Utah FY 2005

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

UTAH STATE UNIVERSITY

Utah Agriculture Experiment Station

and

Utah State University Extension

March 2006

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: 2005

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: $524,717
State Match: $599,561
FTE: 15.13

UAES Total Expenditures and FTE:
Hatch:$195,345
State Match: $1,824,668
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 concerning 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 cross-breeding program. Calves from these cows are being marketed for slaughter under 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.
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: Wheat and barley producers followed yellow stripe rust prevention/spray recommendations given by Extension. Scouting was recommended and information about which chemicals are efficacious to yellow stripe rust was discussed with growers. County agents in Northern Utah and Southern Idaho were made aware of the disease situation/crop development as the season progressed in Spring/Summer 2005.
Impact: Over $500,000 was saved by grain growers following recommendations to control yellow stripe rust in affected and threatened adjacent fields in Spring/Summer 2005.
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: There are in excess of 300 full and part-time vegetable growers in Utah. These growers produce a variety of different crops, each with their own unique production challenges. Utah's growers face many production issues during the course of the year. These include difficulties with stand establishment, early season growth, pest, disease, and weed pressure, crop maturity, and marketing. Factors influencing growers include the weather, availability of water and nutrients, labor and competition. The UAES and CES regularly provides growers with up to date information specific to their farm and unique problems.
Impact: Through research and extension, growers have been helped to achieve early growth and higher tomato and melon yields. The UAES and CES helped a tomato grower in Bountiful achieve more uniform ripening by showing him how to use ethephon sprays on his crop. This increased his box yield by 100% and his profit by more than $10,000.

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

Key Theme: Agricultural Competitiveness

Description: 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 received detailed information on variety selection, plant nutrient needs, irrigation requirements, and harvest strategies from research information conducted by USU.
Impact: Growers are reporting strong consumer demand and good prices ($2/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.
Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT

Key Theme: Agricultural Competitiveness

Description: USU extension has hosted the Utah Winter Onion meetings since 1992. Extension presented UAES research findings to the growers and invited respected onion researchers and extension staff from neighboring states. Findings from UAES's 2005 onion studies were presented to the onion growers.
Impact: Using information from USU, growers regularly improve their production practices thereby, assisting the Utah industry. They learned farming practices that reduce pesticide sprays for thrips that will save growers 1-2 field applications each year. This has a potential savings of over $50/acre
Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT, Intermountain West

Program Title: Gardening and Ornamental Horticulture

Key Theme: Home Lawn and Gardening

Description: Gardens are an important source of fresh produce for Utah"s families. UAES and CES provide gardening information that is useful, relevant, timely, clear and accurate. Information on what to grow and when to grow it ensures that gardeners and gardens are successful and productive. Most gardeners are challenged by weather, soils, pests, and production techniques that do not allow the plant to reach its full potential. Vegetable gardeners around Utah need location specific information about how to successfully grow a wide range of vegetables. Detailed information on specific vegetables and issues of concern to each plant type were addressed by Extension.
Impact: Gardeners learned how to raise transplants, seed, water, and deal with production problems (temperature extremes, nutrient issues, weeds, insects, diseases).. Gardener's shared their local knowledge and participated in group learning.

Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT
Key Theme: Home Lawn and Gardening
Description: Sound water measurement practices taught by Extension enabled economic savings and returns. Turf irrigation water requirements, calculated by Extension, indicate that many urban communities could reduce irrigation use by more than 40% and still supply adequate water to landscapes.
Impact: Extension partnered with others to enable achievement of water conservation.
Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT
Key Theme: Home Lawn and Gardening
Description: Water resources in Utah are strained by the growing population and periodic drought conditions. As a result, landscaping with native plant species is becoming more common however the number of species that are available to consumers is limited. Master Gardeners from around the state were taught by Extension the value of using native plants in their landscapes. Extension is providing needed information on available seed sources. Research conducted through the UAES provides the necessary research background for Extension's recommendations.
Impact: This work resulted in data that can be used for selection of appropriate populations for seed increase to produce plants for landscape use. Master Gardeners gathered seeds and divided, pruned and shared their plants to encourage their neighbors to use water-wise native plantings.
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: Daily crop water use estimates, hourly weather data, and irrigation scheduling information were posted on the web at http://utahreach.org/agweather/ for 10 sites in six counties.
Impact: Users were able to better schedule irrigations and reduce irrigation water use by following the posted crop ET (water use) estimates.
Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT
Key Theme: Niche Market
Description: USU developed materials about food certification programs and direct marketing for producers considering adding value to their products through specific types of certifications and/or direct marketing. USU also participated in developing an electronic toolbox. These materials are part of a web site

designed to help producers considering value-added activities to conduct market feasibility studies for value added agricultural products and then to develop marketing plans. The materials will support the efforts of farmers to add value to their products.
Impact: The methods used make value added and direct marketing materials accessible and understandable.
Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: UT
Key Theme: Managing Change in Agriculture
Description: USU Extension participated in a regional project that developed educational materials based on research findings dealing with the issue of animal identification. The title of the project was "U. S. Livestock Identification Systems: Risk Management and Market Opportunities." The materials have been distributed in hard copy to over 3,000 persons. The materials are also available on the web and have been accessed over 50,000 times.
Impact: Through these materials agricultural producers and others have a better understanding of the impacts an animal identification program will have on the cattle industry in the United States.
Sources of Funds: Hatch, Smith-Lever, State
Scope of Impact: National, International

Program Title: Production Based Agriculture: Develop Programming to Support Small Farm and Ranch Management
Key Theme: Small Farm Viability
Description: USU Extension in Duchesne and Uintah Counties combined to put on a Small Acreage Workshop. Topics presented were varieties of grasses and legumes for pastures; fencing and facilities; water quality and manure management; nutrition for horse, beef, sheep and goats; weed control; wildlife habitat, forestry and fire protection; soil fertility and irrigation–all based on research obtained through various UAES research programs.
Impact: Producer gain vital information to help them manage their small acreage operation. 8 of the 14 surveys received indicated that they would implement at least one practice based on what was learned at the workshop.
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.
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

Other CES and UAES Programs/Projects

Program Title: Alternative Agriculture and Markets
Key Theme: Adding Value to New and Old Agricultural Products
Description: USU has started an annual diversified agricultural conference. Five areas of risk management are covered in addition to giving producers new ideas for more profitable enterprises.
Impact: Evaluations of the conference were very positive. All evaluations of the overall conference averaged above 4 on a 5 point scale. Participants gained knowledge on how to cope with various elements of risk in their operations as well as new ideas.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Livestock
Key Theme: Animal Health

Description: Trichomoniasis is a venereal disease of cattle, causing reduced pregnancy rate and has been a serious problem for beef cattle producers in Utah, especially because of Utah's combined herd grazing. Through USU Extension's education program progress has been made during the past 20 years and for the past several years mandatory testing of all bulls has been required, annually.
Impact: The level of infection with trichomoniasis in bulls has been reduced from 5% to 0.3%.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT
Key Theme: Emerging Infectious Diseases
Description: The Utah Veterinary Alert (UTVA) listserver is used to keep Utah veterinarians aware of current disease outbreaks in the state, nation or world – especially those which could have an impact on Utah.
Impact: Veterinarians received up to date information on West Nile Virus, Canine Influenza, Vesicular Stomatitis, Avian Influenza, Foot and Mouth Disease, and Pigeon Fever of horses.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Sustainable Agriculture
Key Theme: Home Lawn and Gardening
Description: In 2005, Extension posted seventeen horticultural fact sheets in the Garden series on USU Extension's website.
Impact: Agriculture agents and the public have easily retrievable up-to-date gardening information.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Key Theme: Agricultural Profitability
Description: USU serves as host for the Western SARE Program and has a strong reputation for fairness of administration. The Farmer Rancher Grant recipient surveys were completed in early 2005 by University of Arizona's Social Science Research unit.
Impacts: Farmer Rancher Grants were noted, by recipients, to be the single most effective means of extending SARE principles to limited-resource farmers and ranchers. An average positive net income enhancement of $2000/farm was reported (across 13 states and the Island Territories).
Sources of Funds: 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: Small acreages are replacing large farming operations in Utah at a rate higher than seen anywhere else in the country. Cache County Extension was host to the first annual Advanced Small Acreage Workshops. Extension personnel worked closely with plant breeders from ARS to organize a series of presentations and demonstrations designed to enhance the productivity of small acreages within the State. USU Extension produced web materials for the Water Quality extension page and for the Small Acreage page on the Extension web site. They have also produced several publications for small acreage owners.
Impact: On a scale from 1 (not at all) to 5 (very much) 83% if participants ranked the overall impact of the program as 5 and 17% ranked our efforts with a 4. Following are a few responses when asked to identify one practice that would be implemented at their home place as a result of the training: Grass Selection, Certified Seed, Timing of Fertilization, De-worming, Planting Trees, and Weed Control.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

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 Agroterrorism 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: Smith-Lever, State
Scope of Impact: UT

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: 2005

Overview

USU Extension specialists, county educators and UAES scientists address food safety issues on multiple levels. The county educators spearhead training of consumers in safe food preparation, preservation and storage through pressure canner lid testing, workshops, newsletters, newspaper articles, radio and TV shows. Web sites, phone-in messages and satellite training are increasing in use. Home Educators continue to be the primary source of information on home preservation methods in the state. USU Extension provides the only home food safety program 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.

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. USU also certifies employees from Utah food companies who can or jar acidified foods for retail sale.

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: $369,348
State Match: $422,031
FTE: 10.65

Utah Agricultural Experiment Station
Total expenditures and FTE:
Hatch: $209,543
State Match: $2,116,544
FTE: 13.2

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: The Utah Orchard Pest Advisory Service provides current and accurate information on over 15 insect, mite, and pathogen pests of tree fruit and small fruit crops (commercial and home garden). From March to October, pest advisories are published from 1-5 times per week. They are accessed by over 200 people per week.
Impact: Examples of economic impacts include $112,000 saved by Utah apple and cherry producers by eliminating one insecticide application due to accurate spray timing information. Home gardeners changed from using higher toxicity insecticides to reduced risk, “softer” insecticides for home insect control
Sources of Funds: 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 an 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: Foodborne Illness
Description: In 1998, the Utah legislature passed a bill creating the Utah Food Safety Manager Certification Act. This Act requires that food service establishments in Utah have a certified food safety manager. With offices in 28 of the 29 counties of the state equipped with satellite downlink facilities, Extension became the most logical choice for providing education to solve the problem using combined satellite teaching with hands-on Extension agent training. The Food Safety Manager Certification program has had over 1350

participants.
Impact: Pass rates for the FSMC have averaged 80% to 88% depending on the method of determining the course.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT
Key Theme: Food Safety
Description: Home food preservation continues to be an area of interest to Utahns and Cooperative Extension is the only reliable source of information. Extension has presented numerous food preservation classes. Over 1648 people have attended food preservation classes or phoned local Extension offices with questions. Pressure canner gauges have been tested, adjusted or replaced. Ninety-six percent of the counties in Utah must include altitude adjustments in order to process food safely. Without accurate gauges and altitude adjustments, food can be improperly processed and cause food poisoning.
Impact: Extension clients learned safe food preservation techniques. Past surveys indicate that 90% of participants used the training. USU Extension provides the only home food preservation safety programs in the state.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT
Key Theme: Food Safety
Description: Utah food businesses have sent samples of food products to the Extension Food Safety Program to be analyzed for compliance with state and federal food safety laws. Parameters such as pH and water activity are used to determine the safety of the food product.
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
Key Theme: Food Safety
Description: An FDA approved Better Process Control School was held by Extension in Logan, December 1-2, 2005.
Impact: Twelve students from Utah food companies were successfully certified to can or jar acidified foods for retail sale. This is a required certification enabling them to expand their food processing capabilities.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Utah Pesticide Impact Assessment Program
Key Theme: Food Security
Description: USU operates the Pesticide Applicator Training (PAT) program which trains pesticide applicators to become certified or recertified to apply

Restricted Use Pesticides and to comply with the Utah Pesticide Control Act and the Federal Insecticide, Fungicide, and Rodenticide Act. The application of Restricted Use Pesticides is limited to applicators who have been certified or recertified through a regulatory process to buy, use, or supervise the use of Restricted Use Pesticides. These pesticide applicators are called certified applicators and may be commercial (for hire), noncommercial (part of their job requirement), or private (used on their own or rented agricultural land with no direct compensation received). The Utah Department of Agriculture and Food does the actual certifying or recertifying through administering exams or verifying sufficient continuing education units were earned in a three year time period. Training courses are held on an annual basis in various counties around the state.

Impact: Hundreds of applicators wrote on evaluations that they would make positive changes in their use of pesticides. Thousands of applicators received training and continuing education credits that helped them to become certified or recertified as licensed applicators with the UDAF thus staying in regulatory compliance. These efforts improved environmental health and public safety. Environmental and human exposures to pesticides and their residues were reduced.

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.

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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, data that come 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: $207,737
State Match: $237,368
FTE: 5.99

Utah Agricultural Experiment Station
Total Expenditure and FTE:
Hatch: $907,210
State Match: $5,320,588
FTE: 19.6

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 turfgrasses worldwide. Transgenic turfgrasses, 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: A series of nutrition classes focused on cardiac health has been developed called "Healthy Beat." It was taught to Salt Lake County residents as a pilot test.
Impact: Paired t-tests of the participants pre- and post-program showed an improvement in knowledge and skill development.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Expanded Food and Nutrition Education Program (EFNEP)
Key Theme: Human Nutrition
Description: The EFNEP (USDA) Expanded Food and Nutrition Education Program was created in 1969 for the purpose of improving the diet and health of low-income people. Supplemental funding comes from the state of Utah and, since 1998, a grant from the USDA Food Stamp Program. These combined resources target low-income families to utilize their food dollars and food stamps wisely to purchase and prepare nourishing foods and to provide a safe food environment. With a 26% increase in recruitment EFNEP has served a total of 3,432 persons in Utah in 2005.
Impact: Ninety-three percent showed positive improvement in any food group with saving an average of nearly 20% of food dollars per capita per month. Intakes of fruit increased positively by 50%, calcium or dairy fiber grams per day increased by 33%, vegetables 32%, meat 29%, and alternatives by 7%. Nearly all graduates (97%) reported eating 3 or more meals or snacks per day. This enabled 67% to 95% of graduates to at least meet 70% RDA for iron, vitamin A, calcium, vitamin B6, vitamin C and protein.
EFNEP also motivated positive lifestyle changes among the graduates, for example: 62% improved in at least one food safety practice, 89% improved in at least one food resource management practice, and 91% improved in at least one nutrition practices.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: A Healthy, Well Nourished Population
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: $539,630
State Match: $616,601
FTE: 15.56

Utah Agricultural Experiment Station
Total Expenditures and FTE:
Hatch: $193,048
State Match: $3,644,740
FTE: 18.7

Integrated Programs

Program Title: Increasing Water Efficiency and Conservation
Key Theme: Drought Prevention and Mitigation

Description: The mission of the Center for Water Efficient Landscaping is to promote water conservation and quality through research in amenity landscaping irrigation and sustainability and through outreach education of the green industry and water purveyors. Water resources in Utah are strained by the growing population and continuing drought conditions. As a result, landscaping with native plant species is becoming more common, however the number of species that are available to consumers is limited. Provenance studies of selected native plant species that show promise for use in water-wise landscapes will provide needed information on the desirability of available seed sources. This work will be done in collaboration with the Utah Botanical Center and county agents in selected areas of the state, and will result in data that can be used for selection of appropriate populations for seed increase to produce plants for landscape use. Results will be published in refereed journals, trade magazines, and extension publications.
Impact: The development of Statewide center (Utah Botanical Center) to educate the public to the methodology of land stewardship in a high desert ecological environment is key to enriching our lives. Collaborative agencies including, state, federal, local community and individual benefactors have and will continue to provide the necessary resources to ensure UBC success.
Source of Funds: Hatch, Smith-Lever, State, Other
Scope of Impact: Utah, Intermountain West

Program Title: Fisheries and Wildlife
Key Theme: Wildlife Management
Description: Sage-grouse in the state currently occupy less than 50 percent of their previous habitat and are one-half as abundant as they were prior to the 1850s. These population declines have prompted several environmental organizations to petition to list the sage-grouse as endangered. The UAES and CES are working with local groups to assist state and local governments and private landowners in conserving these species while also achieving local, social, and economic objectives.
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.
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
Key Theme: Natural Resources Management
Description: The wildfire model for managing invasive wild land weeds developed at USU continues to guide both local and national strategies, including the National Invasive Species Management Plan developed by the National Invasive Species Council for federal agencies within the Departments of Interior, Agriculture, Defense, and Transportation. USU's fire model for weed management has been influential in the development of the National Park Service's Exotic Plant Management Team program.
Impact: Weed identification and weed control skills of over 1200 BLM and other public land managers were improved through training received from USU Extension Weed Specialist. The Woodsy Owl Program introduced a nation-wide activity kit about invasive weeds for use by elementary school teachers. Due to continued efforts, in 2005 the USDA Forest Service announced a Smokey Bear Poster contest for elementary school children on the subject of "Prevent the Spread of Invasive Species on Our Nation's Forests".
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 Utahs 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
Key Theme: Natural Resource Management
Description: Each year ranchers spend about $5 billion to control invasive non-indigenous weeds in pastures and rangelands.
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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
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: USU Extension drafted the initial agreement setting up a Utah Prairie Dog mitigation bank. The agreement helps enhance and restore habitat for the threatened species. It provides for development and construction in communities affected by its associated restrictions. Three bank sites have been established on 800 acres of land located within the Utah School and Institutional Trust Lands Administration"s Parker Mountain Block in South Central Utah. The sites were put into perpetual conservation easements. An endowment fund has also been established for maintenance of the bank sites. Prairie dog credits are earned by SITLA for the property put into conservation easements. The agency can use the credits as mitigation for its own projects or sell them to others.
Impact: Initially, 77 credits were available based on the Division of Wildlife Resource's dog counts at the sites. Because of high demand, all of these credits have been sold to Iron County, which will subsequently sell them to private developers as it best determines. The credits were each sold to the county for $1,636, plus $200 per credit for the perpetual endowment fund. The values were established based upon a third-party appraisal of the bank-site properties.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Water Quality
Key Theme Water Quality
Description: USU offered 19 workshops to teachers around the state (8 counties), reaching a total of 268 teachers. We trained 93 teachers in Project WET activities (for grades K-5) and 175 teachers in Stream Side Science and related curricula for teachers of grades 6-12. Each participant takes home a manual and a starter set of equipment. We have also placed equipment and materials for checkout in each county extension office in the state.
Impact: Two hundred sixty-eight teachers gained a solid background in watershed and water quality science, and experienced different hands-on activities. At a minimum 8000 students receive these lessons in a single calendar year. USU's evaluations indicate this will result in increased student knowledge.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT
Key Theme: Water Quality
Description: USU Extension's Water Quality program delivered hands-on water quality activities (1 hour or more) to 6,800 youth in 2005 at 4H camps, other camps, school classrooms, water festivals, competitions, and more. Extension provided a range of activities from stream monitoring to activities with aquatic

invertebrates and fish to activities about pollution. The program was delivered in 18 counties in Utah and southern Idaho.
Impact: Youth learned about water quality and environmental issues at a local level.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT, ID

Program Title: Irrigation Management
Key Theme: Drought Prevention and Mitigation
Description: Irrigation technical assistance was provided by USU Extension via email and phone to individuals involved in irrigation companies; individual farmers; consulting engineers; fellow extension specialists and county agents on topics including water measurement, irrigation methods (sprinkle, surface/surge, and drip), improvement of irrigation systems, pipeline hydraulics, irrigation water management, crop water use, irrigation scheduling, and water conservation.
Impact: The estimated value of the assistance to Bear River City was over $6,500 and the City was able to adopt an ordinance for culvert selection that was consistent and technically sound. Improvement in accuracy of water measurement in the Melville Irrigation Company is valued at over $50,000 annually.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Environment and Climate Change: Enhance Extension's Ability to Deliver Environmental Quality Programs for Agriculture
Key Theme: Drought Prevention and Mitigation
Description: USU Extension conducted a series of hands on training where participants designed their own landscape. Program participants completed a minimum of eight hours of classroom instruction and training. They designed their personal landscape plan with the objectives of reducing water use and providing a sustainable landscape with reduced inputs for pesticides, maintenance costs and other needs. Six classes were held and 300 people lowered their landscape water use as a result of the training. In addition to the water savings, the savings on plant materials and on maintenance costs and labor are also very significant.
Impact: Six classes taught at Jordan Valley Water Conservation Gardens. More than 300 individuals trained on how to better select water wise plants for their gardens. Managing water use is the best way to handle water shortages and planning and instituting a landscape plan is critical to help homeowners have a

successful water wise landscapes.
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: USU Extension held a home rainwater harvesting workshop. Eleven attendees learned about options for collecting, storing, and using rainwater at home. There was a demonstration of how to make your own rain barrel for $15.
Impact: Ninety-one percent of the survey respondents indicated they plan to make changes in their home as a result of the workshop. Eighty-eight percent indicated they found the workshop somewhat or extremely useful. Eighty-eight percent indicated that their knowledge of the topic increased as a result of the workshop and 88% indicated they would recommend a UH workshop to a friend.
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: USU Extension is an active participant in a six state regional water quality program. This past year we have completed a summary document on impacts to private lands from Coal Bed Methane development, have produced several educational documents, have begun a study of arsenic contamination in private wells, and have completed a survey of water quality knowledge and needs by citizens in each of the states in the region (UT, MT, WY, CO, ND, SD). CES has been asked to help organize a water forum sponsored by NASALGC that will be held in August, 2006 in Salt Lake City.
Impact: Regional efforts provide greater depth and efficiency of effort in providing water quality programs and developing new materials for our citizens. In the past year, this project has provided new and important materials on coal bed methane, manure management, arsenic in drinking waters, and innovative educational programs.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT, MT, WY, CO, ND, SD
Key Theme: Water Quality
Description: There were 8,834 visitors to the Utah House Program in 2005. An

on-line visitor survey found that 100% of respondents found their visit or workshop to be helpful. Thirty-seven percent ranked their guide/presenter "good," and 57% ranked their guide/presenter "excellent."
Impacts: Results from the on-line visitor survey indicated an increase in visitor knowledge about specific topics: Sustainability (93%), Energy Efficiency (98%), Water Conservation (98%), Healthy Indoor Environments (87%), Universal Design (93%). Forty eight percent of respondents made changes in their home as result of a UH program:
Sources 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 suffer 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, 4-H, 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: $465,414
State Match: $531,799
FTE: 13.42

Utah Agricultural Experiment Station
Total Expenditures and FTE:
Hatch: $155,895
State Match: 1,093,618
FTE: 5.8

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

CES and UAES Programs/Projects

Program Title: Family Financial Management
Key Theme: Family Resource Management
Description: Extension is a founding partner in the Utah Saves program, which in the coming years is expected to reach all Utahns Utah Saves is a state-wide social marketing campaign that encourages all Utahns, especially those of low to moderate means, to save, build wealth, and reduce debt
Impact: Most counties will become local government endorsed Saves Sites through the work of county Extension agents. The reach will be to all county employees statewide with the message to save and use money wisely
Sources of Funds: Smith-Lever, State
Scope of Impact: UT
Key Theme: Family Resource Management
Description: EITC education and VITA sites reach low to moderate income Utahns. Research states that $80 to $90 million each year is not collected by Utahns qualifying for the Earned Income Tax Credit. Extension helps create VITA sites for free tax preparation.
Impact: Getting the message to all Uthans about the Earned Income Tax Credit (EITC) and Volunteer Income Tax Assistance (VITA) has the potential to put $80 to $90 million toward Utahns with low to moderate incomes each year. The EITC has been one of the best government programs to help with asset building.

Sources of Funds: Smith-Lever, State
Scope of Impact: UT
Key Theme: Family Resource Management
Description: USU Extension is participating in a state-wide financial educational and informational Internet site to bring all financial efforts into one accessible place. This site includes PowerPay, PowerSave, and other financial calculators to determine income-to-debt ratios, a youth curriculum for 4-H, Boy Scouts, and faith-based groups, an education center, homebuyer education, and eventually an online bankruptcy education curriculum.
Impact: The financial Web site is expected to get many hits as preparations are made for a launch and press release. PowerPay is currently very popular with the Extension System across the nation and the armed services. Extension's homebuyer education is the only one of its kind in the nation and we expect to put the debtor education program online as well.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT
Key Theme: Family Resource Management
Description: USU Extension offers programs to civic groups, government entities, religious organizations, and to families desiring to improve their financial knowledge and security. The "Take Charge of Your Money" program will be offered as well as a program to special
interest groups as requested. Information concerning managing your finances was given in newsletters, etc.
Impact: In one county participants reported the following impacts: Before the program 52.4% were confident managing money; after 95.3%. Before: 81% felt anxious about finances; after 42.9%. Before: 45% made financial decisions easily; after 71.4%. Before: 52.4% were confident setting financial priorities; after 85.7%. Before: 35% stored financial records; after 60%; 76% of participants set financial
goals during the program; 52% developed net worth statements; 60% developed a spending plan; 55% started an emergency fund; 76.2% identified leaks in spending.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Business Retention and Expansion
Key Theme: Jobs/Employment
Description: Extension business and economic development programs help Utah communities, businesses and individuals to make choices and decisions

regarding growth, employment and development alternatives. Extension specialists help communities and businesses evaluate the advantages and disadvantages of development strategies such as corporate recruitment, tourism, business retention and expansion, entrepreneurship and new business startups through assistance with strategic planning, market research, feasibility studies and training in business and economic development strategies. Specific program areas include business retention and expansion, rural tourism and strategic economic development planning. This year particular emphasis has been given to the annual USU Diversity in Agriculture Conference, to the Governor's Rural Partnership Board, and to the Utah Mainstreet program for rural Utah.
Impact: Twelve local community and economic development strategies including business retention and expansion, rural business incubator and innovation centers, rural tourism, targeted industry and strategic planning for economic development were developed and implemented resulting in local businesses retained and expanded, strategic plans developed and implemented and 468 local participants who acquired and practiced economic development tools and skills
Source of Funds: Smith-Lever, State
Scope of Impacts: Utah, Intermountain West

Program Title: Home Based Business Development
Key Theme: Home-based Business Education
Description: Business owners in rural communities do not have easy access to resources to help them develop or improve an Internet site, so a small core of Extension agents were trained to assist them.
Impact: Several small/micro business owners are expanding their market reach through the use of e-commerce.
Sources of Funds: Smith-Lever, State

Scope of Impact: UT

Program Title: Community Organization and Leadership Development
Key Theme: Youth Development/4-H
Description: Technical assistance and support have been given to the 100+ Youth Councils sponsored by cities and towns throughout Utah. Statewide Leadership Institutes are planned and carried out to bring Youth Council members from all parts of Utah together to learn leadership skills and interact with youth from other communities.
Impact: Ninety-four percent of the 2546 Youth City Council members who attended Leadership Institutes rated the Leadership Institutes as "excellent" or "good" and ninety-one percent indicated they planned to adopt practices taught at the Institutes.
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: Extension provides rural communities with design services for parks, trails, open space and other recreation related facilities. Inputs required include base information, community needs, wants and concerns, committee representation, and progress reviews.
Impact: Communities throughout Utah are in various stages of implementing plans developed with the assistance of USU Extension. Fairgrounds, parks, nature centers, community entrances, parking and turnaround spots, picnic areas, public works facilities, and county sheriff's offices have benefited from USU's design services. These projects conserve water through water conserving landscapes and protect the environment by using sound design principles.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Economic Development
Key Theme: Jobs/Employment
Description: Twelve local community and economic development strategies including business retention and expansion, rural business incubator and innovation centers, rural tourism, targeted industry and strategic planning for economic development were developed and implemented by Extension.
Impact: Local businesses were retained and expanded, strategic plans developed and implemented and 468 local participants acquired and practiced economic development tools and skills.
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: 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. During the past year, youth participated approximately 322, 758 times in 4-H activities.
Impact: Surveys of 4-H participants in one 4-H camp indicated that the majority of participants felt confident in performing 10 basic skills taught at the camp. All of the participants learned to follow instructions and 82% indicated they learned to use money wisely, to accept responsibility for doing a job, to judge the quality of their work, and to make decisions. 81% learned how to help others and 76% learned to solve problems and set goals. These impacts are indicative of other 4-H camps.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Manufacturing Extension Service
Key Theme: Promoting Business Programs
Description: The Manufacturing Extension Partnership (MEP) is a non-profit organization chartered with raising the level of competitiveness, performance, and profitability of Utah's manufacturers. Small and mid-sized manufacturers account for more than half of U.S. production. The MEP leverages state and federal support, along with a network of Utah-based public and private resources to assist in providing services to manufacturers.
Impact: The MEP Is ranked as one of the top 5 MEP Centers nationally for Economic Impact on Manufacturers. The following are impacts for 2005:
Number of Companies reporting Impacts = 78
Total Investment Impact = $9,769,610
Total Bottom-line Impact = $34,103,584
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
Key Theme: Jobs/Employment
Description: The Governor's Office of Economic Development continued the Utah Smart Site Program at a reduced level during the current fiscal year. The program has operated on one-time funding provided by the Legislature in 2001, but these monies are now exhausted.
Impact: Sixteen rural firms engaged in computer programming, architectural design, translation services, medical coding and billing, telephone surveys, and data entry creating 269 new rural jobs.
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 5th-8th grade students both “how” and “why” they need to handle food safely at home to protect themselves, their families, and their friends from foodborne 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 microflora 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 have 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 2005

Eleven counties in 2005 were engaged in formal Civil Rights training and review. In each of the half day sessions the full staff including assistant, 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 2005 from the Utah State University Extension Civil Rights Performance Plan included:

100% made "*all reasonable effort*" to advise program recipients of program availability and have provided documentation of those efforts in civil rights files.

100% include the appropriate civil rights/affirmative action statement on marketing and communication publications in 2005.

96% document the efforts made to increase the membership of underserved racial/ethnic minority group members in structured 4-H youth and family/community clubs and special interest and or study groups during the year.

96% maintain a record of the most current US Census data on county ethnicity.

93% 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.

93% indicated collaborative efforts in planning and program efforts with state, federal and local agencies through assessing the needs of underserved audiences and diverse populations.
87% 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.

86% reported efforts made to contact school districts and the elderly as potential partners for programs serving the underserved and diverse audiences.

86% reported efforts to accommodate those with disabilities.
82% reported that efforts and documentation of participation by underrepresented groups serving on program planning and advisory boards within the county have taken place during the past year.

Indicators of Success

Extension programs are being delivered to an equivalent of 25% of Utahans. Goals are in place and efforts dedicated to reach 25% of all diverse populations within the state over the next four years. The data table indicates contacts made in face to face meetings and in other non-face to face applications in 2005...

Face to Face Contact Reporting 2005

Ethnic Group	% Utah Total	UT Ethnic Population	% And Number Population Reached in USU Cooperative Extension Program - 2004 (Revised Census Figures July 1, 2002)		
			% Served	No. Served	Gender
White	90.2%	2,199,291	25%	549,060	Males
Black	0.8%	29,814	15.5%	4,639	309,060 (50.4%)
Hispanic	9.7%	224,302	19.6%	43,878	Females
Am Indian	0.8%	43,027	18.5%	7,950	303,813 (49.6%)
Asian	1.8%	55,150	13.3%	7,348	

Other forms of Extension Contact

Electronic, Newsletter and Correspondence Contact Summary 2005						
Contact	**Ag NR**	**ComDev**	**FamSci**	**4-H**	**CEd**	**Totals**
Email	55,281	3,998	27,702	28,377	103	115,461
Phone	56,851	4,326	19,077	31,952	227	112,433
Newsletters	618,435	2,823	74,168	104,117	3,900	803,443
Nonelectronic/Prog Announcements etc	786,529	4,539	23,778	558,196	1,756	1,374,798

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.

Piute Tribe

Nutrition classes have been presented to the Koosharem Band of the Piute Indian Tribe. The groups were oriented toward the tribal youth. The program was adapted for the interest of the group. Three adults have graduated from the Family Nutrition Program from this group. A 4-H club has been formed among the Koosharem Band youth. This arts and crafts club is being taught by the 4-H After-school program. This club is one of the first Piute 4-H programs in the community.

Finance Workshop for the Latino Community

-A local Spanish-speaking church invited Extension to present a workshop about getting ones finances organized. Eight members of the Latino community were taught how to organize personal financial paperwork, set financial goals, and set up a budget. The group was very excited to learn new ideas to assist with personal finances. Comments from evaluations of the Latino Finance workshops conducted in Cache County in April and May, 2005: “Thank you for teaching us something new that will help us in the future. Thanks a lot.” “ I liked learning how to carry a balance in my check book and how to live without debts. Thank you for your time.” As a result of the program a numbers of publications have been translated into Spanish to assist this audience with finance.

Native American Family Night Education

The need to give information and programs to the Native American population is being addressed with health education and 4-H programs. The Shivwits reservation has invited Extension to bring weekly programs into their community. These programs will give health, nutrition and diabetes education along with stimulate families to enjoy 4-H activities. These weekly sessions will encourage families and neighborhoods to develop their own 4-H programs for the youth and provide them with ideas to explore.

Greenhouse Plan for Cache County Jail

The new Cache County jail located on about 10 acres west of Logan would like to implement an education program in horticulture focusing on greenhouse management and garden production. About 5 acres of land will house a greenhouse and garden site. Instruction for inmates in horticulture science and management will be provided by USU Extension and trained Master Gardeners as well as electronic courses through USU’s Continuing Education. A $20,000 grant submitted was awarded to go towards a greenhouse facility and equipment. The county sheriff’s

department will match the grant amount so a total of $45,000 will be available for the structure and equipment

Hispanic Farm Safety

A Hispanic Farm Safety program was conducted in cooperation with the Utah Farm Bureau Farm Safety Program. Equipment including a dump truck, loader tractor, PTO driven equipment was available to provide "hands on" demonstrations. The school was held at the USU Caine Dairy Center and a luncheon meal was provided to participants. Certificates of Participation to all students provided documentation to employers showing they have made efforts to provide safety training to their employees. Follow-up assessments will be done to determine the long term impact of the safety practices of those who attended.

B. STAKEHOLDER INPUT PROCESS - 2005

The Utah Accountability In Action Program was completed in 2004 for CES and UAES with 28 Utah counties participating in the stakeholder input process. Elements of the program included a customer needs survey; stakeholder reporting and listening session; under-served/civil rights training session; overall operations review session; and a concluding session on revising plans of work and writing better outcome and impact statements using the logic model as a guidance to improved program reporting. Each of the 28 participating counties conducted a random sample survey of customers to determine customer satisfaction and their future needs based on relevant program issues. Customer satisfaction benchmarks from previous time periods were compared and analyzed. Respondents were asked to rate how important these identified issues were to them and their families in the next five years. Highest priority issues in rank order as identified by stakeholders include: [data from 1418 randomly selected Utah Extension customers 2001-2004]

1. 86% safe foods, healthy diets, sound health practices.
2. 84% strong families, sound parenting.
3. 84% water resources and water resource management.
4. 81% adult's ability and willingness to nurture and guide youth.
5. 80% youth ability to reason, make responsible choices, seek and apply knowledge in new situations.
6. 79% youth character building and life skills; preparation for family; student, work, and civic roles/responsibilities.
7. 78% informed consumers, family financial management.
8. 78% affordability of higher education programs.
9. 75% working with other citizens to address mutual concerns.
10. 71% securing and maintaining an adequate job and income; workforce preparation.

11. 69% retaining and expanding business in my community.
12. 68% participating in public-private activities in which cooperation is high.
13. 66% population pressure on agricultural lands, natural resources and communities; land use planning/management.
14. 66% quality of high tech (web-based, satellite) delivery of courses, degree programs, and training updates.
15. 62% safe/affordable options for child and elder care.

Based on stakeholder input, Extension and UAES staff reviewed and revised individual plans of work in the USU Extension reporting systems called FOCIS (Friendly On line Compact Information System) and MyAg, both of which are designed to capture program outcomes. Stakeholder ideas were integrated into these plans of work with defined strategies for achieving outcomes in the future.

In addition to the Accountability in Action Program, Utah has developed an integrated process for securing regular stakeholder input into perceived needs, program implementation and assessment. Extension Advisory Councils function in nearly all of the 28 counties of Utah. Many counties have specialty councils involving commodities, issues, and other special interest groups. Now in its fourth year of operation, the statewide Extension Executive Council also meets quarterly to provide input into Utah programs and activities. The UAES also has a state-wide council. A concerted effort is made by CES and UAES administration to consider the views from these councils in designing, developing and orchestrating programs for the citizens of Utah. These councils provide representative views of the constituent groups they represent.

Stakeholder input into the programs of Utah Extension and the Utah Agricultural Experiment Station has been broad and varied. The elements of the Accountability in Action Program, Compact Planning, environmental scanning efforts, and advisory councils have all contributed to an open and fair process for stakeholder input in Utah. A new stakeholder process has been developed for succeeding years which will engage the public in refining the programs being offered by CES and the UAES in the future.

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 become 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 2005

Brief Outcome Summaries of Multistate Extension Activities

Agronomy/Crops

Alaska & Native Alaskan SARE Administration Council Meetings

Rasmussen planned, coordinated, and convened a meeting of the Western SARE Board of Directors and visiting dignitaries form Washington, DC in Anchorage, Palmer, Gridwood, and Whittier, Alaska. 39 administrators participated, including the Dean (Agriculture) and Directors (Extension & Agriculture Experiment Station) from University of Alaska--Fairbanks. Ten farms and/or Experiment plots were directly impacted.

Medusahead

Chad Reid was an invited speaker at the Arizona/Utah Rangeland Vegetation Management Update meeting in St. George. Chad was invited by the conference planners to give a talk on Medusahead, Strategies and Facts. The talk was presented to 52 people in attendance and included the ecology, history and control of Medusahead. Participants from Utah and Arizona were educated the threat and control of this weed. This talk was very well received; one organizer of the conference asked for a copy of the talk and presented it at Arizona's state-wide weed conference.

Livestock

2004-2005 UBIA Bull Test

More than 300 cattle producers from Utah, Colorado, Idaho, Nevada and Arizona participated in the 2005 UBIA Bull Test Sale, culminating the 6-month bull test effort. 251 bulls out of 255 entered completed the test, of which 137 were selected to be offered at the sale. Following breeding soundness evaluation, 118 were offered for sale and 109 sold for an average of $2,323. This was a 55% net return over the $1,500 break-even floor price established by the bull owners. This was a 95% increase over prices at the 2003 sale. Much of this increase is due to Extension involvement in two aspects of the sale: development of a marketing plan and producer education concerning Trichamonas foetus, a STD which causes abortion. Using a UDAF/USDA marketing grant which I secured for the UBIA, I worked with Dr. Godfrey to develop and help implement a marketing plan.

Kane, Washington and Arizona Strip Economic Study

Commissioners from Kane, Washington and Coconino Counties are interested in the economic impact that livestock grazing has to Northern Arizona and Southern Utah. Kevin Heaton attended a meeting with local elected officials, economic development specialists, ranchers and University of Arizona Extension personnel. The meeting's focus was to initiate an economic survey of the agriculture impacts from the Arizona Strip, Kane and Garfield Counties. He accepted the responsibility of helping with fund raising and coordinating the town meetings. To-date, they have raised over $1,000.00 for this survey. The Arizona Strip BLM is currently writing their Resource Management Plan. The draft RMP has little information on the economics of livestock grazing and suggests minimal impacts to the local economy if eliminated. Dr Bob Fletcher, a retired University of Wyoming Economic Specialist, completed the study.

Community Development & Business

Western Region County Agents Professional Improvement Conference

Approximately 50 Extension educators from throughout the West attended the WRCA Professional Improvement Conference held in St. George. Over 30 agents presented papers at the meeting. Kim Chapman reviewed four abstracts in preparation for the conference. She also moderated the afternoon session of presentations for animal science and natural resource presenters.

Western Extension Leadership Development Program

Steven Burr continues to serve as the Co-Chair of Western Extension Leadership Development (WELD) Program Planning Committee, comprised of 14 Extension professionals in 13 states in the Western Region. He helped facilitate the WELD III Seminar I, held in Phoenix, Arizona, from April 11-15, 2005, for 29 Extension

professionals (WELD interns) from 12 states. After Seminar I, he assisted Linda Manton, Regional Director of the University of California Cooperative Extension - Central Valley and Chair of the WELD Planning Committee, in the writing of a report on the WELD III Seminar that was submitted to the Western Extension Directors (WED) through Paul Gutierrez, Cooperative Extension Director for New Mexico and WED Liaison to WELD. Planning continues for the WELD III Seminar II that will be held in Portland, Oregon, June 5-9, 2006.

NACDEP Conference & Planning Committee

Jody Gale attended the inaugural Conference of the National Association of Community Development Extension Professionals (NACDEP) in Las Vegas, Nevada. He participated in group discussions at Galaxy Conference in Salt Lake that lead to the formation of NACDEP and this first annual conference. There were 391 participants. Jody represented Utah and participated in 2006 NACDEP Annual Conference Planning Committee meetings.

2005 National 4-H Congress

Six youth and Donna Murphy (Salt Lake Co) attended this annual event held in Atlanta, Georgia over the Thanksgiving weekend. Reports said the youth that attended were excellent representatives of Utah 4-H. The youth that attended include: Adriane Smith (SL), Marcie Jones (SL), Kane Krusi (Cache), Brittany Black (Sanpete), Jeff Rodeback (Utah), and Mandy Niederhauser (Davis).

Family and Consumer Science/Miscellaneous

Human Dimensions of NR in the West Conference

IORT sponsored the Human Dimensions of Natural Resources in the Western United States Conference, held October 27-29, 2005, at the Prospector Square Conference Center, Park City, Utah. Steven Burr served as Conference Co-Chair with Dr. Mark Brunson, and Michael Butkus served as Conference Coordinator. This conference takes place every two years and is sponsored by the Western Association of Recreation Researchers and Professionals (WARRP) comprised of faculty, researchers, and students from Arizona State University, Colorado State University, University of Idaho, University of Montana, and Utah State University.

Wildlife Damage Management

Terry Messmer continued to work with county faculty and clientele to address wildlife damage management issues. They distributed 300 copies of the research report on using temporary signs to reduce deer-vehicle collisions. These were sent throughout the western US to all state wildlife agencies and departments of transportation. They continued to maintain and update the web site www.wildlifecrossing.info. This is a

toolkit of ideas and options to reduce wildlife-vehicle collisions. They conducted in-service training for county faculty on managing rodent damage to crops and residences. They were interviewed several times by *Reader's Digest* for an article on deer vehicle collisions. This article was published in the June 2005 *Readers Digest* magazine.

Community and Families

Cultural Competency: Responding to Victim's Needs

Workshop was presented at the 5th Annual END Domestic Violence and Sexual Assault Conference. The purpose was to explain that service providers need to be aware of cultures, customs, and traditions in order to provide competent, sensitive services to victims of violence. When victims feel that service providers understand them, they are more likely to seek help as a preventive method, rather than intervention after abuse occurs. Participants included law enforcement, mental health, social services, and other providers who serve victims of violence in the Four Corners Region. In addition to local participants, others represented Ute Mountain Ute Tribal police, Navajo Nation police, and social services from Kayenta, AZ and Shiprock, NM. A satisfaction survey was distributed and returned by nearly 50% of participants. Ratings asked how well the presentation identified the problem, provided useful information, and held their interest.

National & Utah "ON-TARGET" Fellows and Training

In collaboration with the National Association of County Agriculture Agents (NACAA), USDA, and NASA, the 5th Annual ON-TARGET training week was held in Salt Lake City. County agents & specialists from Georgia, Ohio, Pennsylvania, Illinois, Louisiana, Texas, Idaho, Arizona, Virginia, and New Mexico (Navajo Nation) participated. Eight Extension agents, specialists, and administrators from UTAH participated.

F. Brief Summaries Integrated Utah Agricultural Experiment Station

Inventory and Management of Invasive Noxious Weeds

Investigators: Dewey, S. A.
Performing Department: Plants, Soils & Biometeorology -- 1624
Start Date: 07/01/2002 Termination Date: 06/30/2007
Reporting period: 01/01/2005 to 12/31/2005
Progress Report: The wildfire model developed by USU to improve and standardize wildland invasive weed management strategy was presented to public land

management personnel at regional and national meetings. Early detection and rapid response to new infestations of exotic weeds is a key element of the model. Utah's many State and National Parks are high-probability points of exotic weed introduction by visitors from around the world. Infestations of invasive weeds could spread from Parks to private agricultural lands throughout the region if not detected and eliminated quickly. Searching and mapping methods were refined and field tested as USU crews surveyed for invasive weeds on more than 40,000 acres of wildlands in portions of Dinosaur, Zion, Arches, Canyonlands, Black Canyon, Cedar Breaks, Bryce, and Capitol Reef National Parks during 2005. Members of NPS EPMT crews were also trained in USU's mapping methods. Weed mapping quality assurance protocols were developed, including the use of plastic replicas of flowering leafy spurge, spotted knapweed, and yellow starthistle plants to test field detection efficiency. Herbicide performance field studies were conducted on squarrose knapweed, leafy spurge, Canada thistle, Russian knapweed, Dalmatian toadflax, downy brome, medusahead on pasture and rangeland sites in Utah; and effective treatments were identified for each species. Herbicide active ingredients included in the tests were picloram, imazapic, dicamba, clopyralid, triclopyr, sulfometuron, chlorsulfuron, metsulfuron, and glyphosate.
Impact: The USU wildfire/weed management model has been incorporated into the core of weed management plans of the Forest Service, Bureau of Land Management, and the National Park Service, thus influencing land management policy and practices on a national scale. The model has been adopted by all sixteen National Park Service Exotic Plant Management Teams, and was practiced during their 2005 national field training exercise held at Arches National Park. Previously unreported infestations of one or more weed species were discovered in each of the National Parks surveyed by USU crews in 2005, allowing land managers to initiate appropriate eradication measures in a timely manner. Results of herbicide studies conducted under local conditions will provide weed managers with valuable guidance when designing control programs for specific invasive species problems.

Project Number: UTA00103
Multi-State Project: NRSP-4
High Value Specialty Crop Pest Management
Investigators: Deer, H. M., Roe, A. H.
Performing Department: Animal Dairy & Vet Science -- 0302
Start Date: 10/01/2004 Termination Date: 09/30/2009
Reporting period: 01/01/2005 to 12/31/2005
Progress Report: New minor use requests under this project include: peach/novaluron/codling moth and pear psylla, caneberry/novaluron/raspberry crown borer, caneberry/etoxazole/two spotted spider mite, onion (dry bulb)/acetamiprid/onion thrips, onion/acibenzolar/xanthamonas leaf blight, bacterial

soft rot, and iris yellows virus, cantaloupe/rimsulfuron/annual broadleaf weeds, safflower/sulfentrazone/annual broadleaf weeds and annual grass suppression. More than 35 minor food crops and a large variety of nursery and landscape crops are grown in Utah. The total value of Utah minor crops is $98 million. This program is a government and land grant university sponsored program to develop the data necessary for submitting minor crop pest control options to the EPA for approval. Through the years this program has expanded to include ornamentals and also, biopesticides including microbials like bacteria and viruses, and biochemicals like pheromones and growth regulators. This program works with farmers, agricultural scientists, commodity organizations, and extension personnel to provide pest management solutions to growers of minor crops. By law, any use of a pesticide must be stated on the label or allowed for by regulation. Each label use instruction must be registered by the EPA. The registration requires proof that the pesticide use poses no undue hazard when applied as instructed. Registration data costs for most pesticide uses are paid by the pesticide manufacturers who expect to sell enough product to return a profit. Many uses for pesticides, however, are on such a small scale that their registration costs are greater than any possible return to the manufacturer. Even these small or minor uses require registration to protect the applicator from a possible fine or crop residue problem. This program has helped in securing clearances for registration of certain pesticide uses on these Utah crops: alfalfa, apple, apricot, asparagus, bean (dry), broccoli, brussels sprouts, cabbage, canola, cantaloupe, carrot, cauliflower, cherry (sweet), cherry (tart), clover, field corn, honey and beeswax, honeydew melons, lettuce, onion (dry), pasture grass, peach, pear, sweet corn, tomato and watermelon.
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 foods, feed, and fiber and help to manage cases of pest resistance

Project Number: UTA00344
Water Use and Growth of Selected Vegetables with Emphasis on Onion
Investigators: Drost, D.
Performing Department: Plants, Soils & Biometeorology -- 1624
Start Date: 07/01/2001 Termination Date: 06/30/2006
Reporting period: 01/01/2005 to 12/31/2005
Progress Report: Irrigation timing significantly impacts onion growth and yield. Our objectives were to evaluate the delivery and timing of water applications to onions and find ways to improve water use efficiency. The specific objectives are 1. To evaluate the water requirements for drip irrigated intensively managed onions; 2. to identify differences in water efficiency in cultivars of onions; 3. to determine the

mechanism of improved water use efficiency; 4. to develop sound water management practices for Utah onion growers. Three plant populations (175,000; 200,000; and 225,000 plants per acre) and two irrigation frequencies (every day or every 7th day) were used to assess plant growth and productivity. These frequencies mimic the differences between drip irrigation and currently used furrow system used by much of the onion industry in the western US. Irrigation application amounts were based on monitoring available soil water, soil water depletion, estimates of daily evapotranspiration, published crop coefficients (Kc), and local precipitation. Information collected is used to estimate seasonal water use for the crop. We are also studying the impacts of how irrigation applied every 2nd or 4th day impacts the performance of early and late and high and low yielding onion cultivars. Onions were seeded in March 2004 and stand counts were assessed 30 days later. Irrigation treatments were initiated in early May and continued till early September. Plant establishment was fair in 2004 and plant stands were approximately 80% of the planted populations. As plant population increased from 175,000 to 225,000, the percentage of large bulbs (jumbo and colossal) decreased and small bulb size increased regardless of irrigation frequency. While all populations received the same amount of water, the interval between irrigation events was very different and was a contributing factor to differences in plant growth. While there was no detectible difference in leaf number or root biomass between the irrigation treatments, bulb to bulb variability increased as the irrigation interval increased from 1 to 7 days. In 2005, there was no difference in yield between the four cultivars evaluated. Seasonal temperatures were considered normal in 2005 with average ET values estimated to be 23.7 inches.

Impact: In general, larger grade onions are worth $2-3 per cwt more than smaller bulb sizes. In 2004, Utah grew onions on 2000 acres with a value of $7.8 million and growers reported that 15-20% of the crop was graded as mediums and culls. Improved water management and crop cultural practices could increase the proportion of the crop in the larger size classes thus improving marketability and farm profits at nominal additional cost to the grower.

Project Number: UTA00359

Turfgrass Management in the Intermountain West: Conservation of Water and Nutrients

Investigators: Kopp, K. L.

Performing Department: Plants, Soils & Biometeorology – 1624

Start Date: 01/01/2001 Termination Date: 06/30/2006

Reporting period: 01/01/2005 to 12/31/2005

Progress Report: During the growing season of 2005, fertilization and clipping treatments were applied to field plots of Kentucky bluegrass. Nitrogen fertilization treatments ranged from 0 kg N/ha to 388 kg N/ha and clippings were either returned

or removed. Clipping samples were analyzed for moisture content as well as total nitrogen and carbon contents. Visual turfgrass quality data were also collected at the site to describe turfgrass color and density. Soil moisture data was collected at 10 cm depth increments to 100 cm. Anion exchange membranes were deployed in the plots and collected and analyzed weekly for adsorbed nitrate. Total nitrogen and carbon contents and anion exchange membrane data are still being analyzed at the time of this reporting. In the greenhouse, turfgrass lysimeters were established with several varieties of tall fescue in preparation for a water use study comparing cultivar groups. The lysimeters were watered with a fertilizer solution and maintained at optimum quality in preparation for data collection. A dry down experiment was initiated with the lysimeters in September of 2004. The research will was repeated in 2005. Over a four-week period, clippings were collected every fourth day. The clippings were weighed to obtain fresh weights and their color was quantified using a color meter. The lysimeters were weighed to obtain evapotranspiration rates and greenhouse conditions were closely monitored. The experiment was terminated when too few clippings were growing over a four-day period to collect. Water and fertilization resumed at this point. Problems with the irrigation system at the site were addressed and the experiment is continuing. A dry down experiment is anticipated on this project during the 2006 growing season. A replicated field project was installed to compare water use and quality of three different landscapes. The design of each of the three landscapes was identical, but the plant material differed. With regard to turfgrass, Kentucky bluegrass, tall fescue, and buffalograss are being compared in the landscapes. The landscapes, which measure 20 x 30 feet, are also lined and plumbed to collect leachate. Hydrology of the landscapes and water quality of leachate will also be examined in related studies.
Impact: Landscape irrigation, and particularly turfgrass irrigation, accounts for as much as two-thirds of the water use in the typical Utah home. The results of this work are being conveyed directly to federal and state agencies as well as water purveyors. In 2005, these findings helped to generate a 13% decrease in statewide water use.

Project Number: UTA00489
Multi-State Project: NC-1119
Management Systems to Improve the Economic and Environmental Sustainability of Dairy Enterprises
(Rev. NC-119)
Investigators: Young, A. J.
Performing Department: Animal Dairy & Vet Science -- 0302
Start Date: 08/14/2003 Termination Date: 09/30/2008
Reporting period: 01/01/2005 to 12/31/2005
Progress Report: Monthly research files containing data for all cows that completed

lactations for that month have been obtained from DHI-Provo for a 12-month period of time. These records contain data from herds that process their cows through DHI-Provo from Utah, Idaho, Montana, California, Arizona and Nevada. This past year I have been working on extracting the records for cows that died or were sold. The records are then prepared for inclusion into a database. Due to the large volume of records, I am still in the extraction and database phase of this project and should finish by mid-summer.

Impact: Death losses on dairies have been increasing and are currently approximately 11% of the cows that leave the herd. If these numbers could be halved, Utah dairy producers could save almost $9 million because they would not have to buy replacement heifers to maintain herd size. In addition, excessive death loss may indicate other problems on a dairy and results in no money for the sale of cull animals.

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
(Attach Brief Summaries)

Fiscal Year:2005
Select One: G **Interim** X **Final**
Institution: Utah
State: Utah

	Integrated Activities (Hatch)		Multistate Extension Activities (Smith-Lever)		Integrated Activities (Smith-	
Established Target %		**%**	8%	**%**		**%**
This FY Allocation (from 1088)			$1,744,781			
This FY Target Amount			$139,582			
Title of Planned Program Activity						
Agronomy and Crops			$42,262			
Livestock			$7,244			
Youth and 4-H			$12,938			
Economic Development Planning			$61,164			
Business Retention and Expansion			$17,973			
Total			$141,582			
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.

Director March 31, 2006 **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
(Attach Brief Summaries)
Fiscal Year:2005
Select **G Interim** **X Final**
Institutio Utah State
State: Utah

	Integrated Activities (Hatch)		Multistate Extension Activities (Smith-		Integrated Activities (Smith-	
Established Target %		**%**		**%**	10%	**%**
This FY Allocation (from 1088)					$1,744,78	
This FY Target Amount					$174,478	
Title of Planned Program						
High Value Specialty Crop					$38,948	
Water Use & Grwth of Sel					$33,828	
Turf Grass Mgmnt - Consv of					$28,856	
Mgmnt Sys Dairy Enterprises					$41,228	
Intg Pest Mgmnt/ Monitoring					$34,618	
Onion Thrips						
Total					$177,478	
Carryover						

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

March 31, 2006

Director **Date**

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Establishment of Target Percentages
for Multistate Extension Activities and Integrated Activities

Institution **UTAH STATE UNIVERSITY**
State **UTAH**

Check one:____ Multistate Extension Activities
X Integrated Activities (Hatch Act Funds)
____ Integrated Activities (Smith-Lever Act Funds)

Options for Determining Target Percentages (Circle one)

X 25 percent (Submission of Form CSREES-BASE is waived).

Target Percentage of _____ (two times the Preliminary Baseline Percentage of _____).

(Option only available if higher than option B and less than 25 percent.)

Target Percentage of _____ for FY 2000 and therafter.

(Option only available if higher than option B and less than 25 percent.)

Target Percentage for FY 2000 and thereafter phase-in:

FY 2000
FY 2001
FY 2002
FY 2003
FY 2004
FY 2005

_H. Paul Rasmussen_____
Director

_March 31, 2006_____
Date

Form CSREES-TARG (2/00)

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Multistate Extension Activities and Integrated Activities
(Attach Brief Summaries)

Institution UTAH STATE UNIVERSITY
State UTAH

Check one: ____ Multistate Extension Activities
X Integrated Activities (Hatch Act Funds)
_____ Integrated Activities (Smith-Lever Act Funds)

Actual Expenditures

Title of Planned Program/Activity	FY 2005
1. A Highly Competitive Agricultural System	$ 122,782
2a. Plant and Animal Health and Safety: Identification	3,505 $
2b. Plant and Animal Heath and Safety: Control	0 $
2c. Plant and Animal Health and Safety: Safety Assurance	$ 68,802
3. Agricultural Production Enhancement	$ 252,319
4a. Intensive Pasture Management and Use	$ 10,600
4b. Natural Resource Management	$ 76,038
5a. Human Health	$ 58,086
5b. Family-Community Relationships	$ 94,380
Total	$ 718,022

H. Paul Rasmussen_____ _March 31, 2006__
Director Date

Form CSREES-REPT (2/00)

Continuation (Detail) of Form CSREES-REPT for 2004

Summary Listing of Projects by Goal Area

Goal 1: An Agricultural Production System that is Highly Competitive in the Global Economy.

Goal Area #1	Project	Hatch	Multi-State	Total Hatch	Non-Fed	Other Fed
	12	7,931	0	7,931	6,640	0
	21	45,479	0	45,479	6,640	0
	35	19,153	0	19,153	15,398	0
	37	0	0	0	98,360	0
	39	0	0	0	0	0
	41	0	0	0	0	0
	91	0	0	0	67,605	0
	244	0	0	0	43,682	0
	286	0	0	0	323,440	0
	296	0	0	0	41,181	0
	301	0	0	0	0	0
	302	0	0	0	0	0
	358	0	0	0	53,338	0
	369	0	0	0	88,025	96,003
	373	0	0	0	179,844	7,347
	425	0	0	0	0	167,893
	495	0	0	0	0	0
	496	0	0	0	49,163	0
	581	0	0	0	23,466	0
	585	0	0	0	0	0
	788	0	0	0	58,338	0
	791	0	0	0	0	0
	885	0	0	0	428,414	0
Total Goal #1		**72,563**	**0**	**72,563**	**1,483,534**	**271,243**
Multistate	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	123	0	93,919	93,919	291,231	0
	329	0	28,863	28,863	49,903	0
Total Goal #1, Multistate		**0**	**122,782**	**122,782**	**341,134**	**0**
Total Goal #1 +		**72,563**	**122,782**	**195,345**	**1,824,668**	**271,243**

Goal 2. Plant and Animal Health and Safety

Goal Area #2a	Project	Hatch	Multi-State	Total Hatch	Non-Fed	Other Fed
	29	0	0	0	0	14,901
	253	0	0	0	0	0
	485	0	0	0	297,546	5,838
	491	0	0	0	0	0

	537	0	0	0	112,156	9,756
	607	33,552	0	33,552	86,464	0
Total Goal Area #2a		**33,552**	**0**	**33,552**	**496,166**	**30,495**
Goal Area #2b	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	27	12,391	0	12,391	27,905	0
	239	0	0	0	29,071	0
	400	0	0	0	489,813	0
	415	0	0	0	291,578	0
	466	0	0	0	38,184	0
	478	0	0	0	0	0
	484	0	0	0	3,497	10,156
	487	0	0	0	4,695	39,632
	618	0	0	0	18,015	0
	622	0	0	0	87,723	0
	624	42,838	0	42,838	66,789	0
	626	0	0	0	0	0
	634	0	0	0	111,154	0
Total Goal Area #2b		**55,229**	**0**	**55,229**	**1,168,424**	**49,788**
Goal Area #2b, Multistate	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	103	0	35,015	35,015	98,304	0
	701	0	0	0	0	0
Total Goal Area #2 +		**0**	**35,015**	**35,015**	**98,304**	**0**
Goal Area #2c	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	126	16,945	0	16,945	76,700	0
	251	0	0	0	0	0
Total Goal Area #2c		**16,945**	**0**	**16,945**	**76,700**	**0**
Goal Area #2c Multistate	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	476	0	68,802	68,802	276,950	0
Total Goal Area #2c		**0**	**68,802**	**68,802**	**276,950**	**0**
Total Goal Area #2 +		**178,289**	**103,817**	**209,543**	**2,116,544**	**80,283**

Goal 3. Agricultural Production Enhancement.

Goal Area #3	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	17	0	0	0	18,996	168,498
	28	0	0	0	37,791	0
	164	17,391	0	17,391	45,545	0
	170	0	0	0	9,778	0
	222	0	0	0	120,786	0
	231	0	0	0	413,006	0
	234	46,565	0	46,565	72,120	659,570
	241	0	0	0	68,408	0
	246	0	0	0	0	18,237
	250	23,580	0	23,580	122,854	0

	295	0	0	0	2,329	0
	328	93,180	0	93,180	207,158	0
	337	45,308	0	45,308	127,475	0
	344	0	0	0	73,716	0
	356	0	0	0	0	111,900
	358	0	0	0	53,338	0
	363	0	0	0	265,542	0
	365	0	0	0	0	0
	366	21,343	0	21,343	217,196	0
	367	0	0	0	0	0
	371	24,137	0	24,137	213,979	0
	436	0	0	0	0	1,213,126
	441	0	0	0	0	61,055
	452	0	0	0	0	55,756
	457	0	0	0	162,798	1,904
	461	0	0	0	180,682	0
	472	0	0	0	7,294	0
	478	0	0	0	0	0
	479	71,640	0	71,640	339,730	0
	483	22,061	0	22,061	147,456	0
	492	0	0	0	379,591	0
	493	0	0	0	342,676	0
	527	77,566	0	77,566	103,746	81,426
	533	59,479	0	59,479	85,514	0
	578	39,992	0	0	50,942	0
	628	52,144	0	52,144	88,777	162,555
	630	0	0	0	174,559	0
	735	100,497	0	100,497	272,100	0
	786	0	0	0	69,818	0
	926	0	0	0	49,440	0
	929	0	0	0	52,565	0
Total Goal Area #3		**694,883**	**0**	**654,891**	**4,577,705**	**2,534,027**
Goal Area #3 Multistate	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	85	0	24,305	24,305	20,659	0
	99	0	41,343	41,343	125,385	0
	236	0	10,184	10,184	36,968	0
	292	0	78,156	78,156	153,332	0
	351	0	16,479	16,479	23,430	0
	417	0	28,648	28,648	107,312	0
	423	0	19,299	19,299	159,945	0
	432	0	0	0	0	0
	489	0	0	0	0	0
	524	0	33,031	33,031	115,852	14,693
	762	0	874	874	0	0
Total Goal Area #3		**0**	**252,319**	**252,319**	**742,883**	**14,693**
Total Goal Area #3 +						

Goal 4. Agriculture and Natural Resources

Goal Area #4a	Projec	Hatch	Multi-State	Total Hatch	Non-Fed	Other Fed
	36	0	0	0	0	191,253
	40	0	0	0	0	1,853
	179	0	0	0	189,665	0
	331	12,624	0	12,624	109,657	0
	797	0	0	0	69,011	0
Total Goal Area #4a		**12,624**	**0**	**0**	**69,011**	**0**
Goal Area #4a Multistate	**Projec**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	332	0	10,600	10,600	10,459	0
Total Goal Area #4a		**0**	**10,600**	**10,600**	**10,459**	**0**
Goal Area #4b	**Projec**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	10	0	0	0	32,431	0
	15	0	0	0	66,328	0
	18	0	0	0	19,266	0
	173	0	0	0	894,602	0
	278	0	0	0	99,772	0
	291	0	0	0	110,183	0
	293	26,397	0	26,397	135,709	0
	294	0	0	0	0	0
	298	0	0	0	0	23,380
	299	0	0	0	0	0
	324	0	0	0	28,231	0
	330	0	0	0	181,325	0
	345	0	0	0	186,643	0
	359	0	0	0	156,434	0
	360	0	0	0	0	257,792
	361	0	0	0	32,461	0
	363	0	0	0	265,542	0
	364	0	0	0	0	432,524
	368	0	0	0	85,031	0
	370	0	0	0	0	392,847
	372	0	0	0	0	556,304
	374	0	0	0	0	595,143
	375	0	0	0	59,091	0
	378	0	0	0	0	0
	379	0	0	0	0	0
	380	0	0	0	0	0
	381	0	0	0	0	0
	431	0	0	0	49,232	0
	442	0	0	0	115,340	0
	555	0	0	0	0	722,984

	556	0	0	0	0	235,635
	568	0	0	0	0	0
	580	0	0	0	15,412	0
	627	0	0	0	0	0
	663	0	0	0	26,128	35,028
	703	0	0	0	22,945	27,975
	705	0	0	0	9,659	12,002
	713	0	0	0	35,834	44,774
	716	0	0	0	0	0
	727	0	0	0	20,596	25,739
	729	0	0	0	28,399	35,101
	786	0	0	0	69,818	0
	787	0	0	0	36,952	0
	790	0	0	0	11,216	0
	792	0	0	0	0	0
	861	22,062	0	22,062	34,227	0
	905	0	0	0	45,751	0
	910	0	0	0	15,464	0
	919	35,818	0	35,818	101,120	0
	923	0	0	0	274,712	0
	924	0	0	0	3,518	1,074,179
	925	0	0	0	93,199	0
	928	22,133	0	22,133	35,046	0
	930	0	0	0	0	0
	943	0	0	0	16,273	0
	945	0	0	0	30,038	0
	946	0	0	0	0	0
	947	0	0	0	17,530	0
	948	0	0	0	0	0
	949	0	0	0	0	0
	960	0	0	0	19,802	0
	961	0	0	0	5,438	0
Total Goal Area #4b		**106,410**	**0**	**106,410**	**3,486,698**	**4,471,407**
Goal Area #4 Multistate	**Projec**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	7	0	22,896	22,896	24,250	168,498
	20	0	2,727	2,727	2,271	0
	52	0	50,415	50,415	52,051	0
Total Goal Area #4b		**0**	**76,038**	**76,038**	**78,572**	**168,498**
Total Goal Area #4 +		**119,034**	**86,638**	**193,048**	**3,644,740**	**4,639,905**

Goal 5: Empower People and Communities

Goal Area #5a	Project	Hatch	Multi-State	Total Hatch	Non-Fed	Other Fed
	209	0	0	0	88,225	0
	228	0	0	0	0	56,927
	237	0	0	0	54,615	17,729

	240	0	0	0	0	59,912
	242	0	0	0	51,140	0
	254	0	0	0	0	0
	258	0	0	0	81,406	0
	638	0	0	0	144,517	0
Total Goal Area #5a		**0**	**0**	**0**	**419,903**	**134,568**
Goal Area #5a Multistate	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	390	0	58,086	0	45,516	0
Total Goal Area #5a		**0**	**58,086**	**0**	**45,516**	**0**
Goal Area #5b	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	38	3,429	0	0	2,834	0
	376	0	0	0	0	0
	421	0	0	0	101,743	0
	579	0	0	0	9,208	6,413
	662	0	0	0	43,942	0
	726	0	0	0	37,804	43,537
	837	0	0	0	13,732	0
	840	0	0	0	38,394	0
	841	0	0	0	47,563	0
	944	0	0	0	70,641	0
	974	0	0	0	0	0
	975	0	0	0	21,865	0
	976	0	0	0	13,280	0
	977	0	0	0	22,936	0
	978	0	0	0	25,121	0
	979	0	0	0	21,692	0
	980	0	0	0	0	0
	981	0	0	0	0	0
	983	0	0	0	0	0
Total Goal Area #5b		**3,429**	**0**	**0**	**467,921**	**49,950**
Goal Area #5b Multistate	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	74	0	22,225	22,225	10,520	0
	835	0	41,191	41,191	42,951	0
	839	0	0	0	60,824	0
	843	0	0	0	27,693	0
	844	0	0	0	39,282	18,330
	869	0	21,590	21,590	17,980	0
	985	0	9,374	9,374	6,544	0
Total Goal Area #5b		**0**	**94,380**	**94,380**	**205,794**	**18,330**
Total Goal Area #5 +		**3,429**	**152,466**	**94,380**	**1,093,618**	**202,848**