberry varieties will be available to homeowners and commercial fruit growers, many of which are small-acreage farmers.
- Extension worked with a nursery in the San Luis valley of Colorado to investigate alternatives to chemical fumigation for controlling soil-borne pathogens in a strawberry nursery. The project was funded through SARE. Made three trips to the nursery in June, July and August to evaluate soil solarization and crop rotation strategies. Demonstrated that soil solarization could be an adequate method for suppressing pathogens, even in such a high-elevation cool climate.
- Extension helped a new greenhouse tomato grower achieve better growth and higher yields. He reported crop grossed $10,000 from 2200 sq ft house. Extension helped a tomato grower in Syracuse deal with a disease outbreak and organized his spray program to increase his yield by 40% and profit by more than $12,000.
- Extension helped three growers develop high tunnel plans for their farms that will allow them in 2007 to produce tomatoes 4 weeks early, thus capturing some early markets where prices are 3 times higher than normal.
- Asparagus acreage in Utah is on the increase due to continued efforts to promote it as a new, alternative vegetable crop with local marketing and good farm price potential. Growers are reporting strong consumer demand and good prices ($2-3/lb) with average farm yields of 3000-4000 lb/A. New

acreage is being planted each year. Growers report between $4000 and $6000 of net income per acre when sold at farmer markets and local stands.
- Extension recommendations are being adopted by approximately 8 growers who are building high tunnels and another 10 have built high tunnels and are producing crops. Growers are reporting strong consumer demand and good prices for crops grown in tunnels. New tunnels are being built each year. Growers report high returns.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT

Program Title: Gardening and Ornamental Horticulture

Key Theme: Home Lawn and Gardening

Description: Gardening and landscaping are popular activities in Utah. Providing information on best management practices, local growing requirements, and new technologies will help save money, conserve water, improve food safety and protect water quality. Demonstrations, publications and outreach programs will be utilized in this program.

Impact:
- More than 600,000 listeners of the Extension KSL Radio Greenhouse Show learn gardening and landscaping practices. The radio show is the most popular, longest running garden program in the nation.
- Twenty-seven different series of Horticulture Education Classes were taught by Extension. In some of the series there are multiple classes taught and the total number of class contacts exceeded 6000 individuals. The newly expanded garden expo series had more than 700 individual class contacts. This series featured multiple class choices on a variety of subjects.
- Training Master Gardeners helps relieve burdens on the Extension Staff and extend the reach of the University. Because the Master Gardener Training has only a limited training, advanced training helps them identify common pests and recommend possible IPM solutions. The training emphasized diagnosing plant problems steps including identifying the host plant, identifying the problem and determining solutions. Control solutions focused on using correct IPM options and reducing pesticide usage.
- 10 Saturday Series classes were taught by Master Gardeners with approximately 90 people in attendance. There were 2,165 plants propagated by Master Gardeners at the UBC greenhouse. There were also 2 classes taught by Master Gardeners at the Spring Celebration. There were 10 speaker's bureau assignments in the public sector. Total Master Gardener hours reported for 2006 = 1,750
- Trained 125 Master Gardeners in water conservation, water-wise plant selection, and water wise landscaping. Advanced Master Gardeners have taught more than 100 presentations in four counties to more than 1000 people using Training materials provided as part of their curriculum.
- Individuals, mostly homeowners, received customized answers to their questions about nuisance pests.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT

Program Title: Production Based Agriculture: Enhancing the Efficiency and Efficacy of Agriculture Information Delivery Systems

Key Theme: Precision Agriculture

Description: Maintaining our producers on the land, and in an economical, environmental and sustainable fashion, to enhance the ability of all consumers to enjoy a heightened quality of sustainable life for ourselves, families, communities, now and in the future is the goal of this program. Training of agents and others in sustainable agricultural techniques, principles and current research will be the primary focus

Impact: A set of 22 PowerPoint presentations was made available to all county agricultural and horticultural agents for use in their locations. Subjects include Master Gardener modules on soils and fertilizers, animal waste utilization, nutrient cycling and soil fertility, small pasture soil fertility and irrigation management, and soil quality/health. Over 550 individuals representing growers, agriculture and horticulture professionals, and students were contacted with current information and guidelines in soil management appropriate to their needs.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT

Program Title: Production Based Agriculture: Develop Programming to Support Small Farm and Ranch Management

Key Theme: Small Farm Viability

Description: This program involves a structured and integrated approach to develop a small farm/ranch program led by an issue team that will identify needs and opportunities to deliver information to this audience, and then initiate an ongoing program to support small farm and ranch owners in Utah.

Impact: There is an opportunity and need to develop some demonstration plots and pastures for hands- on workshops and to provide visual presentations on options available to the public to include into their properties. The UBC and TGP locations have been selected to develop these demonstrations.

The UBC demonstration site under construction will present windbreak ideas, pasture varieties (both grass and legumes), various irrigation, weed control, planting processes that may be valuable and easy to use for SmAc owners. The TGP site will be more of a pasture demonstration including irrigation, weed control and fertilization, but will also include a grazing component. Both site plans are still in draft processes, but hopefully work will start in spring of 07 with hands on establishment work

From the two 2006 workshops we found: 100% of the participants indicated that the presenters were current, up to date and understandable. Over 90% of the responses indicated that the workshops answered their questions and that they learned many new things. From the longitudinal workshop we learned that about 30% past participants continue to use USU/SmAc website. 50% of the participants have implemented practices learned and the other 50% have plans to do so. Only 25% have completed their goals.

The SmAc website was updated with the new look and feel of Extension Websites. Resources have been added and new links created to help small acreage owners. It provides review materials for those who have attended workshops and also resource information for those who are looking for new ideas

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT

Program Title: Homeland Security: Protect Utah's Agricultural Security and Productivity by Developing and Delivering Quality Plant and Animal Pest Diagnostic and Pest Management Services.

Key Theme: Plant Health

Description: At the Utah Pest and Plant Disease Laboratory over 300 diagnoses have been provided and approximately $50,000 dollars in grant support have been obtained in 2005. The UPPDL is being upgraded with newer equipment and supplies to conduct state of the art plant disease diagnostic services. Equipment added to the laboratory includes three microscopes with digital imaging capabilities, newer computers for diagnostic/office support, an incubation chamber and laboratory disposable supplies.

Impact: The UPPDL can conduct state of the art plant disease diagnostic services to identify and isolate plant diseases.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT

Program Title: Enhanced methods of agricultural production and marketing

Key Theme: Agriculture Competitiveness

Description: There are a number of UAES projects and CES programs that are directed toward enhancing methods of agricultural production and marketing. One of the most significant efforts is that related to animal identification, which has implications for both the production and marketing side of agriculture. Work is also underway in an attempt to identify alternative means of feeding cattle, particularly through the winter but also in a pasture setting for the summer months.

Impact: The impacts associated with animal identification are not yet fully known. Feed costs can be reduced an average of 17% using alternative winter feeds and by up to 15% using pasture-based intensive management programs.

Sources of Funds: Hatch, Smith-Lever, State, Other
Scope of Impact: Utah, Intermountain West

Program Title: Homeland Security: Develop an Agro-Security Education and Response Team

Key Theme: Emerging Infectious Diseases

Description: USU Extension was invited to present an overview of avian influenza to the Utah Agro terrorism Working Group. The purpose of the presentation was to help the group gain a basic understanding of the nature of avian influenza (AI) viruses, and why that is important in order to objectively evaluate risk. Lines of defense in the US were discussed that make it unlikely that a problem such as the one occurring in Asia would ever happen hear. AI is not new, and we have effective ways of dealing with it in our country. If an outbreak of any H5/H7 AI should occur here, severe economic damage would likely take place because of trade restrictions and decreased poultry consumption caused by media hype.

Impacts: Understanding the real threat and risk of AI by this high-level state working group enables them to make proper decisions on security risk.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT, Region, U.S.

Other CES and UAES Programs/Projects

Program Title: Alternative Agriculture and Markets

Key Theme: Adding Value to New and Old Agricultural Products

Description: Agriculture is in transition and alternative crops, methods and marketing needs to be evaluated. Alternatives will be explored with production of livestock, dairy, crops and production relationships to the environment. Extension sponsors the Diversified Agriculture Conference which presents information on alternative agriculture and markets. USU has the Cattlemarketanalysis.org web site which has averaged over 1,000 hits per week. Users are from Utah, numerous other states, and from several other countries. Research was conducted on the costs and returns of crop enterprises in Utah. Crop enterprise budgets were prepared and a report was submitted to the Farmland Advisory Committee (Utah Tax Commission). The suggestions were accepted by the committee and subsequently accepted (after public hearings) for implementation in 2007.

Impact: Producers have learned about alternative agriculture and markets through Extension programs.

- Risk management practices were learned by 200 producers who indicated they were going to use the information which would be useful in their operation.
- Producers, students, extension professionals and various policy makers are using the Cattlemarketanalysis.org web site for cattle and beef market information and analysis.

- At the Arizona-Utah-Nevada Range Livestock workshop producers learned that the value of a replacement heifer changes with the cattle cycle and that in some years they may be better off to purchase rather than raise replacements.
- Applied research on the costs and returns or crop enterprises in Utah will be used by the Utah Tax Commission to set FAA values in Utah. The tax savings for producers are in the millions of dollars compared to what they might pay if market values were used. Of equal importance to the individual producer is the annual adjustments that are made to reflect local productive values. These values allow many producers to remain in business as agricultural producers.
- Outlook materials for dairy and sheep were prepared and presented by Extension at the annual meetings of the Utah Bankers Association and in an insert for the Farm Bureau News. Producers use the outlook and price information provided to make informed management decisions. Some producers used the outlook to "lock in" prices. One producer reported saving in excess or $40,000 as a result of taking the initiative to forward contract their milk.

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Livestock

Key Theme: Animal Health

Description: The majority of livestock receipts come from cow-calf operations, dairies and sheep but the future is grim because of economic considerations. This program will explore alternative marketing and production improvement strategies with dairy, swine, sheep, cattle producers, pasture owners and forage producers. The UTVA list-server goes to approximately 300 veterinarians. It has become the primary method of information distribution for UDAF. The administration of Utah Public Health requested that their personnel be maintained on the list.

Impact:
- Extension held the 9th Intermountain Beef 3910 and provided 25 attendees with timely, relevant and hands-on experiences from live animal to carcass evaluation. Participants are primarily Utah beef producers but also include industry and Extension personnel and producers from neighboring states. Evaluations from the participants were excellent. Producers who have taken the workshop report that they are more knowledgeable of the beef industry, BQA, traceability and carcass and live animal evaluation.
- Extension developed the Master Beef Manager Program and launched a prototype in early 2006. Specific topics were taught on a monthly basis with approximately 20 producers at each location. Extension received a $40,000 grant to expand the program into four more counties. Extension faculty met with producers approximately twice at each of the new locations using basics of risk, BQA and animal production. All evaluations have been excellent to date.
- Extension conducted a study of silage composed of three residual feeds: wheat straw, liquid cheese whey and wheat middlings. It was concluded that beef producers could decrease winter feed costs by as much as one-third if whey silage was substituted for more traditional diets. The cost savings over time would be millions of dollars for Intermountain beef producers. There have been no other studies conducted using this novel approach to producing silage.
- Three hundred and twenty three sheep and goat producers, industry representatives and students from seven states increased their understanding of sheep and goat care by attending the 2006 Sheep & Goat Education Day. Rotation session pre-post-tests showed statistically significant(P=.01) increases in understanding for all topics; with a pre-test range of 1.62-2.66, and a post-test range of 3.14-3.98, where 1 = no understanding and 5 = complete understanding.
- Forty-eight seed stock producers from five states entered 277 bulls in the UBIA Performance Bull Tests. Ninety-three of 241 bulls completing the Jr. Bull Test were sold for an average of $2,311.83, 36% over the consigner-established floor price. New this year was a Sr. Bull Test for fall-born calves. Eight of 27 bulls completing the Sr. Bull Test were sold for an average of $2,525.00, 26% over the consigner-established floor price. These superior genetics went to 59 cattle producers from UT, AZ, MT, & OR.

- Hundreds of people have been exposed to the mission of the Extension Equine Team through clinics, teaching on campus, development of a Research and Fact Sheet; the 4-H Horse Program, and statewide Extension Educational programs. Extension has increased horse care awareness through new and growing contacts with the public, the Horse Equine web sites, and the equine booth. Over 100 horses and horse owners of Cache County were given training, handouts/fact sheets, and evaluation of their horse relating to horse hoof health. Many were surprised to find that their current hoof care was not adequate. This partnership helped horse owners understand more about the total horse care and health needs.
- Nipple drinker systems have historically not been able to sustain tom growth past 15 weeks of age. Lubing, Inc. has developed a cup drinker. Closed systems, such as the nipple drinkers, are advantageous because they inhibit bacterial and viral contamination of the drinking water and chlorine will remain at higher concentrations at the point of water delivery. They are also cleaner and require less daily maintenance. However, the volume of water large turkeys need to consume has been a limiting factor in the success of nipple drinkers during grow-out. The results of the USU trial shows that the Lubing nipple drinker is capable of maintaining equal weight gain through grow-out compared to the "industry-standard" Plasson bell drinker. Water spillage is lessened and litter condition is improved over the bell-type system.
- Feeding trials for optimal performance of Hybrid Converter hens and toms were conducted this year. Our trials indicate that for heavy hen production, a yearly difference of approximately $320,000 in feed costs savings would be achieved with the USU program. For mid-tom production an estimated yearly savings in feed of $380,000 could be anticipated. Camelina oil may be integrated into turkey diets if cost and availability are reasonable; however, caution should be exercised in integrating levels of CM above 5% in turkey starter diets. Subsequent studies are suggested evaluating turkey growth performance when CM is integrated into grower and finisher diets

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Sustainable Agriculture

Key Theme: Agricultural Profitability

Description: Maintaining our producers on the land, and in an economical, environmental and sustainable fashion, to enhance the ability of all consumers to enjoy a heightened quality of sustainable life for ourselves, families, communities, now and in the future is the goal of this program. Training of agents and others in sustainable agricultural techniques, principles and current research will be the primary focus.

Impact:
- Peer evaluation of Western SARE placed it as one of the most effectively administered competitive grants programs in the nation. $3.86 million was allocated to Land-grants, farmers, ranchers, and NGO's in the Western Region. This directly impacts over 556 cooperating farms in the Western Region. Extension presented an invited oral keynote presentation to the national extension ANREP annual conference in Park City, UT. At least 12 regional SARE proposals resulted from this presentation.
- Extension pioneered a new method of BREEZE regional review of proposals with key extension/research administrators in the Western States. $200,000 in graduate "fellow" proposals were reviewed and awarded across the Western region.
- 21 farmers in Box Elder and Cache County are now using Geospatial techniques on over 20,000 acres. Twenty four county agents were training and EQUIPPED with a Geospatial Took Kit. Subsequent surveys of past ON-TARGET fellows have shown that this has increased profits on over 1 million acres in the United States.

Goal 2: A safe and secure food and fiber system.

Utah State University Extension and Utah Agricultural Experiment Station Progress Report for Plan of Work Goals: 2006

Overview

USU Extension specialists, county educators and UAES scientists address food safety issues on multiple levels.

A Food Safety Extension Program has fully taken shape on the Logan campus. The Food Safety Program supports both County Educator efforts and the public in the areas of home food safety, home food preservation, retail food safety, and small business food safety. The county educators spearhead training of consumers in safe food preparation, preservation and storage through extension fact sheet, pressure canner lid testing, workshops, newsletters, newspaper articles, radio and TV shows. USU Extension provides the only home food safety programming in the state. Support from the Extension specialist included answering nearly 250 email or telephone questions from both Agents and consumers regarding food safety and preservation.

The USU Food Safety Manager Certification (FSMC) program is certifying food industry workers as certified food safety managers. This results in safer food establishments throughout Utah. Food Safety Manager training was provided to Utahans via agent instruction, independent study, and online study. Educated Retail and Foodservice employees will meet Utah regulations, produce safer foods and minimize the risks of food borne illness.

There are a growing number of small food businesses in Utah. These food entrepreneurs have a great passion for their craft, but lack the skills and abilities in areas like food safety, food quality and nutritional labeling. Utah food businesses send samples of food products to the Extension Food Safety Program to be analyzed for compliance with state and federal food safety laws. The USU Food Safety Extension Program has begun the creation of a Food Product Innovation Center that will help serve this program area.

Three research projects on the Logan campus helped provide education and information in the area of retail and small business food processing. One project will lead to a research consortium, another to safer jerky manufacture, and the last will provide online training opportunities in meat and poultry processing.

Applicators that successfully complete pesticide certification or re-certification training are more likely to calibrate sprayers properly and make pesticide applications at rates and times when a maximum number of pests can be controlled. The possibility for a pesticide residue on food is greatly reduced.

State Assessment: The programs offered with Goal 2 address critical issues in Utah. Extension and UAES faculties on campus and in the counties are responding very well to local and statewide needs.

Total Expenditures and FTE:
Utah Extension Service
Smith-Lever: $371,656
State Match: $363,501
FTE: 10.65

Utah Agricultural Experiment Station
Total expenditures and **FTE:**
Hatch: $212,764
State Match: 1,464,373
FTE: 16.8

Integrated Programs

Program Title: A Safe and Secure Food and Fiber System

Key Theme: Food Security

Description: A major integrated effort has been undertaken to assist in maintaining and enhancing a safe and secure food and fiber system. This begins with the most basic aspects of livestock and plant hygiene in terms of production practices, but also extends to food processing and even food handling. Extension has developed training programs (required of all food handlers in the state of Utah). The UAES has undertaken research that will be used to improve food safety, beginning at the production end of the food system (i.e., animal identification) through animal slaughter (i.e., reduced chemical use during growth and finishing and cleaner feeding environments). The two units are working together to get the information prepared for wide distribution.

Impact: As might be anticipated, it is difficult to quantify the impacts of food and fiber safety. Though critical in importance, this work is not in a mature stage, implying that studies have not yet been completed that will allow an impact estimate.

Source of Funds: Hatch, Smith-Lever, and Other
Scope of Impact: Utah, Intermountain West, U.S.

Program Title: Integrated Pest Management

Key Theme: Integrated Pest Management

Description: A total of 22 weekly pest advisories were prepared and disseminated to the IPM listserve group from April-September, 2006 for a total of 4,400 contacts. The listserve is composed of extension agents, state and federal agency land managers, commercial growers, and home owners. The advisories are also posted on the USU Extension IPM web page at http://utahpests.usu.edu/ipm/htm/advisories/treefruit/2006advisories. Orchard insect and disease control timing information from advisories is utilized by county agents and disseminated to a much wider audience (e.g., Larry Sagers gives codling moth and peach twig borer control timing information on the KSL Greenhouse radio show). Pest advisories help Utah farmers and home owners reduce pesticide use by accurately identifying pest problems, informing them of alternative non-chemical management options, and accurately timing pesticide applications to provide the most benefit.

Impact: Citizens of Utah reduce their pesticide use by gaining knowledge about pest biology and optimal control timing. The target audience includes county agents, Utah Dept. of Ag. field inspectors, growers, home gardeners, and others. For commercial orchards and crops, over 7,000 acres were saved at least one pesticide application at $40 per application for a savings of at least $280,000. Pesticide savings by home owners would be additional.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT

Program Title: Plant and Animal Health and Safety

Key Theme: Other – (a) Identification

Description: Plum curculio, Conotrachelus nenuphar, is a quarantine insect in western North America and a threat to Utah''s fruit industry. Its presence in Box Elder County, Utah, threatens the states tree fruit production (7,680 acres and $5.0 million value of utilized production in 2002).

Impact: We determined effective monitoring and management techniques for home yard and wild plum thickets where the insect predominates. Entomopathogenic nematodes substantially suppressed prepupae in laboratory and field bioassays.

Source of Funds: Hatch, Smith-Lever, Other
Scope of Impact: Utah, Intermountain West

Key Theme: Other – (b) Control

Description: Application of animal wastes in excess of plant needs can contribute to water pollution. Nitrogen transformations are of particular concern due to the potential for excess N to be transported off site. Appropriate use of animal wastes requires predictive ability for the release of nitrogen from organic forms and subsequent conversions.

Impact: As waste N content varied considerably, producers are being advised to base waste application rates on actual N analysis. Estimates of 10% mineralizable N in the first year and 5% in the following year were reasonable predictors of available N in compost based on yield comparisons. We suggest that careful management of dairy compost needs to account for soil accumulation of available P & K, mineralizable N and the timing of N release from these multiple year applications.

Sources of Funds: Hatch, Smith-Lever, Animal Health, Other
Scope of Impact: Utah, Intermountain West, U.S.

Key Theme: Other – (b) Control

Description: Inflammation of the uterus (endometritis) appears to affect the majority of dairy cows and often extends into the breeding period, having a profound negative impact on reproductive performance, resulting in decreased income for dairy producers.

Impact: Impaired immune function is associated with nutrient deficiencies that occur prior to calving. It is estimated that delayed conception costs the dairy producer $3/day for each day conception is delayed. With 90,000 dairy cows in Utah, it is estimated that Utah producers loose $5.4 million annually due to reproductive inefficiency caused by persistent uterine infections. Reduction of persistent uterine infections could save Utah dairy producers $60 per cow by allowing cows to become pregnant sooner. These savings do not include savings associated with reductions in cost for treatment and culling.

Sources of Funds: Hatch, Smith-Lever, Animal Health, Other
Scope of Impact: Utah, Intermountain West, U.S.

Key Theme: Other – (b) Control

Description: Aflatoxin B1 (AFB1) is the most important mycotoxin in occurrence and toxic potency, and poultry, especially turkeys, are the most susceptible food animals to its effects. In the first phase of this project, we discovered that the safe food antioxidant butylated hydroxyanisole (BHT), when added to the diet of turkeys, protects against nearly all symptoms of aflatoxicosis. While BHT is FDA-approved in foods, it is not approved as a chemopreventive in animal feeds. In this phase of the project, we will establish the safety of BHT, determine the mechanism(s) by which it confers protection in turkeys, and also determine whether similar antioxidants, which are AFB1-protective in mammals, are likewise protective in turkeys.

Impact: Our project has identified safe feed additives that can actually protect animals against the adverse health effects of feed-borne toxins such as aflatoxin.

Sources of Funds: Hatch, Smith-Lever, Other
Scope of Impact: Utah, U.S.

Key Theme: Other – (b) Control

Description: Currently, mass vaccination in poultry is administered through the water. We will explore the possibility of mass vaccination of poultry via a feed ingredient containing an immunogenic portion of a viral

genome rather than through the water. Another important consideration is that the vaccine be completely non-viable and non-contagious. Our part of this project is to determine if a plant containing an immunogenic part of the Newcastle viral genome, when fed to turkeys, will elicit an immune response.

Impact: Mass application of non-contagious vaccine to poultry through feed would give a much more economic means of vaccination than through individual bird injection, or even through drinking water.

Sources of Funds: Hatch, Smith-Lever, Other
Scope of Impact: Utah, U.S.

Key Theme: Other – (b) Control
Description: Utah farmers and ranchers lose over 30 million dollars annually directly attributable to weeds. Noxious weeds are particularly competitive and difficult to manage.

Impact: The potential savings to Utah agriculture through jointed goatgrass management is approximately $5 million annually. Conservative estimates put annual yield and quality losses in agronomic crops alone, due to weeds in Utah, at over 30 million dollars.

Sources of Funds: Hatch, Smith-Lever, Other
Scope of Impact: Utah, Intermountain West, U.S.

Other CES/UAES Programs and Projects

Program Title: A Safe and Secure Food and Fiber System

Key Theme: Food borne Illness

Description: This program responds to public concerns about pesticide and drug residues in food and improper food handling and preparation in food service establishments and in the home. Educational programs will assist producers and consumers in wise management of resources and reduction of waste. The county educators spearhead training of consumers in safe food preparation, preservation and storage through extension fact sheet, pressure canner lid testing, workshops, newsletters, newspaper articles, radio and TV shows. USU Extension provides the only home food safety programming in the state. The USU Food Safety Manager Certification (FSMC) program is certifying food industry workers as certified food safety managers. This results in safer food establishments throughout Utah. Food Safety Manager training was provided to Utahans via agent instruction, independent study, and online study. There are growing numbers of small food businesses in Utah. These food entrepreneurs have a great passion for their craft, but lack the skills and abilities in areas like food safety, food quality and nutritional labeling. Utah food businesses send samples of food products to the Extension Food Safety Program to be analyzed for compliance with state and federal food safety laws.

Impact:
- Nearly 250 consumers learned appropriate food safety and preservation through email or telephone from the Extension Food Safety Specialist.
- Educated Retail and Foodservice employees met Utah regulations, produce safer foods and minimize the risks of food borne illness by participating in the USU Food Safety Manager Certification program. Sixty six (66) students passed the Challenge exam, Nineteen (19) passed the exam using the home study video, and four (4) passed the exam after taking the online course.
- Over 60 businesses were assisted with creating a safe food product to sell in Utah in 2006. The USU Food Safety Extension Program has begun the creation of a Food Product Innovation Center that will help serve this program area.
- Three research projects on the Logan campus helped provide education and information in the area of retail and small business food processing. One project will lead to a research consortium, another to safer jerky manufacture, and the last will provide online training opportunities in meat and poultry processing.

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Utah Pesticide Impact Assessment Program

Key Theme: Food Security

Description: USU provided instruction and technical support for licensed and unlicensed pesticide applicators in Utah. Licensed individuals attending pesticide training receive continuing education units or pass a written exam to acquire or renew a license for the purchase and application of restricted use pesticides. Nineteen workshops on Pesticide Applicator Training were delivered. A study was conducted to determining the cause of pesticide misapplications by private, commercial, and noncommercial applicators in Utah. This study involved 991 of Utah's licensed pesticide applicators and more than 62% were found to be exceeding label rates by 20% or more. The causes included 30.9% inaccurate calibration, 26.3% incorrectly label information, 18.5% incorrect pesticide dilution, 17.1% equipment malfunction, 4.2% incorrect method of application, and 3.0% misidentification of target pests. Educational information was disseminated to more than 4000 pesticide applicators and regulatory agency employees throughout Utah outlining the best management practices to reduce pesticide misapplication.

Impact: The impact of these trainings reduced the expense of over applying pesticides and decreased the negative impacts of pesticides misapplications to the environment, people, and other animals. The estimated cost of unnecessary applications of pesticides for 91% of the people involved in this study averaged more than $80 and ranged from $18 to $5870. Almost 90 percent of the applicators reported at least a 10 percent reduction in pest application costs, representing almost $80,000 in savings.

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Plant and Animal Health and Safety

Key Theme: Other – (c) Safety Assurance

Description: Many pesticides and other chemicals are used in agriculture. Natural attenuation of these chemicals and bioremediation of sites contaminated by these chemicals may be accomplished by fungi. The purpose of this research is to identify wood-rotting fungi for the biodegradation of a wide variety of chemicals, such as pesticides and other agrochemicals.

Impact: White-rot fungi, those fungi which can degrade lignin in wood, have many applications, from the biodegradation of environmental pollutants to bioconversion of agricultural wastes to useful products. The fungi were used for reclamation of a former hardwood sawmill plant located in the southeastern US which treated wood with pentachlorophenol (PCP) and lindane. Fungi were also used for bioremediation of a pesticide-contaminated aerial application site in California. Both sites were reclaimed following bioremediation. The fungus is also appropriate for on-farm hazardous waste treatment. The fungi can be used to naturally generate chemicals which degrade pesticides.

Source of Funds: Hatch, State, and Other
Scope of Impact: Utah, U.S.

Goal 3. A healthy, well-nourished population.

Overview

Eating behaviors in our current society have shifted from an emphasis on getting enough of the right foods to an emphasis on choosing healthy foods from abundant supplies of a wide variety of foods and controlling amounts to prevent over consumption. New scientific studies provide very specific information on nutrients and their interactions in the body. Skill is required to interpret these recommendations into food selection and recommendations for consumers. The importance of nutrition to health and prevention and delay of chronic disease is well established. Extension agents have traditionally provided nutrition information about coronary heart disease and cancer but are now providing the public with ideas about food selection, serving sizes and increased physical activity to prevent overweight, obesity and diabetes, much of the underlying data coming from UAES scientists.

State Assessment: The programs offered within Goal 3 addresses critical issues in Utah. CES and UAES faculties on campus and in the counties are responding very well to local and statewide needs. Work by UAES scientists is providing a solid foundation for Extension data needs.

Utah Extension Service
Total Expenditure and FTE:
Smith Lever: $209,035
State Match: $204,448
FTE: 5.99

Utah Agricultural Experiment Station
Total Expenditure and FTE:
Hatch: $825,996
State Match: $4,075,889
FTE: 56.1

Integrated Programs

Program Title: Enhancing Human Health and Nutrition

Key Theme: Human Health

Description: Research and outreach related to diabetes is ongoing. Research and extension efforts involve Utah's general population, plus a large segment of the Native Americans in Utah and the immediately surrounding area (particularly in the Four Corners are of the Intermountain West). The research and extension efforts associated with this program area are not mature and much work remains to be done.

Impact: It is anticipated that the diabetes research and education will realize cost savings of at least $3,000 per person per year.

Sources of Funds: Hatch, Smith-Lever, State, Other
Scope of Impact: Utah, U.S.

Program Title: Nutrition and Health

Key Theme: Human Nutrition

Description: Sufficient nutritional knowledge to choose appropriate foods and to form desirable eating patterns is necessary for a healthy population. "Diabetes-Stepping Up to the Plate" is now available to each

county in the state. This extension nutrition curriculum has been pilot-tested for 18 months with over 200 people.

Impact: Matched t-tests of participants have shown improved weight and anthropometric measures if above normal. The use of multiple formats will be tested to see which is most effective in transmitting the information. Data on participants in this program has been estimated to decrease hospitalizations and create a cost savings of $3,000 per person, per year.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT

Program Title: A Healthy, Well Nourished Population

Key Theme: Agricultural Product Enhancement

Description: Much whey is sold as a commodity for use in animal feeds, which generates relatively little monetary return on this potentially valuable by-product.

Impact: This project developed new technologies, including a patented method and product that will increase demand for whey proteins as an ingredient in human foods. Implementation of these technologies by the food industry will increase the value of whey protein up to 500% compared to its use in animal feed. Utah produces 140 million pound of whey protein per year and stands to gain $56 million per year in added value for each 10% its whey that is diverted from animal feed to human food.

Sources of Funds: Hatch, Smith-Lever, State, Other
Scope of Impact: Utah, U.S.

Key Theme: Agricultural Product Enhancement

Description: New apple cultivars with varying degrees of disease resistance are continuously being developed around the world. Utah's apple growers are looking for alternatives to the standard cultivars grown in the Northwest. Participating in a unified national approach to evaluating horticultural characteristics and pest susceptibility of new apple cultivars will provide a database to predict profitability of the new cultivars in a more efficient, rapid, and systematic evaluation of cultivar characteristics.

Impact: Five high quality apples of eighteen evaluated have been determined to be of potential value to Utah fruit growers because of tree quality, apple size, yield, resistance to diseases, and fruit quality. They are Ambrosia, Delblush, Hampshire, Jubilee Fuji, and CWR10T17. Plantings of these cultivars will enhance apple producer profits.

Sources of Funds: Hatch, Smith-Lever, State, Other
Scope of Impact: Utah, Intermountain West

Key Theme: Agricultural Product Enhancement

Description: Kentucky bluegrass (Poa pratensis L.) is one of the most widely grown turf grasses worldwide. Transgenic turf grasses, including Kentucky bluegrass, are being developed by numerous companies and universities. Wide-hybrids between Kentucky bluegrass and other bluegrasses, which might normally be genetically unstable (e.g. sterile), may produce seed asexually by way of apomixis. These plant materials will not be released into the market until the genetic and ecological consequences of transgene movement thru cultivated, naturalized, and native bluegrass species has been examined.

Impact: Hundreds of millions of acres of Kentucky bluegrass are grown as lawns, sports fields, and parks, but little is known about its genetics. Because of this, when genetically engineered varieties of Kentucky bluegrass are developed, there may be concerns about the movement of foreign genes into native grasses. Our study shows that some grass species are genetically more similar, i.e., P. secunda, P. interior, and P.

nervosa, could hybridize with Kentucky bluegrass causing the movement of a foreign gene. The common weeds P. trivialis and P. annua are less similar, which reduces the chance of them receiving the foreign genes.

Sources of Funds: Hatch, Smith-Lever, State, Other
Scope of Impact: Utah, U.S.

Key Theme: Agricultural Product Enhancement

Description: Beef cow body condition (body energy reserves) can vary greatly from year to year and within a given year depending on weather conditions and forage supply. Low body condition will reduce the overall performance of beef cows and may also reduce the ability of cows to utilize low-quality forage (LQF), the winter diet on many cow-calf operations.

Impact: When young, suckling calves were exposed to LQF via their mothers'' diet, their subsequent utilization of LQF as adult cattle was improved. The body energy reserves or the body condition (BC) of cattle will affect LQF utilization. Those in a functionally acceptable BC exhibited a 1.4 percentage point improvement in dry matter digestibility and 1.1 kg increase in dry matter intake compared to cattle in poorer BC consuming the same LQF diet. Thus, there was not only a 15% increase in energy intake and resultant improvement in performance, but cost per unit of energy intake was reduced by about 2.6%.

Sources of Funds: Hatch, Smith-Lever, State, Other
Scope of Impact: Utah, Intermountain West

Other CES and UAES Programs/Projects

Program Title: Nutrition and Health

Key Theme: Human Health

Description: Healthy Beat Cardiovascular Nutrition has been taught and evaluated in both the traditional classroom setting and with a self instructional system through a CD audio-visual program.

Impact: Knowledge, waist & hip circumference, and cholesterol levels improved for all participants. It is anticipated that each person participating in the Healthy Beat Cardiovascular program will save $500-$3,000 per year in medication costs.

Description: Nutrition for adults with learning disabilities has been piloted. The Food Stamp Nutrition Education curriculum has been adapted for use with this population in 2006-2007. During 2007, the curriculum will be evaluated for effectiveness. Training and distribution will then occur.

Impact: Adults with disabilities will improve their nutritional status and health.

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Expanded Food and Nutrition Education Program (EFNEP)

Key Theme: Human Nutrition

Description: EFNEP has successfully developed a new curriculum called Giving Your Body the Best. This 17-lesson curriculum implements the USDA 2005 Dietary Guidelines for Americans and MyPyramid, aimed to provide the most updated nutrition information to all EFNEP and FSNEP participants in U.S.
EFNEP has served a total of 2,253 adults and 7,764 youth in Utah in FY 2006. Majority were Whites (61%) and Hispanics (33%). Recruitment among Hispanic has increased 6%. Fifty-one percent of graduates

completed the program within three months receiving 7-12 lessons taught by EFNEP nutrition education assistants.

Impact: Ninety-five percent of graduates showed positive improvement in any food group. This impact is improved 2% from that in FY 2005 and is the highest impact among all years when EFNEP served Utah. Servings of fruits, meat and alternatives, vegetables, dietary fiber, calcium or dairy increased positively by 38%, 38%, 25%, 19%, and 19% respectively. Furthermore, 98% of graduates reported eating three or more meals or snacks per day. This enabled 53%-95% of them to meet 70% RDA for iron, vitamin B6, calcium, vitamin A, vitamin C, and protein (listed in ascending order).

EFNEP also motivated positive lifestyle changes among the graduates, for example:
- 65% graduates improved in food safety practices,
- 87% graduates improved in food resource management practices, and
- 90% graduates improved in nutrition practices.

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: A Healthy, Well Nourished Population

Key Theme: Human Nutrition

Description: Diabetes Stepping Up To the Plate Continues to be taught throughout the state. The Spanish Translation has been piloted this year with the same pre-post test evaluations as the English version. A formal evaluation will be conducted on the Spanish version in 2007.

Impact: It is anticipated that each person participating in the Diabetes Program will save $3,000 each year.

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Key Theme: Agricultural Product Enhancement

Description: Callipyge sheep develop extreme muscling in their loin and hind quarters after birth, thereby providing a unique model of postnatal skeletal muscle growth and development.

Impact: Production of lean meat, or muscle, is the primary product driving animal agriculture. The Utah station studied several facets of muscle physiology in callipyge sheep because they demonstrate characteristics important to meat animals including increased size of the valuable muscles of the loin and leg, leaner carcasses, and increased feed efficiency. Long term impacts are expected from this research.

Sources of Funds: Hatch, State, Other
Scope of Impact: Utah, U.S.

Key Theme: Agricultural Product Enhancement

Description: Projects range from cellular development to agricultural security. While the studies have a basic biology component, they also have a component that translates this information into publicly access information that is aimed at direct use by stakeholders. Specific examples of the breadth of projects in this work are: 1) gene expression in alfalfa during stress, 2) cellular events during fertilization, 3) geomapping of pathogenic species and genetic drift to assess spikes in outbreaks, 4) ecology of microbes in ready-to-eat foods, 5) molecular diagnostics of agriculturally relevant pathogens using arrays, and 6) regulatory networks for cellular communication to understand how cells regulate growth.

Impact: This work is focused on agriculturally important traits in plants, animals, and microbes. Work is being done in a number of areas related to these organisms. For example, alfalfa is being studied using

gene expression arrays to determine the set of genes involved in drought resistance. Once defined, these genes can be modified or moved into other systems to improve their traits.

Sources of Funds: Hatch, State, Other
Scope of Impact: Utah, U.S.

Key Theme: Agricultural Product Enhancement

Description: Radiation hybrid mapping is a method for producing high resolution genome maps, which can then be used for determining gene order. By mapping expressed sequence tags (ESTs) that are common across species, a radiation hybrid panel can also serve as the comparative link across species. In this way, knowledge of the genome organization of a species is enhanced as well as integrated with other species maps.

Impact: We have constructed an ovine radiation hybrid (RH) panel that will be used for development of a framework/comprehensive RH map for sheep. This panel is being distributed to researchers interested in contributing to the ovine RH map. The resulting map will contribute substantially in the search for economically important genes in sheep because it creates a link between the genetic maps of human, cattle and mouse with that of sheep.

Sources of Funds: Hatch, State, Other
Scope of Impact: Utah, U.S.

Goal 4: Greater harmony between agriculture and the environment.

Overview

The potential for the sage grouse to be listed as an endangered species is a very real threat to agricultural and grazing practices. Many agencies and individuals have worked very hard to find answers to assist these and other species and maintain greater harmony. Extension has been a key player in the facilitation and education effort and the Utah Agricultural Experiment Station has been an active participate in applied research efforts.

Water is a limiting resource in Utah and much of the west. Improved use and efficiency of irrigation water is critical for sustained agricultural production. Great progress has been made in both the improvement of water quality and in the education of a diverse public of their role in the process. Much progress has been made through use of data, improved instruments and communication and applied demonstrations of how to apply all of those.

Noxious and invading weeds present one of the major, looming threats for the grazing and wild lands in Utah. Prevention of introduction is difficult, so early identification and eradication becomes critical.

State Assessment: The programs offered with Goal 4 address critical issues in Utah. CES and UAES faculties on campus and in the counties are responding very well to local and statewide needs.

Utah Extension Service
Total Expenditures and FTE:

Smith-Lever: $543,002
State Match: $531,088
FTE: 15.56

Utah Agricultural Experiment Station
Total Expenditures and FTE:
Hatch: $206,338
State Match: $3,663,926
FTE: 61.2

Integrated Programs

Program Title: Increasing Water Efficiency and Conservation Keep

Key Theme: Drought Prevention and Mitigation

Description: Much of the Western U.S. is semi-arid and issues related to water conservation and efficiency of use are of paramount importance in meeting current and future water needs that often compete depending on the use and user. The primary goal of this program is to identify areas related to water efficiency and conservation then determine potential solutions for these difficulties.

Impact:
There has been a huge increase in the water assessment fee. This yearly fee has gone from $10 to $220 in just the last few years. This is mainly due to greatly increased maintenance costs on the Davis and Weber Canal.

Source of Funds: Hatch, Smith-Lever, State, Other
Scope of Impact: Utah, Intermountain West

Program Title: Fisheries and Wildlife

Key Theme: Wildlife Management

Description: This program seeks to develop through a system of sustainable development partnerships programs which will remediate, assess and evaluate wildlife damage, wetland and endangerment conservation and grazing management on public lands. Through linkages with federal, state and private agencies, stakeholders will become involved in facilitation decision making for public conservation policy.

Impact: Through Extension's efforts with 11 local groups there is improved sage-grouse habitat on over 10,000 acres. The local working groups' efforts are demonstrating that local landowners are leaders in the conservation and management of sensitive species using data provided by the Agricultural Experiment Station.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT

Key Theme: Wildlife Management

Description: Extension has played a pivotal role in shaping Wildlife Management on Private Lands based on UAES research. There are 95 Utah Cooperative Wildlife Management Associations in Utah encompassing over 2 million acres of private rangeland. Gross revenues exceed $20 million. USU has been contacted by other states, New Mexico and Arizona, to help them develop similar programs. The primary source of incomes for CWMU's continues to be agricultural enterprises.

Impact: The program generates over $14 million in new revenue for landowners and provides over 3000 high quality hunts for residents on private land. In addition over 30,000 acres of wildlife habitat were improved in 2005.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT

Program Title: Water Quality

Key Theme: Water Quality

Description: CES and UAES have trained volunteers to monitor 25 lakes and reservoirs. Secchi readings are taken from 1 to 12 times during the summer. Volunteers of the Lake Watch program are enthusiastic participants who typically sign up year after year.

Impact: These volunteers provide data the state monitoring program would not otherwise have, filling data gaps between the state's 5 year monitoring. The data greatly expands the state's limited monitoring results, providing important information on long term trends and annual patterns. The volunteers, with their increased knowledge of lake functions and their direct involvement with a particular lake, become advocates for lake water quality throughout the state.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT

Key Theme: Drought Prevention and Mitigation

Description: Lysimeters were maintained for the fourth year at Murray Golf Course, Sunbrook Golf Course, and the BYU Spanish Fork turf grass plots, for the 13th year at the Logan Golf and Country Club, and for the second year at Southgate Golf Course in St George. The weekly water budget data is being used to determine crop coefficients for estimating turf ET state wide. The research study will continue for at least one more year with funding from the Utah Division of Water resources.

Impact: As a result, calculated turf irrigation water requirements indicate that many urban communities could reduce irrigation use by more than 40% and still supply adequate water to landscapes.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT

Key Theme: Drought Prevention and Mitigation

Description: There are many issues related to water use and conservation in Utah. To deal with these issues, the 2005 Utah Water User's meeting was one of the most significant public meetings in Utah's water resource community for canal companies, irrigators, municipal water managers and various Federal, State, and local agency personnel to learn of current issues, to exchange ideas and concerns, and to make contacts with consultants in the water resource development area.

Impact: The eighty-three participants in the seminar and field visits learned of sound water measurement practices. An irrigation district that installed a weir after the 1997 seminar was still realizing an estimated benefit of $20,000 per month and another district realizes a benefit of $3,000 per month. The combined value of these water measurement improvements is over $275,000 a year.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT

Program Title: Noxious Weeds keep

Key Theme: Natural Resources Management

Description: Noxious weeds reduce agriculture productivity and threaten natural ecosystems in the West. This program will help private and public land managers stop the spread and reduce the existing acreage of noxious weeds in Utah. The primary objectives of the extension program in 2006 were to raise awareness about weeds, improve weed recognition skills, and increase understanding and adoption of integrated weed management methods. Numerous face-to-face presentations aimed at accomplishing each of these objectives were made to a variety of audiences. The UT-MT-WY Extension Weed Management Handbook was updated and published in both hardcopy and online formats to promote increased adoption of integrated weed management practices. Intensive weed inventory and mapping workshops were conducted for federal, state, and county weed managers.

- **Impact:** Extension played a significant role in a year-long statewide radio and billboard ad campaign to raise public awareness about invasive weeds. The three weed awareness billboards caught the attention of many I-15 travelers during the summer. Based on the many related website visits, phone calls, and emails received interest in weed identification was increased in 2006. Extension received requests for over 950 weed photos. Sales of the UT-MT-WY Weed Management Handbook and numerous "hits" on the pdf website version suggest that the weed management decisions of many people were improved by Extension's efforts.
- Milestone herbicide was extremely active in controlling musk thistle. Spot-treatments at rates lower than those used when using Tordon were very successful. Milestone is less toxic to deciduous trees and can be used under the dripline. 30 days after treatment a measurement (plant counts) showed that 1-2% of the total plants treated in an area had been missed. This is consistent with other reports and makes spot-treatment successful but not perfect.
- Having a state strategic plan for the management of noxious weeds makes it possible for Utah to receive matching funds from the United States Forest Service for weed management on land adjacent to Forest Land. Having the draft in place has permitted Utah to receive more than $200,000 per year for the past 2 years. The final draft, once published, will be the document for future weed activities in Utah.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT

Key Theme: Natural Resources Management

Description: Salt Cedar is an aggressive perennial weed that infests pastures, rangeland, and riparian areas. It is difficult to control with herbicides and so USU used goats as the bio-agent. Goats did a good job of salt cedar control during the first year and were evaluated. Herbicides were applied to salt cedar re-growth one year after goats had grazed the plots. Control from grazing with goats dropped off in the second year. Arsenal herbicide provided the most effective long-term weed control but there was considerable damage to the understory vegetation from this treatment.

Impact: Goats can provide very successful control of salt cedar. Control is improved when follow-up treatments of herbicide are used on the re-growth that occurs after grazing.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT

Program Title: Pasture Development, Reclamation, and Quality

Key Theme: Other – Intensive Pasture Management and Use

Description: Some livestock species have been shown to benefit from the intensive use of irrigated pasture land. Rotational grazing improves the quality of available forage, assures that a larger portion of the forage is utilized, and can result in higher returns per acre. This research attempts to identify the physical and fiscal feasibility of utilizing intensively rotated, irrigated pastures in Utah with application of new knowledge to the Intermountain West.

Impact: Improved pastures can potentially reduce feed costs by $12.5 million for Utah's dairy producers. Over $2 million in feed costs can be saved for dairy heifers. Irrigated pastures can potentially reduce cattle feed costs by $21 to $30 million.

Sources of Funds: Hatch, Smith-Lever, State, Other
Scope of Impact: Intermountain West

Program Title: Human, Wildlife, and Domestic Livestock Interactions and Compatibility

Key Theme: Natural Resource Management

Description: Mature stands of aspen are not regenerating on forested rangelands throughout the West. We have a poor understanding of vegetation characteristics that are conducive to both domestic livestock production and big game habitat.

Impact: Estimates are that the West has lost up to 60% of its historic aspen stands over the last century. The economic value of this forgone forage is estimated to be in the neighborhood of $6 to $8 million annually for two of Utah's 5 national forests.

Sources of Funds: McIntire-Stennis, Hatch, Smith-Lever, State, Other
Scope of Impact: Utah, Intermountain West

Key Theme: Natural Resource Management

Description: Application of animal wastes in excess of plant needs can contribute to water pollution. Nitrogen transformations are of particular concern due to the potential for excess N to be transported off site.

Appropriate use of animal wastes requires predictive ability for the release of nitrogen from organic forms and subsequent conversions.

Impact: As waste N content varies considerably, producers are being advised to base waste application rates on actual N analysis. Estimates of 10% mineralizable N in the first year and 5% in the following year were reasonable predictors of available N in compost based on yield comparisons. Peak plant N demand can easily be met by compost, but continued high N mineralization after harvest makes nitrate leaching post-growing season and the next spring likely. Careful management of dairy compost needs to account for soil accumulation of available P & K, mineralizable N and the timing of N release from these multiple year applications.

Sources of Funds: Hatch, Smith-Lever, State, Other

Scope of Impact: Utah, Intermountain West, U.S.

Key Theme: Natural Resource Management

Description: Municipalities across the U.S. face increasing development pressures that can irreversibly alter the quality of life in their communities. The challenge is especially acute in Utah, where population is expected to increase more than 70% over the next 25 years. To assist stakeholders in assessing the impact of such growth pressures, USU researchers used satellite images of past development patterns to spatially predict the likely location of new development between 2000 & 2030. These projections were then used to spatially estimate the loss of prime agricultural soils, as well as identify areas of future conflict where ecologically important locations are likely to be displaced by development.

Impact: The open space plan developed by USU was recently adopted by the 5-county Wasatch Front Regional Council to guide open space planning across a region of nearly 10,000 square miles.

Sources of Funds: Hatch, Smith-Lever, State, Other
Scope of Impact: Utah, Intermountain West, U.S.

Key Theme: Natural Resource Management

Description: Each year ranchers spend about $5 billion to control invasive non-indigenous weeds in pastures and rangelands.

Impact: The results of this model demonstrate that it is possible to develop a GIS-based model of invasive weed spread and management. Our simulation of a leafy spurge infestation in Box Elder County, Utah shows that managers can select alternative treatment strategies and technologies to find the most cost-effective treatment for the long-term. For leafy spurge in Box Elder County, it was found that the most cost-effective treatment for the entire infestation would be either 2,4-D at 1.5 quarts/acre or Imazapic at 7 oz./acre. The greater impact of this research is that such a simulation can be conducted and that alternative weed treatment strategies can be simulated on a landscape to determine the most efficient weed treatment strategy.

Sources of Funds: Hatch, Smith-Lever, Other
Scope of Impact: Utah, Intermountain West

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Sources of Funds: Hatch, Smith-Lever, Other
Scope of Impact: Utah, Intermountain West

Key Theme: Natural Resource Management

Description: This research will show how simple strategies that incorporate behavioral principles in management can markedly improve efficiency and profitability of agriculture, the quality of life for managers and their animals, and the integrity of the environment.

Impact: Several producers are experimenting with using supplementation to alter use of sagebrush by livestock, with the potential to increase net profits on some sagebrush-steppe ranches as much as 30% as they realize previously unutilized forage, enhance grass and legume productivity, and reduce costly treatment expenses involved in mechanical and chemical means for controlling sagebrush. Changing the culture of cattle to use landscapes in a more sustainable manner at the Nature Conservancy's Red Canyon ranch in Wyoming saved that organization more than a million dollars compared to fencing the stream corridors. Training cattle to avoid eating larkspur on high mountain pastures or changing the timing of grazing in some areas can save an average rancher with about 300 cows as much as thirty thousand dollars a year in many parts of Utah and Idaho. A producer in Eastern Montana has used behavior to train his cattle to eat the best and leave the rest, resulting in improved rangeland health and his being offered grazing leases at well below market rates, resulting in a net financial benefit of around $70,000 per year on a 200 cow operation. Feeding bison has been notoriously problematic, but understanding behavior led one producer to explore alternative strategies that allowed animals to range more freely and select from a choice of alternative foods. The animals rewarded his efforts with above average gains and cost savings between twenty and twenty-five cents per pound of gain, or about $140 per animal.

Sources of Funds: Hatch, State, Other
Scope of Impact: Intermountain West

Other CES and UAES Programs/Projects

Program Title: Fisheries and Wildlife

Key Theme: Wildlife Management

Description: This program seeks to develop through a system of sustainable development partnerships programs which will remediate, assess and evaluate wildlife damage, wetland and endangerment conservation and grazing management on public lands. Through linkages with federal, state and private agencies, stakeholders will become involved in facilitation decision making for public conservation policy.

Impact:

- Community Based Conservation Working Groups: Eleven of Utah's 12 Community-Based Conservation working groups have completed written draft plans of their sage-grouse conservation strategies. These plans will guide the working groups as they implement actions over the next 10 years to manage and conserve sage-grouse and other sensitive species that depend on sagebrush.
Parker Mountain Adaptive Management Working Group is one successful example. This working group consists of people of diverse backgrounds and interests who forged a partnership to achieve a common good. In the past decade, PARM's efforts have increased sage-grouse populations from about 600 birds to over 4500 and have received the largest Natural Resource Conservation Service Wildlife Habitat Incentive Program Cost-Share ($350,000) ever awarded
- Sage-grouse Restoration Project: Three proposals were selected to receive a total of $200,000 in funding through the Sage-Grouse Restoration Project. The projects selected for funding will address critical

information needs. The information obtained from these projects will be reported on the Sage-grouse Restoration Project web-site to assist local sage-grouse working groups to implement their plans. The efforts of these groups were cited by the U.S. Fish and Wildlife Service in their 2005 decision denying the petition to list greater sage-grouse as an endangered species.

- Strategies to Recover the Utah Prairie Dog: The Utah prairie dog is federally listed as a threatened species. Prairie dogs on private land cannot be counted towards recovery goals, yet over 70% of the population inhabits private land. The plan is being reevaluated and prairie dogs on private lands may be considered toward recovery. Consequently, information regarding public perceptions about the species and its management is needed. To obtain this information, we surveyed Utah residents to identify public attitudes and knowledge regarding the species and its management.
- Improving Sage-grouse Brood-rearing Habitat**:** The Western Association of Fish and Wildlife Agencies identified need to determine the effect of management practices on sage-grouse and sagebrush ecosystems under different environmental conditions. Two mechanical treatments tested were effective at reducing shrub canopy cover. The Dixie harrow, two years post treatment, showed an increase in both grass (+5.0 %) and forb (+3.3 %) covers. In general, Lawson aerator was ineffective within the first two years at increasing herbaceous cover. The results from this research project provide agencies with much needed information on more effectively managing these lands.

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Statewide Water Quality Educational and Technical Support

Key Theme: Water Quality

Description: The general public and political leaders of Utah consistently identify water resources and water quality as a high program priority. The goal of this program is to develop and deliver water quality education and outreach programs to diverse populations in Utah. Such programs as K-12 watershed education, volunteer stream monitoring programs and Farm *A* Syst program will be included.

Impact: The water quality Extension program at USU continues to provide high quality hands-on experiences for youth, to develop curriculum and other materials, and to train teachers and 4H educators on the use of these materials. All activities are tested, age appropriate, and designed to help understand the connection between activities on land and impacts to our waters.

- During the 2006 calendar year the water quality extension team:
  - visited 26 classrooms, field days, scout, 4H camps and environmental competitions;
  - provided over 4,000 kids with at least an hour of hands on water quality educational activities;
  - conducted 22 teacher training workshops to 262 teachers;
  - Made over 2,000 other contacts at public events such as water fairs.

- Educator workshops: Over 250 educators attended 1 to 2 day workshops, and reached many others through fairs and conventions. Trainings include Stream Side Science workshops, Project WET workshops, and advanced training in aquatic invertebrate biology and GPS/GIS in the classroom. Each of these educators gained a new understanding of watershed issues and the skills and materials to teach these concepts to 100s of students each year.
- USU's Stream Side Science curriculum was formally evaluated. Over 400 9^{th} grade students were given pre and post tests, revealing a significant increase in knowledge about water quality and watershed concepts.
- A supplement to Stream Side Science, specific to the Salt Lake area watersheds, was developed. This supplement will be an important part of the Salt Lake City's outreach programs that plan to offer 3-4 teacher workshops each year using these materials. Given typical attendance and classroom size, this will result in 6,000 to 15,000 students learning about water quality concepts as they pertain to their own watershed each year.

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Extension Educational Programs on Water Resource Issues: Storm Water Runoff

Key Theme: Drought Prevention and Mitigation

Description: Develop a statewide team of Extension and campus academic faculty capable of creating and delivering imaginative and unique educational programs that assist communities to cope with storm water runoff issues.

Impact: Results from an urban storm water study in 2003 have been applied to urban educational materials, providing urban water resource managers with educational materials necessary for meeting the needs of their storm water discharge permits. This information benefits over 50,000 people in northern Utah alone.

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Extension Educational Programs on Water Resource Issues: Quality Culinary Water and Groundwater Protection

Key Theme: Water Quality

Description: Develop and deliver educational programs concerning the quality of drinking water. Assist families and communities to provide a safe and adequate supply of drinking water at both the home and community levels.

Impact: A series of drinking water publications were updated and posted on the Extension Web site. These publications cover common contaminants in the west. As well as a publication that compares different drinking water treatment options in terms of cost, effectiveness, and value in treating specific pollutants. This information is especially important to the ~ 15% of Utah residents who rely on private wells for their drinking water source and obtain no assistance from state or federal agencies in monitoring or improving this water.

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Environmental Education: Agriculture, Grazing, Wildlife and Water Quality

Key Theme: Natural Resource Management

Description: As Utah becomes more urban, social and political perspectives shift away from agriculture toward an urban-oriented land use. This program is to provide environmental education to various urban and suburban audiences in order to reduce urban/agricultural conflicts, enhance the public's perception of agriculture and improve agricultural urban land stewardship.

Impact:

- A team of Extension professionals have been providing doing Small Acreage Workshops for 4 years and we needed to know how we had affected the participants' long term and if they had implemented any of the ideas gained at the former workshops. A longitudinal survey was developed and sent out to all of the past participants that we could find (approx. 200). We also evaluated each workshop after completion so there were two other evaluations performed following the workshops. The 2006 workshops were held in Salt Lake County and Weber County. Both were very successful, had excellent turnouts, and very good presenters.
- An online watershed information system was developed which provides integrated water quality, land use, and other data, reports, contacts and information to citizens and professionals in the tri-state Bear

River Watershed. This was a stated need by people throughout the watershed because of problems in managing water quality and quantity across many jurisdictions. Seewww.bearriverinfo.org. Funded by an EPA watershed Initiative grant for over $500,000.

Source of Funds: Smith-Lever, State
Scope of Impact: UT, ID, WY

Program Title: Dairy Manure Lagoon Management

Key Theme: Agricultural Waste Management

Description: Dairy producers must be educated about proper management of waste lagoons to prevent nutrients from entering surface and ground water. This program will train dairy producers in the best management practices for waste lagoon management through a combination of workshops, seminars, newsletters and on-farm visits.

Impact: Forty seven participants, including personnel from state and federal agencies, attending a Dairy Waste Management tour in Delta learned about different manure management systems, dairy lagoons, separator systems, and dead cow composting. This was a very good program and the comments of those who attended were very positive.

Source of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Rural and Community Forestry Extension

Key Theme: Forest Resource Management

Description: This program will improve private forest management, enhance sustainable processing and use of forest products, improve the health and quality of urban/community forest, reduce fire hazards, increase the health and functionality of windbreaks and increase adult and youth awareness of forestry issues.

Impacts:

- USU forestry specialists and county agents were instrumental in planning and conducting several important conferences in the state in 2006. These include the following:
    - Utah Forest Products Association Conference, held in February in Price Utah, provided valuable information to over 100 people from the forestry and forest products industry.
    - The Association of Natural Resources Extension Professionals conference, held in Park City Utah this year was attended by 235 individuals from around the country. Evaluation were very high, with comments such “one of the best meetings I’ve had the privilege of attending”. The ANREP conference netted over $10,000 for the organization.
    - Restoring the West Conference for 2006, held Sept 12-13 in Logan, UT had with a focus on Aspen regeneration. This is of critical interest to land use managers across the west.
    - In addition, hundreds of people attended workshops and smaller conferences that the USU forestry Extension team either planned or participated in, including workshops in small acreage management, fire wise and low water use plantings, master gardener assistance, and urban tree trimming. In all cases, evaluations were consistently very high.
- The forestry program has taken a lead in web page development. (www.extension.usu.edu/forestry) Usage continues to increase, with a record number of page views in a single day of 2,228 on May 10th, 600 more than the previous record. For all of 2006 the site averaged 480 page views and 166 visitors a day. This web site alone allows the programs, presentations and materials of USU extension to reach global audiences.
- Forestry specialists alone reached over 6000 individuals in 2006, offering assistance in planting, pruning, native trees, wood products, and more.

Source of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Non-point Source Pollution: Improving Water Quality through Irrigation Management

Key Theme: Water Quality

Description: Reducing salt load in the Colorado River is a national and regional goal. This program will control salt loading in the Colorado River by improving irrigation water management among farmers in eastern and east-central Utah. Tri-county collaborative project.

Impact:
- Extension posted information on daily crop water use estimates, hourly weather data, and irrigation scheduling information on the web at http://utahreach.org/agweather/ for 15 sites in 8 counties. These enable users to better schedule irrigations and reduce irrigation water use by following the posted crop ET (water use) estimates.
- The Salinity Forum and NRCS asked USU Extension to assist in accessing the function and condition of salinity control practices installed during 1982-1996 through the USDA Colorado River Salinity Control Program. The emphasis is on older systems to assess whether cost sharing programs are need to maintain practices. Participants at the annual Uintah Basin Water Conference learned from a preliminary report that farmers are using the systems and maintaining them. Most farmers intend that the change to sprinklers will be permanent. Participants learned that Lower Basin States are more interested in considering cost share for replacement than the Upper Basin States.

Source of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Grazing and Weed Control on Public Lands (Extension Only)

Key Theme: Natural Resource Management

Description: Livestock grazing has been a mainstay of agriculture in many Utah counties. Grazing monitoring and weed control on public lands are two issues of importance to grazers and agency personnel responsible for public land management. This program will train ranchers in how to monitor range conditions, and ranchers and agency personnel in how to control weeds on public lands.

Impact:
- Extension agents coordinated *Tamarix* eating beetle collection and distribution in Wayne County. An estimated 50,000 beetles were collected by county road department employees and released on private property along the Fremont River. These beetles help control a noxious plant which is impacting riparian areas throughout the intermountain west, resulting in poorer water retention, poorer wildlife habitat and soil loss.
- Extension played a significant role in a year-long statewide radio and billboard ad campaign to raise public awareness about invasive weeds. The UT-MT-WY Extension Weed Management Handbook was updated and published in both hardcopy and online formats to promote increased adoption of integrated weed management practices. Intensive weed inventory and mapping workshops were conducted for federal, state, and county weed managers.

Source of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Water Conservation: Culinary Water Use and Landscape Water Management

Key Theme: Drought Prevention and Mitigation

Description: Approximately one-half of the culinary water consumed in Utah is used for landscape irrigation. Many landscapes are watered inefficiently resulting in the waste of a valuable resource. This program will train water users to use culinary water more wisely by developing and implementing landscape irrigation system evaluation protocols and programs for urban water users.

Impact:

- USU Extension Service studies show proper landscape design and installation reduces water needs 30-50%. Master Gardeners evaluated 300 landscape plans for water conservation with 30 percent water savings on each landscape. Based on sample cost analysis of $50 per month in the growing season, water savings over a 20-year period for 300 homes is $90,000. .
- Sixty-four landscape managers (Large Water Users) participated in the program this year, impacting approximately 18,000 acres of managed landscapes in Utah. Approximately 450 residents of Salt Lake Counties had Water Checks performed on their home landscapes. These Water Checks result in an average water savings of 16,000 gallons of water per household per year.

Source of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Range Resources

Key Theme: Natural Resource Management

Description: Pressure on rangeland owners and users in forcing efficiency and sustainable pasture, rangeland and watershed management required that Extension take an active role in leadership and education to increase environmental and economic sustainability of rangeland and pasture use.

Impact:
Dozens of school participants have implemented one or more improvements in pasture and grazing management effectiveness since 2000 as a result of the Lost Rivers Grazing Academy.

- Nearly 300 ranchers, government personnel and allied industry reps attended the 3-day Range Livestock Workshop in St. George and Kanab. Nearly 100 people also attended the tour, which highlighted how fire impacts warm desert ecosystems, annual grass invasion and how to manage that grass. The workshops taught about cheat grass and how to manage annuals, managing where cattle graze, mineral & water nutrition, adaptive management, animal health, poisonous plants, heifer replacement & cattle marketing and the impact of grazing & recreation on the AZ Strip. Workshop participants included a good mix of ranchers and government agency personnel with 48% being ranchers and 27% being agency personnel. Significant participation from both the ranchers and agency personnel create better working relationships and helps solve current and future land management issues. Participating ranchers manage over 16,000 head of livestock.
- In 2006 the USU Public Lands Issue Team organized and conducted range management schools in three locations in the state. The purpose of these schools was to inform ranchers, agency personnel, and other interested parties about the latest range management techniques. It also provided a forum for all these different parties to come together and discuss issues that affect everyone. The schools were held in Roosevelt, Price, and Oakley. Each attendee receives a binder with up-to-date information that they can take home and use as a reference.
- Extension put on a 2 day workshop for the Ute Tribe to educate its employees on fundamentals of assessing natural resources. A needs assessment revealed the need to teach the value of soil information. We organized the workshop to include a classroom introduction to soil surveys and field tours of farmland and rangelands. I introduced soil surveys and their use in agricultural settings. Shane Green from the state NRCS office introduced concepts of soils and vegetation surveys in rangeland settings. Then we took the field trips to see the application in the field. Eighteen tribal members joined us on the first day and sixteen on the second.
- The web site (http://www.ext.usu.edu/rra) was expanded; the site contains repeat photography that documents long-term vegetation change in Southern Utah. The web site now contains 1571paired photos

showing changes to rangelands over time, some of the original photos date back to 1872. Ecological descriptions of the changes over time that have occurred at each site are also included. In addition, to help the public understand rangeland changes over time this site has a photo tour that documents: Range condition, Soil erosion, Riparian conditions, Stream conditions, Oil and Gas development, Mining, Pinyon-Juniper invasion, Sagebrush expansion Aspens demise and Forage production. This site is of great value to resource managers to help guide management actions and to educate the public. Continued work on the site was facilitated by a $7,500 grant from the U.S. Forest Service that was obtained this year.

Source of Funds: Smith-Lever, State
Scope of Impact: UT

Key Theme: Natural Resource Management

Description: Farmers/ranchers continually request research-based information on site-specific systems that conserve energy and natural resources. However, new methods must be developed that are less-expensive than those currently used in high-value crops.

Impact: Hans Hayden, Chair of the Idaho Wheat Commission and NAWG officer noted that geospatial technologies, implemented by this project, have saved him over $10,000 in fertilizer and pesticide application costs. Duane Grant estimated that this project (malfunctioning center-pivot nozzles were identified with satellite imagery, and corrected) saved him over $16,000. These are just two farmers of over twenty-four that were directly impacted by the results of this project.

Sources of Funds: Hatch, State, and Other
Scope of Impact: Utah, Intermountain West, U.S.

Key Theme: Natural Resource Management

Description: Severe drought, currently entering the sixth consecutive year, continues to plague Utah and much of the Western U.S. Demand for water to irrigate urban landscapes is increasing in the Intermountain West while water supply varies greatly with desert-driven climate conditions. Demand is driven largely by irrigation of residential, commercial and recreational landscapes. Many cities in the Intermountain West are adopting water conservation measures to reduce demand. Low-water-use landscaping with drought-adapted plants, is a major component of these water conservation measures.

Impact: Water audits conducted consistently show approximately two-thirds of water used is applied to outdoor landscapes. An impact of the pot-in-pot nursery project is the interest shown by a large, local nursery. They have invested in the continuation of the research at their facility and have partially funded a master's level research project for a Utah State University student. Initial results of the Big Tooth Maple mound layering propagation bed study indicate a strong potential to produce one plant per square foot per growing season.

Sources of Funds: Hatch, Other
Scope of Impact: Utah, Intermountain West, U.S.

Key Theme: Natural Resource Management

Description: Public land managers should include input from society regarding natural resource use. Citizens in different parts of the U.S. respond differently to proposals for public land management. Land managers are learning they must avoid "one-size-fits-all" approaches for public education about proposed activities.

Impact: Our study of a Colorado school for ranchers found that changes occurred not simply because of the school, which has been highly publicized in recent years, but also because federal range managers showed grazing permittees how the changes were both beneficial and necessary for public as well as private land.

As a result, new efforts are being launched to teach public land managers in other states about the potential for fitting new grazing practices to specific federal lands.

Sources of Funds: Hatch, Other
Scope of Impact: Western U.S.

Key Theme: Natural Resource Management

Description: Increasing demand for and use of water will tax available resources, could degrade water quality and quality of human life, and could harm ecosystems and wildlife habitat.

Impact: The optimization techniques developed typically provide management strategies that are 20 percent better than those developed using simulation modeling techniques alone. These techniques will be very beneficial and will save millions of dollars as they are applied worldwide for contamination remediation.

Sources of Funds: Hatch, Other
Scope of Impact: Utah, Western U.S.

Key Theme: Natural Resource Management

Description: A variety of management practices are needed to reduce wildfires and rehabilitate burned rangelands in the Great Basin. Traditional wildfire rehabilitation practices in the Great Basin can be costly, and can replace diverse, native plant communities with very simple plant communities dominated by seeded species like crested wheatgrass.

Impact: Recently completed research indicates that cattle can be used to reduce the biomass of crested wheatgrass seedings and disperse seeds of desirable, native plant species (by eating and depositing seeds in dung) to gradually increase the diversity of the seedings.

Sources of Funds: Hatch, Other
Scope of Impact: Utah, Western U.S.

Key Theme: Natural Resource Management

Description: The purpose of this project is to develop methods for animal feeding operation manure (wastewater and nutrients) management using integrated facultative ponds (IFP) in northern, arid climates.

Impact: Based upon the results of this project, two ponds have been designed, constructed and are being used in the state. These IFP systems are reducing the nutrient concentrations by 80 to 95%. Both owners have changed the way they operate their manure handling systems from manure input through final disposition. Due to nutrient reduction, the pond liquids can be applied to the farms land resources more uniformly and without exceeding the agronomic rate for the crops and soils.

Sources of Funds: Hatch, State, Other
Scope of Impact: Utah, Intermountain West, U.S.

Key Theme: Natural Resource Management

Description: Wildlife damage is a major problem for U.S. agricultural producers, who each year suffers over $2 billion in losses despite spending an additional $2 billion and 90 million hours trying to prevent the damage. Sandhill crane damage to newly planted cornfields was analyzed to see if it could be reduced by providing the birds with diversionary food.

Impact: In control fields, 23% of the sprouted corn seed were eaten by cranes and damage in four of them was so extensive that the farmer had to replant at least part of them. Crane damage to baited fields averaged 7%, and none of these fields required replanting. The benefit/cost ratio for this practice was 20:1

indicating that the use of diversionary food can be an effective method of reducing crane damage in fields where damage historically occurs. However, it cannot protect fields that are suffering from crane damage for the first time or where crane damage is sporadic.

Sources of Funds: Hatch, State
Scope of Impact: Utah, U.S.

Goal 5. Enhanced economic opportunity and quality of life for Americans.

Utah State University Extension (CES) and Utah Agricultural Experiment Station(UAES) Progress Report on Plan of Work Goals: 2005

Overview

Extension and the Agricultural Experiment Station partner with key individuals, groups and agencies representing a variety of educational, research, business, public and private organizations to provide services that improve the quality of life for Utah families and communities. USU Extension is one of the founding partners in "Wingspan," a statewide policy dialogue on rural issues. This culminated in the Utah legislature creating the Governor's Rural Partnership Board, which includes a seat for USU Extension. The Board conducted an extensive issue surfacing activity throughout the state in 2004, which serves as an exemplary external needs assessment for Utah State University's programming pursuant to Goal 5.

Utah is number one in the nation in the number of personal and business bankruptcies. One program developed by USU Extension, the PowerPay program, is recognized nationally as a system for consumers to utilize in managing and reducing personal debt.

Utah's Youth and Families with Promise program is designed to address youth problems through early intervention with at-risk youth and their families. It is based on a two-level mentoring approach utilizing college age mentors who work directly with the identified youth and retirement-age mentor couples who work with the parents and other siblings.

Small manufacturing businesses in Utah benefit from the Utah Manufacturing Extension Program (MEP). Extension helps small manufacturing companies develop strategies, access the latest technologies, and implement the newest management and manufacturing practices.

Home-Based Business/Entrepreneurship is another area where Extension is assisting citizens in Utah. Since 1970, small businesses have accounted for nearly all the new jobs that have been created. The "Ca$hing in on Business Opportunities" curriculum was developed to provide business management information to potential and existing business owners. Extension agents are becoming business information providers to clients, helping them enhance the management of their businesses.

Extension helps business owners in rural communities with E-Commerce. Agents are teaching small/micro business owners to expand their market reach through the use of e-commerce.

The Western Region Community Development team (sponsored by CES and UAES) planned and implemented the Community Vitality Initiative training, which taught basic community and economic development principles to Extension agents and stakeholders through the western region. The Youth City Council program allows teens to experience and contribute to the success of their local municipal governments.

State Assessment: The Goal 5 program areas are very effective in helping Utahans improve their quality of life. The demand for financial services, family life programs, 4H, and community development remain strong in Utah. Extension and Agricultural Experiment Station faculties on campus and in the counties are responding well to local and statewide needs.

Utah Extension Service

Total Expenditure and FTE:
Smith Lever: $468,322
State Match: $458,046
FTE: 13.42

Utah Agricultural Experiment Station

Total Expenditures and FTE:
Hatch: $1693,609
State Match: 11,523,023
FTE: 7.9

Integrated Programs

Program Title: Extension Educational Programs on Water Resource Issues: On-Site Wastewater Treatment

Key Theme: Impact of Change on Rural Communities

Description: The Utah On-site Wastewater Treatment Training Program was established in January 1998. The mission of the training program is to assist in the protection of public health and the environment by providing technology transfer, training, and information dissemination in on-site wastewater treatment to stakeholders in Utah and the surrounding region, and by raising the level of public awareness and knowledge in on-site wastewater treatment issues. The program provides classroom and field training to site evaluators, regulators, designers, operators, and maintenance personnel in support of the statewide certification program for on-site wastewater professionals.

Impact: Most counties that have utilized the on-site waste water treatment training program report a positive outcome, though it is related to having the complete program (classroom and field training and other materials).

Source of Funds: Hatch, Smith-Lever, State, Other
Scope of Impact: UT

Program Title: Families and Youth at Risk

Key Theme: Children, Youth, and Families at Risk

Description: Utah's Youth and Families with Promise Program (YFP) is designed to address youth problems through early intervention with at-risk youth, ages 10-14, and their families. YFP is a two level mentoring program (young-adult individual mentors and grandparent-age mentor couples) designed to reduce and prevent delinquent behavior.

Impact: Parents, youth, mentors and teachers were surveyed using a post-then-pre design which showed statistically significant improvement ($p < 0.001$) in nearly every area surveyed. Focus groups held with parents and also with mentors revealed very positive impacts.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT

Other CES and UAES Programs/Projects

Program Title: Family Financial Management

Key Theme: Family Resource Management

Description: Many Utah families are experiencing financial difficulty from being over-extended. Computer programs, seminars, classes, budget plans, etc. will be held to teach consumers how to deal with finances.

Impact:

- A six unit curriculum entitled "Take Charge of Your Money" has been developed by USU Extension faculty and agents from 28 counties are trained in its delivery. Post-pre evaluations from participants showed that all of the measures' gains were statistically significant, not due to chance. A follow-up survey of Cache County participants showed 93% are more committed to assisting their children with learning basic money management skills. Eighty five percent have investigated their insurance coverage more thoroughly. One hundred percent of the respondents believe that financial goals have given them a road map to financial security. Eighty five percent now have a basic savings plan for emergency savings, long term savings, and non-monthly expenses. Seventy three percent believe that this series has helped them to save between $500 and $1000 a year using suggestions from class. Participants in Extension's family financial management classes are adopting the practices taught.
- Extension has collaborated with United Way of Salt Lake to implement Utah Saves, a social marketing program designed to increase wealth and reduce debt. Extension has also delivered programs on EITC (Earned Income Tax Credit), and debtor education classes to recent bankrupts.
- Nine Utah Cooperative Extension agents were certified by the Department of Justice to offer two-hour debtor education classes in accordance with the Bankruptcy Abuse Prevention and Consumer Protection Act of 2005 (BAPCPA). With this education, a significant number of debtors will emerge from bankruptcy with the skills they need to successfully manage their personal finances.
- Two interactive computer programs, PowerPay and PowerSave were posted on the Extension website and a HUD-certified First Time Home Buyer's program was tested. The finance site on the Extension homepage was expanded to include all of the above programs, plus information on where classes for bankruptcy education classes were being held.
- The Bankruptcy Issues Team split into four subgroups: low income, farm family, website, and Latino Finance. Each of these subgroups has been active in writing news releases, designing workshops, and planning for the next five year's work.
- "The Good Life, "a series of workshops on planning for retirement has seen an average of 60 participants at each session. This program was sponsored by Utah State University's Community Credit Union, who also sponsored the web re-design of PowerPay.

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Business Retention and Expansion

Key Theme: Jobs/Employment

Description: Rural Utah is economically disadvantaged in competing for new business and industry. Extension will assist in retaining and expanding existing firms. A new initiative team in entrepreneurial assistance represents a substantial allocation of effort to BR&E. The program delivered NeXTLevel and a western variant of the EDGE training that was developed in Nebraska. This team involves on-campus specialists, area economic development agents and county agent. In 2006 USU Extension supported small business development activities through its centers in Logan, Roosevelt and Vernal and through state-wide training of entrepreneurs and business owners. These activities are cooperative ventures with the state of Utah, the SBA and USU Extension.

Impact: As a result of these activities, 336 individual counseling clients were served; 48 workshop or educational programs were conducted and attended by 1438 participants who learned about preparing a business plan, marketing, accounting and book keeping, financial management, and customer service. In addition, 48 successful loans were assisted, and total reported dollars borrowed exceeded $6 million. The impact of these small business assistance programs includes training, professional development, acquisition of financing, and ultimately businesses started or expanded, and jobs created.

Sources of Funds: Smith-Lever, State
Scope of Impacts: Utah, Intermountain West

Program Title: Home Based Business Development

Key Theme: Home-based Business Education

Description: The business development program focuses on education programs of improving and enhancing local business development of home occupations. Providing people with information and training on home-based business development.

Impact:

- Through Extension's efforts several small/micro business owners are beginning to recognize that they can expand their market reach through the use of e-commerce. A small core of Extension agents assisted business owners in rural communities who do not have easy access to resources to help them develop or improve an Internet site.
- One hundred thirty-nine youth, 22 teen leaders, 17 county volunteers, 3 specialists and 4 state staff representing 18 counties piloted Entrepreneurial Camps. Youth came up with a business plan, including what products or services they would sell, price, marketing plan and so forth. They went home with a greater understanding of the business world and what is involved in creating their own business.
- Extension held training for Mini-Society facilitators in cooperation with Idaho. Participants included Extension agents, YFP coordinators, teachers and after-school program teachers. Evaluations indicate that both youth and parents perceived the program to be very beneficial.

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Community Organization and Leadership Development

Key Theme: Leadership Training and Development

Description: Community organization leadership development is designed to increase participant's skills in organizing, operating, maintaining and evaluating local groups and organizations.

Impact: This program is being pursued initially through the development of the EPIC TASK training program being designed and implemented in partnership with the Governor's Office of Planning and Budget. It is a community-based training program conducted in two phases. The first, Effective Professional and Interpersonal Communication (EPIC) is a four-session training that addresses foundational skills in interpersonal communication, conflict management (two person) and coalition building. The second phase, Targeted Advanced Skills and Knowledge (TASK) build on the competencies that EPIC reinforces, but attempts to build additional abilities in a specific issue area (natural resources/ public lands, social service provision, health systems, etc.). The content in each TASK session will therefore vary in response to specific attributes of the issue, but the common features will be: conflict assessment, systems approaches to working through issue complexity, and collaborative approaches to building implement able decisions.

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Community Planning and Design

Key Theme: Impact of Change on Rural Communities

Description: Rural communities lack planning personnel and skills to develop provision for planning and design. Training and workshops will be provided for communities. Each year Extension personnel conduct one large community design project, working in conjunction with the Utah State University Department of Landscape Architecture and Environmental Planning, and then a number of smaller projects in response to requests.

Impact: In 2006-07, the large project was a charette held in Sanpete County to address community design issues related to the congressional designation of US Highway 89 as a heritage highway. A total of 15 teams of graduate and undergraduate students conducted design projects on behalf of individual communities as well as the overall corridor. The US Highway 89 Heritage Corridor communities now have designs and community input that can be used for master plans in the area. In addition, twenty communities have landscape architecture and environmental plans or projects to enhance their communities. These included:

Wasatch County Fairgrounds Revised Master Plan
Ephraim Main Street Master Plan
Ephraim Main Street Revised Master Plan
Fountain Green Main Street Master Plan
Bicknell Distance Education Building Landscape Plan
New Harmony Library Landscape Plan
Monticello Visitor Center Master Plan
Monticello Visitor Center Landscape Plan
Castle Valley Town Community Survey Review
Midway Community Parks
Sevier County Visitors Center
San Raphael Bridge Recreation Site
Mendon City Futures Analysis
Logan City 300 North to 400 North Streetscape Design
Everybody's Playground Conceptual Design (Idaho Falls, ID)
Little Sahara Visitor Center Landscape Plan
Kane County Administrative Offices Master Plan
Kane County Courthouse Site Design
Panguitch Community Gardens and Demonstration Plots Master Plan
Wayne County Group Community Main Street Study

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Economic Development

Key Theme: Jobs/Employment

Description: Rural West has limited employment opportunities, changing employment base to service industries and lower incomes. Economic information and technical assistance for strategic planning and goal setting will be available to three communities per year.

Impact: In 2006 extension rural entrepreneurship and local economic development programs assisted Utah communities, businesses and entrepreneurs to make choices and decisions regarding growth, employment and development alternatives. Specific program areas included home based business and entrepreneurship, small business management, business resource and innovation centers, Main Street Programs, business retention and expansion programs, and Utah Shingo Prize for Manufacturing Excellence programs and site visits. In 2006 extension rural entrepreneurship and economic development programs assisted 18 Utah communities, conducted 16 workshops and educational programs, and provided training or professional development for 442 participants. Partners include the Governor's Rural Partnership Board, Governor's Office of Economic Development, Utah Small Business Development Centers, Utah Small Cities Inc, Associations of Governments and local counties and municipalities.

- A socio-economic analysis of the USDI-BLM Richfield Field Office Draft Management plan was conducting for the county commissioners in a six-county region. This small ($35,000) project allowed the commissioners to more articulately critique the adequacy of the BLM's analysis.
- A $750,000 grant has been received from the Utah Governor's Office of Public Lands Policy Co-ordination to conduct a statewide socio-economic analysis of public lands management. This project was a direct spin off of the Richfield project described above.

- Two area economic development agents have assisted rural businesses and jurisdictions with economic development planning on issues such as Congressional designation of US HWY 89 as the “Mormon Heritage Highway” and the development of plans and infrastructure in the communities along that Highway.
- Development of a short-line railroad in Sevier County.
- Assistance to dairy operations.
- Development of infrastructure (electricity, natural gas, water systems, etc.)

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Key Theme: Economic Development

Description: Utah food businesses have sent samples of food products to the Extension Food Safety Program to be analyzed for nutritional labels. This process has been especially important in 2005, since new label requirements go into effect January 2006 regarding allergens and trans fat.

Impact: Over 60 products have been analyzed from approximately 40 businesses at no cost to the businesses.

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Youth and 4-H

Key Theme: Youth Development/4-H

Description: Give youth opportunities to become involved with the community, prepare them for adult responsibilities and future employment. Train more youth volunteers. Get youth involved in livestock, dairy, poultry, and horse projects. There were 434 youth and adults who attended the 24th Annual Youth City Council Leadership Institute.

Impact: Ninety-six percent of the 173 participants who completed an evaluation form rated the conference as excellent (60%) or good (36%). Keynote speakers were well received with 99% rating John Bytheway as excellent or good, 81% rating Sharlene Wells Hawkes as excellent or good, and 95% rating Neleh Dennis Nielson as excellent or good. Twenty-three percent of participants indicated they or their Youth City Council had adopted one or more practices taught at prior AYC Leadership Conferences. A majority of participants (94%) said they would adopt one or more recommended practices taught at this year’s institute.

Description: Extension agents and specialists are involved in providing a variety of traditional contests, camps, service opportunities, carnivals, fairs, classes and clubs including Family and Consumer Science, Environmental Science, Livestock, Horse, Dairy, and other clubs for Utah youth. The 4-H program is a “learn by doing,” youth education program for boys and girls in the 3rd through 12th grades. Projects are chosen among 100 project areas or created by the youth and leader.

Impact: Paired T-test evaluations of participants at a 4-H winter sewing camp showed significant knowledge gain on various points. This is indicative of other 4-H programs.

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Manufacturing Extension Service

Key Theme: Promoting Business Programs

Description: Establish a state-wide presence as a manufacturing resource provider for Utah through the Manufacturing Extension Service.

Impact: The USU Extension MEP is ranked as one of the top 5 MEP Centers nationally for economic impact on manufacturers. The following are impacts for 2006:
Number of Companies reporting Impacts = 86
Total Bottom-line Impact = $28,670,505
Total Investment Impact = $ 21,545,600
Customer Satisfaction Score = 4.74/5.00
Jobs Created or Retained = 1015
Fed Cost per Impacted Client = $10,523

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Improving Rural Vitality

Key Theme: Impact of Change on Rural Communities

Description: The passage of SB 50, in July 2004, created the Governor's Rural Partnership Board and granted USU Extension a permanent seat on the Board. A number of the priority ideas being considered by the Governor's Rural Partnership Board directly involve the broader university or Cooperative Extension directly. The GRPB has set goals to study the health insurance crisis in rural Utah, pass funding for tourism, facilitate an ongoing statewide diversified agriculture conference, improve coordination between resource partners in support of local entrepreneurs, create an agribusiness innovation center, expand the Utah Micro-enterprise Loan Fund to rural Utah, convene a meeting of local officials to discuss coordination and cooperation on rural land use, natural resource, public land use, and energy policy, and provide ongoing funding for Utah Smart Sites.

Impact: A new advertising agency has been selected with funds appropriated by the Legislature and the first round of cooperative grants have been awarded. The Diversified Agriculture Conference continued, with 250 participants learning skills and concepts to help their agricultural businesses. Pilot "Business Resource Centers" are scheduled to open in January, one focusing on the composites industry and another on agribusiness. Funding for creating an agribusiness innovation center has been secured and the Governor's office held a meeting where local officials discussed coordination and cooperation on rural land use, natural resource, public land use, and energy policies. The office of planning and budget has released a Planning Resource Management Toolkit.

Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Assessing the Impacts of Changes in Rural Communities

Key Theme: Family/Community Relationships

Description: The migration of young and middle-age adults into and out of rural places is known to affect the social and economic welfare of rural areas.

Impact: This study has shown that non-Hispanic blacks and Hispanics are much less likely than non-Hispanic whites to continue moving once they have arrived in a place and but are approximately equally likely to return to a place that they have lived in before. When there is a period of strong economic growth, movement into rural places with amenities (e.g. vacation-type areas) is much more likely than in periods of economic stagnation or decline. However, periods of economic growth are not associated with a reduced out-migration from rural areas without natural amenities.

Sources of Funds: Hatch, State, Other

Scope of Impact: Utah, U.S.

Key Theme: Health

Description: Dietary calcium absorption by the intestine declines with age and may contribute to age-related problems with bone mineral metabolism.

Impact: Calcium and phosphate absorption by intestine decline with age. A significant portion of the decline is loss of the rapid vitamin D metabolite (1,25D)-induced stimulation that is mediated by a novel membrane receptor, rather than the classical nuclear receptor. For age-related onset of osteoporosis, the 1membrane receptor presents a new pharmacological target to enhance mineral absorption. The implications for agriculture are that this pathway should provide a target to increase phosphate absorption in production animals, and minimize the mineral in manure which leads to eutrophication of waterways.

Sources of Funds: Hatch, State
Scope of Impact: Utah, Intermountain West, U.S.

Key Theme: Health

Description: Eighty-eight percent of children are regularly preparing food for themselves and others. Utah State University, Safe Food Institute, LetterPress Software, and the Partnership for Food Safety Education collaborated to develop Children Fight BAC!, a series of four comprehensive, instructional computer modules to teach 5 -8 grade students both “how” and “why” they need to handle food safely at home to protect themselves, their families, and their friends from food borne illness.

Impact: One month after using the modules, sixth grade students had a 24% increase in retained food safety knowledge and an 80% increase in time spent washing hands during in-class food preparation activities.

Sources of Funds: Hatch, State
Scope of Impact: Utah, U.S.

Key Theme: Health

Description: EPA currently recommends no further treatment of water to be stored in the home if drawn from a chlorinated municipal source.

Impact: Samples of water which had been stored in Utah homes for emergency use were tested for micro flora and residual chlorine. Water samples stored from 2 months to 40 years all showed some microbial counts. All samples had chlorine below detectable levels using the chemical strip test. Recommendations must be made that all stored water has chlorine added to ensure safety for emergency use regardless of source.

Sources of Funds: Hatch, State
Scope of Impact: Utah, U.S.

Underserved Minority Output Indicators and Outcomes in 2006

Six counties in 2006 were engaged in formal Civil Rights training and review. In each of the half day sessions the full staff including assistants, aides, and technicians discussed techniques employed for reaching those who have been traditionally underserved. Focus was given to learning how to effectively apply the "all reasonable" effort in reaching diverse populations within each county. Goals were established which will assist counties in reaching parity with the diverse audience in county communities. All Utah counties reported progress in meeting the performance standards established in the Civil Rights Performance Plan.

Outcomes in 2006 from the Utah State University Extension Civil Rights Performance Plan as reported in annual county reports included:

1. 96% have instigated better collaborative planning with Federal and local agencies to address underserved populations with programs.

2. 100% have documented efforts to increase the membership of underrepresented racial/ethnic minority group members in structured 4-H youth and family/community clubs this year.

3. 89% assure that media utilized conveys equal opportunity regardless of race, color, sex, national origin or disability and copies of those efforts are filed in the central and individual civil rights documentation files.

4. 92% of counties reported compliance with regulations, laws, and procedures, outlined in the USU Affirmative Action EEO four-year plan when seeking employees. Documentation is then kept in the central civil rights file.

5. 89% reported efforts made to contact school districts and the elderly as potential partners for programs serving the underserved and diverse audiences.

6. 93% reported efforts to accommodate those with disabilities.

7. 93% of all Extension employees have engaged in some civil rights training during the past year designed to improve cultural sensitivity and meet affirmative action goals.

8. 96% reported *all reasonable efforts* have been made to advise program recipients of program availability.

9. 96% indicated that sex-neutral language in publications and communications and programs are routinely monitored and checked to eliminate gender bias.

10. 89% indicated that they have developed specific performance plans to remediate any deficiencies identified in civil rights reviews conducted in the county.

Indicators of Success

The figures in the tables below indicate that Extension is making great progress toward meeting diversity goals as a portion of the state population served and that an equivalent of over 40% of the Utah population is being reached with face-to-face Extension programs. Hispanic, American Indian, and Asian populations continue to be the largest ethnic underserved groups as a proportion of the total served. Great strides have been made in reaching ethnically diverse populations in Utah.

State and County faculty are aware of USU Extension Civil Rights goals to improve the face-to-face contact with diverse audiences. Increased efforts are being made annually statewide to measure the contacts made

with each racial group and new targets have been set. The goal is to reach all racial/ethnic populations at the same level as those reached with the dominant racial group [36.7%] in the state. Goals have been established to reach additional Hispanic and Asian/Pacific Islander populations in the future. Native American contacts are nearly on target for reaching the 36.7% goal for this population. The Face-to-face contact goal of 36.7% contact with the Utah Black population has been exceeded [46.6%].

Face to Face Contact Reporting 2006
Representative highlights of some of the outstanding work conducted by Utah State University Extension faculty as they served the underserved and minority populations in the state are enumerated below.

Face to Face Contact Reporting 2006

[* USU Extension has face-to-face contact with an equivalent of 41.6% of Utah's total population]

Ethnic Group	% Utah Total	Utah Ethnic Population	% And Number Population Reached in USU Cooperative Extension Program - 2006 (*Revised USA Census Estimates 2005) Race alone or in combination with one or more races * Fed Stats		
			% Served	No. Served	Gender
White	93.8%	2,316,141	36.7 %	850,578	Males
Black	1.0%	23,746	46.6%	11,079	445,660 (46.2%)
Hispanic	10.9%	268,234	28.8%	77,381	Females
Am Indian	1.3%	32,942	35.0%	11,555	519,038 (53.8%)
Asian/PI	2.6%	64,336	21.9%	14,105	

Electronic, Newsletter and Correspondence Contact Summary 2006					
Contact	**Ag NR**	**Com Dev**	**Fam Con Science**	**4-H**	**Totals**
Email	251,473	5,466	22,424	52,643	332,006
Phone	50,840	5,294	22,537	49,035	127,706
Newsletters	394,960	4,604	118,538	141,411	659,513
Nonelectronic/Prog Announcements etc	364,945	2,976	438,573	135,487	942,089

Representative highlights of some of the outstanding work conducted by Utah State University Extension faculty as they served the underserved and minority populations in the state are enumerated below.

Ute Tribe Animal Health and Premise Registration
A workshop was organized for Tribal members at the request of the Tribe. Topics included USDA programs, Agrability, Vesticular Stomatitis and other vector diseases, Trich testing, and animal ID. USU Extension, UDAF, and USDA provided the training. Lunch was provided by the Tribe. 60 participated including 50 tribal members.

Ute Tribe Land Resource Workshop
Extension put on a 2 day workshop for the Ute Tribe to educate its employees on fundamentals of assessing natural resources. A needs assessment revealed the need to teach the value of soil information. We organized the workshop to include a classroom introduction to soil surveys and field tours of farmland and rangelands. An introduction to soil surveys and their use in agricultural settings was given. The state NRCS office introduced concepts of soils and vegetation surveys in rangeland settings. Then we took the field trips to see the application in the field. Eighteen tribal members joined us on the first day and sixteen on the second.

Even Start Group
The Ogden City School District offers Hispanic parents of preschool children an opportunity to get their GED while their children attend a special preschool program. EFNEP teams up with the Even Start program by offering nutrition and cooking classes geared to help the participants adjust to cultural food differences. For many, grocery shopping is a major challenge and storing food safely is a health problem.

Healthy Lifestyle
EFNEP/FSNE clients learn the benefits of a healthy lifestyle. L. Mendoza tells, “The lesson on physical fitness for a healthy heart has really motivated me to be more active and eat a healthy diet. Not only do I feel that I am saving money, but I feel that I am making better choices in what I buy. Thanks to the FSNE program, I’m planning healthy meals for my family and healthy snacks for my preschoolers.” A. Ruiz wrote, "I really enjoyed the EFNEP program. Darlene helped me understand nutrition facts and the importance of physical activity, which helped my husband and I lose weight. Overall, my family is more healthy." Tom tells, "Carla taught me to drink more water and less pop. I found out that I like vegetables, fruit and whole wheat bread. I am now walking every day. My new healthy lifestyle is because of the senior FSNE program." Russell wrote, "Since FSNE, I have started a fitness routine and am eating a heart-healthy diet. I feel better."

4-H SHOWCASE

4-H SHOWCASE Timpanogos Elementary 4-H Showcase involved 300 attendees. They had their Spanish Awareness Club present the musical Wizard of Oz in Spanish. The leader was Hispanic but the youth in the club didn't know Spanish so they learned the language and culture through practicing the musical. They had a huge attendance and lots a PR. Last year they held a Hispanic Culture club for the "White" kids that attend Timpanogos Elementary so they would become more acquainted with the culture. Every event we conduct has translated materials in Spanish. For events at the school all announcements/introductions are given in both Spanish and English. Diversity is always forefront in everything done.

Deseret Industries Workshop: Budgeting and Goals
Cache County FCS Agent, were invited to the Deseret Industries on April 28 to present a budgeting and goal setting workshop twice to a total of 82 of their employees. This group was very receptive to our suggestions and ideas for improving their money management skills. We were pleased to be invited to come back three more times in 2006 to teach about other aspects of money management. The Deseret Industries often employs people who are disabled or are experiencing other difficulties in their lives. This is an exciting opportunity to teach this underserved group of individuals about a very important topic.

Creating Safe Spaces for All Youth
Creating Safe Spaces for All Youth; working with Gay, lesbian, bisexual, transgender and Questioning You is the title of a workshop presented at Western Region Leaders Forum. The objective of the presentation was to create an awareness that working with youth and adults from this group is not only the legal thing to do it is the right thing to do. Participants received resource materials, definitions and strategies for working with GLBTQ youth.

ADVANCE Seed Grant Award
ADVANCE Seed grant awarded for "Reconnecting with the Land: Creating Career Opportunities for Navajo Students through Service Learning, Environmental Education, and Cross-Cultural and Intergenerational Interactions." The goals of this project are to help Navajo students at Monument Valley High School reconnect with their cultural traditions, and explore post-secondary career opportunities through participation in a summer environmental education and water-wise landscape design course.

Christmas Box House garden program
Supported and facilitated Master Gardener volunteer program at Christmas Box House, a shelter for temporarily displaced youth. Weekly one-hour sessions. Three Master Gardener volunteers plus Christmas Box House volunteers participate. About 12 youth per week are involved.

B. Stakeholder Input Process - 2006

Utah State University Cooperative Extension and the Utah Agricultural Experiment Station began an internal review process of potential programs to be included in future plans of work in March 2005 extending into 2006. Program leaders and extension county faculty were asked to review issue areas identified by the Utah State University Cooperative Extension "Accountability in Action Program" surveys conducted 2000-2004 wherein issue areas and potential programs were delineated. The issue areas identified from this study were reviewed to determine if in fact these issues would be relevant to Utah populations in potential programs for the 2007-2011 and subsequent annually updated Plan of Work (POW) documents. Input from stakeholders was sought in each Utah county through a preliminary survey of issue areas. Targeted letters and personal contacts were made by Utah counties to under-represented and under-served populations inviting their participation in the issue identification process. Additional input was generated from a web-based on-line general public survey of issue areas. Newspaper advertisements and public service radio announcements were used as mass media approaches to invite Utah residents to open public forums where issues were discussed and identified. An on-going review of the issues identified and specified in the plan will be updated annually in future plans of work.

A second internal program and issues review process with campus specialists and program leaders was undertaken. A summary of issue areas and relevant strategies identified through these two processes was subsequently presented to program leaders for their consideration. Program leaders suggested a number of program issue areas and strategies as a result of this process. The identified issues and strategies were further refined by the POW team in the development of a survey instrument. The instrument focused on potential issues and strategies to be considered in a future plan of work in the areas of agriculture, natural resources, economic and community development, family and consumer science, and youth. A preliminary issues and strategies plan of work survey tool was developed and pre-tested with program leaders and regional directors to ensure that the issues suggested by county and campus faculty were included in the tool and that the tool was easy to use.

The survey tool was approved by the Utah State University Institutional Research Board and subsequently provided to each county in Utah. Counties were instructed to select a purposeful sample of a minimum of 10 persons within their county to complete the survey. Suggestions were made that those completing the survey might include county advisory board members, commissioners, and others who have been engaged with extension and the agricultural experiment station program advisement in the county. Additionally, the statewide Extension Advisory Council was also asked to complete the issues and strategies survey.

Those selected to complete the survey were asked to evaluate how important the issue areas and strategies in each of the program areas was to them and their family in the next five years. Further, respondents were asked to suggest other issue areas and program strategies they believe extension and the agricultural experiment station should pursue in developing a plan of work for 2007-2011 and subsequent annually updated Plan of Work (POW) documents.

High priority issue and strategy areas were identified by both the purposeful sample and by the general public electing to complete the survey on the web site. The input from these two sources allowed for a listing of the highest priority areas to be developed. These high priority issue and strategy areas were further validated by open to the public stakeholder listening session conducted in six regions of Utah. Sessions were advertised regionally in local newspapers, via personal letter, and telephone calls. All reasonable effort was made to contact county under-served populations encouraging their attendance and participation at the listening sessions which were held in the Uintah Basin-Vernal, Wasatch Front South-Salt Lake City, Southwest Utah-Cedar City, Southwest Utah-Richfield, Southeast Utah-Price, and Wasatch Front North-Ogden. Stakeholder input from these open meetings was then integrated into the POW survey database to provide a composite view from more than 500 Utahans.

C. Program Review Process

Merit Review Process – Extension Plan

There have been no significant changes in the merit or project review processes for the five-year plan of work.

Scientific Review Process – Agricultural Experiment Station

There have been no changes in the scientific review process employed by UAES. The procedures outlined in the five-year plan of work still are in effect.

D. Evaluation of the Success of Multi and Joint Activities

1) Did the planned programs address the critical issues of strategic importance, including those identified by the stakeholder?

The planned program areas for the Utah Agricultural Experiment station are: (1) Plant and Animal Health and Safety, (2) Agricultural Product Enhancement, (3) Pasture Reclamation, Development, and Quality, (4) Human, Wildlife, and Domestic Livestock Interactions and Compatibility, and (5) Family Training, Development, Assistance, and Sociology.

The planned program areas for the Utah State University Extension Service were (6) Agronomy/Crop Production, (7) Horticulture, (8) Livestock, (9) Safe and Secure Food and Fiber System, (10) Nutrition and Health, (11) Rural and Community Forest Extension, (12) Sustainable Livestock Production, (13) Rangeland Resources Extension, (14) Noxious Weed Control, (15) Families and Youth at Risk, (16) Business Retention and Expansion, (17) Economic Development Planning, (18) Youth and 4-H, (19) Sustainable Agriculture, (20) Integrated Pest Management, (21) Utah Pesticide Impact Assessment Program, (22) Expanded Food and Nutrition Education Program, (23) Statewide Water Quality Education and Technical Support, (24) Non-point Source Pollution, (25) Renewable Resources Extension Act, and (26) Native American Programs.

The relationship between the program areas identified above and the stakeholder issues identified below are indicated by various superscripts, where the superscript value corresponds to the number associated with the planned program area. These stakeholder issues were identified in the process described in this document, as well as the initial Plan of Work for Utah State University's Extension Service and Agricultural Experiment Station.

Improving production efficiency 1, 2, 6, 7, 8, 12, 13, 20
Preserving farmland and open spaces 4
Determining ways of enhancing quality of life and improving family life 5, 10, 15, 16, 17, 18, 22, 26
Identifying the important relationships between work and family 5, 15, 16, 17, 22, 26
Developing socially acceptable methods of water conservation and use 4, 23, 24, 25
Developing alternative crops and enhance existing crops 1, 2, 6, 7, 19, 20
Expanding study of intensively managed pastures 3, 6, 8, 12, 20, 23, 24
Investigating best methods of waste control and disposal 4, 9, 12, 21, 22, 24, 25
Expanding marketing options for farmers 2, 6, 7, 8, 9, 11, 12, 16, 17
Developing better methods of weed control/management 1, 2, 3, 14
Developing methods of identifying and controlling animal and plant diseases 1, 2, 6, 7, 8, 9, 12

2) Did the planned programs address the needs of under-served and under-represented populations of the state(s)?

Under-served Minority Output Indicators and Outcomes

Research, for the most part, is neutral with respect to majority versus minority output and outcome indicators.

Output and Outcome Indicators

Where possible, we would prefer to utilize prices to reflect the value of various goods and services. Where no market prices exist, reliance on physical measures becomes necessary.

3) Did the planned programs describe the expected outcomes and impacts?

The planned programs, as developed in the 1999 Plan of Work submission does describe expected outcomes and impacts in sufficient detail to provide a means of evaluating their effectiveness. See original Plan of Work submitted by Utah, with the 2005-2006 amendment provided by Utah State University Extension and the Utah Agricultural Experiment Station.

4) Did the planned programs result in improved effectiveness and/or efficiency?

There are many planned programs at USU that are resulting in improved effectiveness and efficiencies. For example, the livestock pooling programs, feed rationing, soil sampling, and agricultural research programs are all leading to more efficient and effective agricultural practices in Utah. The USU Food Safety Managers Certification Course has increased the effectiveness of mandated food safety manager training in Utah. The pest suppression efforts of USU and Utah's regulatory agency helped quarantine the Plum circulio (PC), insect pest in northern Utah, from other Utah counties in keeping their export markets open and is valued at $2.4 million/annually. The Expanded Food and Nutrition Education Program is helping people to improve their food resource management practices, nutrition practices, and food safety practices. Examples of a few of the Natural Resource/Environmental programs that are making a difference are the biosolids disposal (municipal waste) program; the water quality, conservation, and education program; and the managing wildlife program, the latter having saved an estimated $200,00 for farmers and ranchers in wildlife damage. Programs improving the effectiveness of constituents include the financial management programs that are helping individuals and families to get out of unnecessary debt, the business programs that help new businesses get started and established business to expand. Overall, USU Extension and Experiment Station's planned programs have resulted in improved effectiveness and efficiency for government, the private sector, and in some cases, the nonprofit sectors of Utah's economy.

E. Multistate Extension Activities 2006

Agronomy/Crops/Natural Resources

UT/AZ/NV Range Livestock Tour & Workshops

The Annual Tri-State Range Livestock Tour was held in Washington County on April 4th and Workshops held in St. George on April 5th and Kanab on April 6th. The tour and workshop focused on cheatgrass and red brome ecology and the challenge of managing introduced annuals (red brome and cheatgrass) to reduce the fire risk and renovate recently burned areas. The workshops further taught about cheat grass and how to manage annuals, managing where cattle graze, mineral & water nutrition, adaptive management, animal health, poisonous plants, heifer replacement & cattle marketing and the impact of grazing & recreation on the AZ Strip. 80% of attendees rated the relevance of topics excellent or superior. 99% said the knowledge gained would benefit them economically. New this year was the inclusion of NV producers and Extension in the workshop. The success of this year's program will most likely lead to continuation of the tri-state model.

Pasture management program development & delivery

A series of professional development workshops on pasture and grazing management for NRCS, Extension, and related advisors was held in Prosser, WA and Logan, UT. Collaborators are G.E. Shewmaker (Idaho), S. Fransen (Washington), and M. Bohle (Oregon). The programs provided information on best management practices and adaptability to the western region for grazing and pasture management.

Forest Service Aspen Restoration Efforts

Extension has been involved in identifying stakeholders in the Intermountain West who are concerned with aspen management in pubic and private lands. USU Extension staff facilitated and consulted with the Aspen Summit that brought together 35 scientists and managers from all over the West in SLC December 18-19, 2006 to set an aspen research agenda for the Forest Service.

Utility Tree Pruning Breeze Presentation

Western states have benefited from the resources developed utilizing the web based system called Breeze to better understand the impacts of utility tree pruning in the presentation "What people (and trees) think about utility tree pruning". http://breeze.usu.edu/p43624247/ to view.

Sage-grouse Restoration Project

Western states have benefited from the research conducted through the Sage-Grouse Restoration Project. The project addresses critical information needs. The information on the Sage-grouse Restoration Project web-site enables local sage-grouse working groups to implement restoration plans. The efforts of these groups were cited by the U.S. Fish and Wildlife Service in their 2005 decision denying the petition to list greater sage-grouse as an endangered species. Seven projects are proposed and operating in California, Colorado, and Utah. The projects include: 1)Grazing sagebrush with sheep to enhance greater sage-grouse brood-rearing habitat, 2)Development of a Sagebrush Habitat Improvement Guide for the Gunnison Sage-grouse by Evaluating Recently and Historically Treated Areas within the Gunnison Basin, and 3) Greater Sage-grouse Use of Restored Sagebrush Areas in Rich County Utah.

"On-Target" Geospatial Program

USU Extension geospatial scientists met with the executives of the United Potato Growers of Idaho to develop means to survey national potato acreage utilizing geospatial tool applications.
Geospatial Extension Specialists also who trained county agents, extension specialists, USDA-Forest Service, and land-grant professionals from across the United States with the Geospatial Tool Kit (GTK).

Livestock

2005-2006 UBIA Performance Bull Test - 1
Two hundred and fifty bulls consigned by 48 seed stock producers from 5 western states entered the 2005-2006 UBIA Jr. Performance Bull Test. 241 bulls completed the test, and 111 were offered for sale at the UBIA Bull Test Sale, with 93 of the bulls selling for 36% over the break-even floor price. New to this year's test was a Sr. test for bulls born from Oct.-Dec. 2004. Buyers expressed interest in the past to purchasing slightly older performance-tested bulls. 27 head were consigned by 8 seed stock producers. 12 bulls were offered in the sale of which 26% received more than the break-even floor price established by the consigners.

Sheep & Goat Education

Three hundred and twenty-three sheep and goat producers, industry reps and students from seven states attended the 2006 Sheep & Goat Education Day. The event was held in conjunction with the Utah Wool Growers Association Annual Convention, and was underwritten by the UWGA. Keynote sessions were held on Leading Edge Management, Sheep & Goat Handling & Psychology, & Advanced Lambing & Kidding Husbandry. Afternoon rotation sessions covered topics such as, Small Ruminant Nutrition, Se Nutrition,

Dealing with Predators, OFDA & Ranch Wool Testing, Lambing & Kidding Techniques & Facilities & Fencing Design Considerations.

Community Development & Business

National Extension Tourism (NET) Design Team

The USU Extension along with other Western States are working with the NET Design Team was originally created in 1994 as one of four national Extension focuses under the Communities in Economic Transition Initiative. The mission of the NET Design Team is to identify and pursue opportunities for enhancing Extension Tourism Programs nationally. As part of its mission, the Team also assists in the planning and coordination of the National Extension Tourism (NET) Conferences. The team worked on the development of a National Tourism Website and planned for the 2006 NET Conference that was held in Burlington, VT, September 10-13, 2006.

Youth Family and Consumer Sciences

Eat Healthy/Stay Healthy: NEAFCS Conference

A disease prevention workshop titled "Eat Healthy/Stay Healthy" was developed by USU Extension and presented at the National Association of Extension Family and Consumer Sciences Agents Conference in Denver, Colorado on October 5, 2006. "Eat Healthy/Stay Healthy" has been peer reviewed and is in the process of being shared with other western states for adaptation into their foods and nutrition curricula

Giving Your Body the Best

The Utah EFNEP *Giving Your Body the Best* curriculum is composed of 17 lessons which were showcased at the EFNEP Annual Meeting. PowerPoint slide shows of each lesson, presentation notes, handouts, traditional flip charts were displayed. The national response was positive from EFNEP coordinators who were interested in purchasing the curriculum for adoption in other states.

F. Brief Summaries Integrated Utah Agricultural Experiment

Extension Integrated Impacts

Onion Thrips in Utah Dry Bulb Onions

Alston, D. G.
Impact:
Onion thrips are the most common cause for insecticide use in dry bulb onion production in western North America. Utah onion producers typically apply 4-6 insecticide sprays per season to suppress thrips during the main bulb growth period in mid and late summer. Insecticide resistance is a major concern and limits the longevity of new insecticides. Furthering our knowledge of onion thrips ecology and population response to reduced-risk insecticides will contribute to more sustainable thrips management and annually save Utah onion producers up to $1 million in reduced insecticide costs, avoidance of insecticide resistance, and improved crop quality. Our data suggest that onion thrips eggs within leaf tissue are a main contributor to the thrips populations on plants. Once onion thrips establish in a field, egg survival even following insecticide applications may play a greater role in perpetuating the population than adult dispersal. Onion thrips population suppression strategies should consider prevention of egg-laying and egg hatch to enhance population management in onion fields.

Determining the Cause of Pesticide Misapplications by Private, Commercial, and Noncommercial Applicators of Utah

Beard, F. R.
Impact:
The impact of this research reduced the expense of over applying pesticides and decreased the negative impacts of pesticides misapplications to the environment, people, and other animals. The estimated cost of over application or unnecessary applications of pesticides for 91% of the people involved in this study averaged more than $80 per location and ranged from $18 to $5870. This translates into losses of $400,000 for the almost 5000 licensed applicators in Utah and when applied to licensed and unlicensed applicators will easily exceed $4,800,000 statewide. Changes implemented by this research have reduced pesticide misapplications, primarily through the identification and elimination of pesticide over applications. Almost 90 percent of the 991 licensed pesticide applicators who participated in this four year study reported at least a 10 percent reduction in pest application costs, representing almost $80,000 in savings. More than 25 percent of the applicators reported savings of more that $200 annually and this translates into more than $190,000 in savings over a four year period.

Selection and Optimization of Trailer Mounted Spray Equipment

Beard, F. R.
Impact:
Self-contained broadcast pesticide spray units with hand held spray guns are the commonly used equipment by landowners with 20 acres or less and by larger landowners making spot applications. The malfunction of pesticide spray equipment accounts for more that 22% of the claims paid nationally by insurance companies for pesticide misapplications. The use of quality spray equipment that is regularly maintained can reduce such insurance claims by as much as 60%. It is estimated that given the frequency with which self contained spray equipment is used, that an initial investment of $1500 for more expensive equipment, compared to that of $700 for less expensive equipment, can result in a savings of more that $1000 over the 7 to 10-year life expectancy for such equipment. This translates into more than $175,000 in savings annually for the more than 5000 licensed pesticide applicators in Utah.

High Value Specialty Crop Pest Management
Deer, H.M.
Impact:
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. These additional registrations help maintain a high quality and varied supply of food, feed, and fiber and help to manage cases of pest resistance.

Inventory and Management of Invasive Noxious Weeds
Dewey, S. A.
Impact:
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 has been incorporated into the strategy and field operations of all National Park Service Exotic Plant Management Teams and all Fish and Wildlife Service Invasive Species Strike Teams. Special emphasis is being paid by these agencies to the model's elements of early detection and rapid response (EDRR). Previously unreported infestations of one or more weed species were discovered in each of the areas inventoried by USU crews in 2006 allowing land managers to initiate appropriate eradication measures in a timely manner. Results of herbicide studies conducted under local conditions provided weed managers with valuable guidance for designing programs to control their specific invasive weed problems.

Vegetable Cropping Opportunities: Cover Crops and Production Strategies for Conventional and Organic Summer and Winter Vegetables in Utah
Drost, D.

Impact:
Vegetable growers need to increase the organic matter generated on-farm. Few growers in Utah use either summer or winter cover crops. Cover crops improve nutrient retention and soil cover in off-season periods, release these nutrients to planted vegetable crops and contribute to long-term maintenance of soil carbon and nitrogen. In addition, they can help suppress diseases and weeds and there by decrease the dependence on chemicals. Tunnels allow growers to produce crops well outside the normal production periods for the specific crop and in some cases allow year-round production. Utah growers need to select crops that benefit from high tunnel environments namely those with accelerated maturity, enhanced yields or improved quality, while offering the highest possible returns on investment. Increased use of these types of technologies could potentially increase the dollars earned per acre by more than 20%.

Water Use and Growth of Selected Vegetables with Emphasis on Onion
Drost, D.
Impact:
Onion growers throughout Utah want to increase the percentage of larger size grade (jumbo and colossal) onions harvested from their production fields. Growers realize that improvements in water management can increase the yield. However, without improvements in water delivery, furrow irrigated onions will remain the common irrigation system used. In 2006, growers reported a 30% decrease in productivity do to wet conditions in March delaying planting, dry weather in early May affecting early establishment, extreme heat in late July and wet conditions during harvest. Growers reported that onions were water stressed in July due to their inability to irrigate as frequently as they would have liked. While better water management could have minimized this stressful period, once growers get behind in their irrigation, you cannot catch-up and recover growth losses. This then ultimately decreases bulb size, lowers farm profits, and may contribute to increases in insect and disease pressure. Growers learn about these approached at yearly summer onion field days and through educational meetings. Most growers agree that they need to improvement water application efficiency and this then would increase bulb yield and size thus improving potential farm profitability by 15-20%.
Harrison – None

Turfgrass Management in the Intermountain West: Conservation of Water and Nutrients
Kopp, K. L.
Impact: As a result of these projects, turfgrass cultural practice recommendations continue to be refined in the interest of reduced nutrient and water use. As the lysimeter project progresses, there will be water quality measurements made and these may lead to improved water quality in urban landscapes.
Selection and Production of Nitrogen-Fixing Native and Non-Native Plants for Sustainable Intermountain West Landscapes

Kratsch, H. A.
Impact:
Our work will help Intermountain West nurseries and growers meet the rising consumer demand for low-water-use landscape plants by investigating their growth requirements. Our results suggest that plant yields can be increased by as much as 50% when soil conditions and management regimes are adjusted as seedlings grow and mature. Results will reduce the cost of production and time to sale for selected native and adapted plants, saving a producer thousands of dollars annually and enticing more growers to enter the native plant market.

Wholesaling and Retailing Non-Traditional Agriculture Products in Utah
Ward, R.
Impact:
With future on season extension and other value-added crops this enables producers to get higher revenues and hence profit from agriculture. With higher land values and urban encroachment, this can help keep agriculture land in ag uses longer.

The Management Style and Competence of Dairy Farmers as an Indicator of Profitability and Productivity

Young, A. J.
Impact:
Nutrition can impact dairy income by altering milk yield and composition or increasing feed costs. Feed costs are typically half of all expenses on a dairy. Development of better models to predict MUN will help the dairy farmer more correctly balance the ration so that protein is used more efficiently and less leaves the cow via urine and feces, thereby decreasing the potential to cause environmental problems.

Management Systems to Improve the Economic and Environmental Sustainability of Dairy Enterprises
Young, A. J.
Impact:
Death loss on dairies has been increasing linearly over the past 10 years and is estimated to be approaching 11% of animals in the herd. Reducing those losses by half could save Utah dairy producers almost $9 million. Determining when death losses are occurring and factors that contribute to those losses can result in significant economic returns to dairy producers.
Value-Added Opportunities and Potential for Increased Efficiencies for Utah Cattle Producers

ZoBell, D.
Impact:
The TRC mineral study provided information that will assist the parent mine owners in developing mineral products for the North American market. This will also provide employment for miners and others in the wholesale and retail trade. The impact to Utah could be millions of dollars as the product is mined. Beef producers will also benefit with a low cost alternative mineral with potential savings of hundreds of thousands of dollars in the US. In the studies on perennial forage kochia, there appears to be great potential for this species as it will compete with cheatgrass, provide a protein-rich feed resource, can thrive under adverse conditions and provide a green strip for wild fire buffers. There are no known toxins or toxic metabolites in forage kochia that have been reported. There are potentially thousands of acres that can be interseeded to forage kochia with an economic impact of hundreds of millions of dollars in increased revenue.

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Actual Expenditures of Federal Funding for Multistate Extension and Integrated Activities
(Attach Brief Summaries)
Fiscal Year:2006

Select One: ☐ **Interim** ☐**X Final**
Institution:Utah State University
State: Utah

		Integrated Activities (Hatch)		Multistate Extension Activities (Smith-Lever)		Integrated Activities (Smith-Lever)	
Established Target %			**%**	8%	**%**		**%**
This FY Allocation (from 1088)				$1,717,843			
This FY Target Amount				$137,427			
Title of Planned Program Activity							
Agronomy and Crops				$53,574			
Livestock				$11,134			
Youth and 4-H				$6,400			
Economic Development Planning				$53,469			
Business Retention and Expansion				$14,851			
	Total			$139,428			
	Carryover						

Certification: I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays represented here accurately reflect allowable expenditures of Federal funds only in satisfying AREERA requirements.

Noelle E. Cockett — **Director**
Mar 22, 2007 — **Date**

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Actual Expenditures of Federal Funding for Multistate Extension and Integrated Activities
(Attach Brief Summaries)
Fiscal Year:2006

Select One: ☐ **Interim** ☐**X Final**

Institution:Utah State University

State: Utah

	Integrated Activities (Hatch)		Multistate Extension Activities (Smith-Lever)		Integrated Activities (Smith-Lever)
Established Target %		**%**		**%**	10%
This FY Allocation (from 1088)					1,717,843
This FY Target Amount					171,784
Title of Planned Program Activity					
Alston					13,895
Beard					17,335
Deer					12,073
Dewey					18,941
Drost					18,404
Harrison					15,656
Kopp					14,746
Kratsch					15,892
Ward					13,379
Young					15,678
Zobell					18,783
Total					174,782
Carryover					

Certification: I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays represented here accurately reflect allowable expenditures of Federal funds only in satisfying AREERA requirements.

Noelle E. Cockett — **Director**

Mar 22, 2007 — **Date**

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Actual Expenditures of Federal (Hatch) Funding for the
Utah Agricultural Experiment Station
Fiscal Year:2006

Select One: ☐ **Interim** ☐**X Final**
Institution:Utah State University
State: **Utah**

Goal	Project	Hatch	Multi-State	Total Hatch	Non-Fed	Other Fed
Goal 1	35	131	0	131	53288	0
	37	0	0	0	68587	0
	38	14398	0	14398	10802	0
	39	45134	0	45134	34537	0
	42	0	0	0	8841	0
	46	0	0	0	0	0
	91	0	0	0	22249	0
	244	0	0	0	69477	0
	245	0	0	0	0	0
	253	0	0	0	75944	0
	254	0	0	0	85521	0
	255	0	0	0	12566	0
	257	0	0	0	0	0
	286	0	0	0	325719	0
	301	0	0	0	6405	0
	302	0	0	0	20341	0
	304	0	0	0	0	0
	373	0	0	0	163830	1212
	375	0	0	0	40677	0
	377	0	0	0	85462	0
	425	0	0	0	0	1160297
	455	0	0	0	0	0
	495	0	0	0	0	0
	496	20838	0	20838	178591	0
	497	0	0	0	46466	0
	498	0	0	0	8211	0
	499	0	0	0	0	0
	502	0	0	0	0	0
	545	0	0	0	73804	150664
	552	0	0	0	40910	55783
	568	0	0	0	0	0
	570	0	0	0	10343	0
	580	0	0	0	55510	0
	581	37933	0	37933	62117	0
	584	8602	0	8602	107133	0
	585	54152	0	54152	0	66798

	586	0	0	0	0	0
	788	0	0	0	74451	0
	791	0	0	0	0	0
	949	0	0	0	8659	0
	962	0	0	0	0	0
	963	0	0	0	0	0
Total Goal 1	**17625**	**181188**	**0**	**181188**	**1750441**	**1434754**
Goal	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
1R	85	0	13230	13230	27831	0
	123	0	103635	103635	6296	0
	329	0	25199	25199	32160	0
Total Goal 1R		**0**	**142064**	**142064**	**66287**	**0**
Total Goal 1,1R		**181188**	**142064**	**323252**	**1816728**	**1434754**

Goal	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
2a	41	0	0	0	8945	0
	537	0	0	0	99585	11483
	607	45274	0	45274	73550	0
Total Goal 2a		**45274**	**0**	**45274**	**182080**	**11483**
Goal	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
Goal 2b	27	0	0	0	24911	0
	415	0	0	0	325049	0
	466	0	0	0	367656	0
	484	0	0	0	0	12012
	487	0	0	0	1921	67043
	618	0	0	0	30842	0
	622	0	0	0	70293	0
	624	44061	0	44061	54159	0
	634	0	0	0	65062	0
Total Goal 2b		**44061**	**0**	**44061**	**939893**	**79055**
Goal	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
Goal 2bR	103	0	36548	36548	89890	0
	701	0	0	0	0	0
Total Goal 2bR		**0**	**36548**	**36548**	**89890**	**0**
Goal	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
Goal 2c	126	18575	0	18575	78435	0
Total Goal 2c		**18575**	**0**	**18575**	**78435**	**0**
Goal	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
Goal 2cR	476	0	68306	68306	174075	0
Total Goal 2cR		**0**	**68306**	**68306**	**174075**	**0**
Total Goal 2a,b,bR,cR		**107910**	**104854**	**212764**	**1464373**	**90538**

Goal	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**

Goal 3	28	0	0	0	23550	0
	164	2246	0	2246	6195	0
	170	0	0	0	13907	0
	222	0	0	0	82580	0
	234	49166	0	49166	229467	12625
	241	31120	0	31120	58111	66493
	242	0	0	0	59138	0
	250	19711	0	19711	61353	0
	256	0	0	0	18308	0
	261	0	0	0	0	0
	262	0	0	0	0	0
	328	93988	0	93988	177513	0
	337	0	0	0	71957	0
	358	0	0	0	43609	0
	366	25033	0	25033	117005	0
	371	20914	0	20914	99793	0
	457	0	0	0	144023	0
	461	0	0	0	167709	0
	479	84815	0	84815	293704	0
	492	0	0	0	362945	0
	493	0	0	0	324140	0
	527	76343	0	76343	88063	107878
	533	46893	0	46893	54781	0
	571	0	0	0	0	0
	578	35685	0	35685	41141	0
	630	34646	0	34646	316028	0
	735	66847	0	66847	138696	0
	786	0	0	0	59843	0
	790	0	0	0	73786	0
	849	0	0	0	40648	0
	929	0	0	0	46046	0
Total Goal 3		**587407**	**0**	**587407**	**3214039**	**186996**

Goal	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
Goal 3R	99	0	46865	46865	139983	0
	236	0	8354	8354	27252	0
	292	0	76305	76305	109320	0
	417	0	31747	31747	84811	0
	423	0	27673	27673	178730	0
	489	0	13072	13072	42063	0
	524	0	34460	34460	279691	0
	762	0	113	113	0	0
Total Goal 3R		**0**	**238589**	**238589**	**861850**	**0**
Total Goal 3,3R		**587407**	**238589**	**825996**	**4075889**	**186996**

Goal	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
Goal 4a	36	0	0	0	20425	16187
	40	0	0	0	169590	28397

	44	0	0	0	14087	3281
	331	30879	0	30879	128289	0
	797	0	0	0	60791	0
	946	0	0	0	0	0
	947	0	0	0	33023	0
Total Goal 4a		**30879**	**0**	**30879**	**426205**	**47865**

Goal	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
Goal 4aR	948	0	8735	8735	8699	0
Total Goal 4aR		**0**	**8735**	**8735**	**8699**	**0**

Goal	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
Goal 4b	10	0	0	0	29118	0
	43	0	0	0	17235	0
	173	0	0	0	560762	0
	278	0	0	0	89718	0
	291	0	0	0	242303	5625
	293	27146	0	27146	143119	4891
	294	0	0	0	0	2135
	296	0	0	0	51432	0
	298	0	0	0	0	425491
	299	0	0	0	0	509648
	322	0	0	0	0	0
	324	0	0	0	202293	0
	330	0	0	0	176060	0
	345	0	0	0	0	20816
	359	0	0	0	88458	0
	364	0	0	0	19953	917045
	370	0	0	0	0	799134
	374	0	0	0	323727	1425402
	431	0	0	0	136162	0
	442	0	0	0	117646	0
	548	0	0	0	58454	123488
	550	0	0	0	32424	0
	556	0	0	0	0	160102
	569	0	0	0	2637	0
	627	0	0	0	30436	0
	663	0	0	0	25634	37922
	664	0	0	0	0	0
	703	0	0	0	23510	27354
	705	0	0	0	0	756
	713	0	0	0	29606	34173
	716	0	0	0	0	0
	727	0	0	0	21009	24693
	729	0	0	0	23846	27580
	786	0	0	0	59843	0
	792	0	0	0	41699	0
	861	21172	0	21172	32074	0
	905	0	0	0	41355	0

	910	0	0	0	32336	0
	919	7611	0	7611	46417	0
	923	0	0	0	244172	0
	925	0	0	0	76617	535
	928	22492	0	22492	62850	0
	930	0	0	0	42393	0
	961	0	0	0	36066	0
Total Goal 4b		**78421**	**0**	**78421**	**3161364**	**4546790**

Goal	Project	Hatch	Multi-State	Total Hatch	Non-Fed	Other Fed
Goal 4bR	7	0	20671	20671	13968	23013
	20	0	8463	8463	6445	0
	52	0	59169	59169	47245	0
Total Goal 4bR		**0**	**88303**	**88303**	**67658**	**23013**
Total Goal 4a,aR,b,bR		**109300**	**97038**	**206338**	**3663926**	**4617668**

Goal	Project	Hatch	Multi-State	Total Hatch	Non-Fed	Other Fed
Goal 5a	209	0	0	0	78923	0
	228	0	0	0	0	0
	237	0	0	0	0	0
	240	0	0	0	0	70563
Total Goal 5a		**0**	**0**	**0**	**78923**	**70563**

Goal	Project	Hatch	Multi-State	Total Hatch	Non-Fed	Other Fed
Goal 5aR	390	0	65887	65887	46056	0
Total Goal 5aR		**0**	**65887**	**65887**	**46056**	**0**

Goal	Project	Hatch	Multi-State	Total Hatch	Non-Fed	Other Fed
Goal 5b	376	0	0	0	0	0
	378	0	0	0	0	466042
	379	0	0	0	0	0
	380	0	0	0	0	0
	381	0	0	0	0	0
	421	0	0	0	19053	0
	546	0	0	0	0	0
	549	0	0	0	0	0
	579	0	0	0	10124	6543
	837	0	0	0	24608	0
	840	0	0	0	32646	0
	841	0	0	0	40050	0
	850	0	0	0	0	0
	864	0	0	0	0	0
	975	0	0	0	9554	0
	976	0	0	0	4374	0
	979	0	0	0	19566	0
	980	0	0	0	0	0
	981	0	0	0	2344	0
	982	0	0	0	3375	0
	983	0	0	0	7977	0

Total Goal 5b		**0**	**0**	**0**	**173671**	**472585**
Goal	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
Goal 5bR	74	0	21729	21729	27000	18200
	835	0	25028	25028	30241	0
	839	0	0	0	59346	0
	843	0	0	0	35070	0
	844	0	0	0	44416	0
	985	0	12075	12075	7384	0
Total Goal 5bR		**0**	**58832**	**58832**	**203457**	**18200**
Total Goal 5a,b,bR		**0**	**124719**	**124719**	**521938**	**627235**
Grand Total		**985805**	**707264**	**1693069**	**11523023**	**6891304**

Certification: I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays represented here accurately reflect allowable expenditures of Federal funds only in satisfying AREERA requirements.

H. Paul Rasmussen — Mar 29, 2007

Director — **Date**