



State Accomplishments For the Formula Grants 2007 Annual Report

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Overview and Background Information

The Cooperative State Research, Education and Extension Service (CSREES) requires a plan of work and annual report on the four major research and extension formula funds; Hatch, Evans-Allen, Smith-Lever 3b&c, and 1890 Extension Programs. Recently, CSREES substantially revised the format and means of submission of these reports, restructuring them using an outcome-based, logic model design and collecting them electronically via the internet using a database system. The purpose of this revision was not only to reduce the burden imposed on collecting the Plan of Work (POW) and Annual Report of Accomplishments (AR), but to make the information collected usable for CSREES program leadership and portfolio evaluation. An additional benefit of the revision is that the information collected can be easily analyzed and assembled into a national report on the POW and AR for these formula funded programs.

The 2007 – 2011 Plan of Work Summary Document, first published in May 2007, then revised and published in September 2007, was the first such document based upon the newly formatted POW. Subsequently, the 2008 – 2012 Plan of Work Update Summary Document was published in final in March 2008. This summary report is the first national report on the annual report based upon the first POW submitted using the new format. This report focuses mainly on outcomes from the 2007 Annual Report of Accomplishments and Results. It starts to open a window into the outcomes the States reported in 2007, and also gives the CSREES – Land-Grant partnership information to examine the questions of balance and direction as a unified system.

This report, based only on the 2007 Annual Report of Accomplishments and Results, documents the allocation effort of Formula dollars among the CSREES Portfolio of programs as documented through reported effort, and lists examples of good outcomes found in the 2007 Annual Report and classified by the CSREES Portfolios. The objective of further analysis of the most frequent outcome measures found will be to discover which outputs and outcomes can be proposed for possible standardization for future Plans of Work and Annual Reports to allow for aggregation of data on a national level or regional level.

Benefits of the new POW system includes giving States the ability to scan the system to learn what other states are doing to address similar issues, how other States are evaluating their efforts, and what performance indicators are being used, etc. Also, this new system will increase our ability to respond to external reporting requirements on outcomes and proper use of funds and provide agency managers with program results feedback.

CSREES supports programs to address complex problems ranging from improving crop productivity to addressing nutrition and obesity. These complex problems require multiple approaches. These multiple approaches include appropriate application of research, education, and extension to these problems; working with multiple partners including colleges and universities, other Federal agencies, and private organizations; and intelligent application of the various appropriations available to the agency.

CSREES does not actually solve these problems through its own actions. Instead, it attracts the best and the brightest at other organizations to work on these problems through various types of grants, especially competitive and formula grants. Each funding mechanism has its strength.

The formula grants work in concert with the competitively awarded grants in the National Research Initiative to address important problems. The competitive process is specifically designed to work through attracting the best proposals to an agency-defined topic and funding those of highest relevance and quality. Whereas the formula grants allow the state land-grant universities to allocate funds quickly for a rapid response to emerging issues as well as for providing funding for activities not well supported by the competitive process – programs targeted to the regional or local level, very long-term research, seed money to initiate new lines of research, and supporting research and extension capacity.

The formula grant process works through the long-standing partnership that USDA has with the land-grant university system. CSREES identifies national priorities for these programs, but the allocation of funding to these priorities is decided by each individual university. CSREES reviews plans of work, annual reports, and individual project reports (for certain formula grants) to ensure relevance, quality, and performance, but affects decision making primarily through program leadership – identifying priorities and opportunities for collaboration and convincing partners to focus their resources in these directions.

A good example of formula grant funds ability to quickly respond to a national crisis includes the rapid response to the soybean rust invasion by the state land-grant universities with leadership from CSREES in collaboration with other USDA agencies and the US Soybean Board. This response has helped save soybean growers up to \$300 million in 2005.

This report shows examples of good outcomes by our land-grant university partners and the continued importance of the formula grant funds to the CSREES portfolio.

Definitions

State Planning Unit – One or more institutional entities that make up a single State Plan of Work. This could be any combination of 1862 and 1890 State Land Grant University Research and/or Extension entity in a single State.

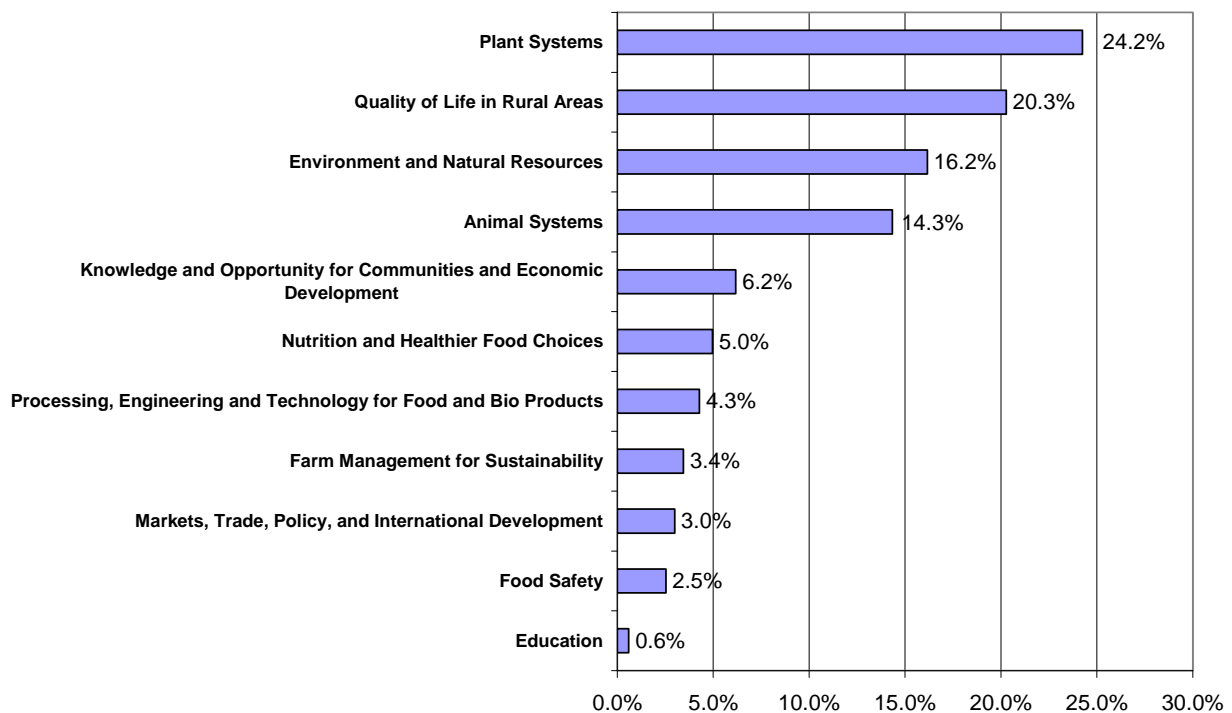
Portfolio – A portfolio is a set of continuing, CSREES-funded activities broadly focused on a current and/or emerging issue of societal importance and serves as the foundation for agency planning and evaluation. A portfolio is operationally defined by a unique set of primary knowledge areas (KAs) supplemented by secondary KAs that may be shared with other portfolios.

Knowledge Areas (KAs) – A subject content classification scheme for use in characterizing federally-funded, CSREES-administered research, education, and extension activities for the purpose of enabling budget and accountability reporting and integration.

State Accomplishments by CSREES Portfolio

A total of \$684,047,000 was appropriated for the four formula grant funds subject to this Plan of Work and Annual Report in fiscal year 2007. A total of \$491,867,947 was reported expended from the formula grant funds in 2007 on the various planned programs in the 2007 Annual Report of Accomplishments and Results; \$227,910,923 from Smith-Lever, \$198,577,074 from Hatch, \$36,075,573 from Evans-Allen, and \$29,304,377 from 1890 Extension. The bar chart below shows the distribution of all four of these formula grant funds by CSREES portfolio.

Percentage of Expenditures by Portfolio for All Formula Grants From 2007 Annual Report
Data (N=\$491,867,947)



Plant Systems

Increase in Yield and Revenue

The **University of Arkansas** developed new rice varieties. When the program was started in 1980, the average rough rice yield in Arkansas was only 4,110 pounds per acre compared to 7,200 pounds per acre in 2007 which is the highest state average yield in Arkansas history. The average monetary gain in 2007, at a rough rice price of \$10.00 per hundred weight, was \$185 per acre or \$246 million for the 1.325 million acres grown in Arkansas, of which \$123 million is due to the Arkansas varieties. Formula Grant: Hatch and Smith-Lever

The Experiment Station at **North Dakota State University** released the new varieties Faller Wheat, Lariat and Stampede pinto beans, Sheyenne non-transgenic soybean, RG7008RR soybean, and Pinnacle two-row barley. The estimated dollar value to producers, seedsmen, grain merchandisers, processors, crop consultants, and plant breeders in North Dakota on these new varieties is \$290,600,000 for 2007. Moreover, because of best management practices developed by CSREES-funded North Dakota research and extension, North Dakota wheat and barley producers reduced economic losses by \$40,000,000 through use of better varieties of wheat and through use of fungicides. Formula Grant: Hatch

The Colorado wheat crop was valued at over \$500 million last year and the variety Hatcher, developed by **Colorado State University**, was planted on 500,000 acres this year, with an average expected yield advantage over the average of all other varieties of 3 bushels per acre, will conservatively result in 1,500,000 more bushels of wheat production than if Hatcher was not grown. At a market price of \$5 per bushel for 2008 wheat, Hatcher could result in an increase of value of over \$7 million - in a single year. Formula Grant: Hatch and Smith-Lever

The **Oregon State University** wheat quality program worked with the Oregon wheat breeding program to select for improved wheat quality to enhance export competitiveness of Oregon wheat. This program contributed to the release of 3 wheat varieties: Goetze, Norwest 553 and Tubbs06 and the potential placement of two more lines. These new varieties are now leading in terms of acreage and performance in the Pacific Northwest; the lines help reduce economic losses from grassy weeds, increase management options, and further increase production efficiency. Formula Grant: Hatch

The **South Dakota State University Crop Performance Testing Program** conducted yield trials at 13 winter wheat, eight spring wheat and oat, seven spring barley, and six corn and soybean locations in South Dakota. On average the superior varieties (hybrids) yielded more than the other entries in the test by 5 bushels for spring and winter wheat, 8 bushels for barley, and 10 bushels per acre for oats. In soybeans, the superior varieties yielded more than the other entries in the test by 5 bushels per acre; while in corn the superior hybrids yielded more than the other entries by 18 bushels per acre. On average crop producers increased their gross profits by \$51.10 per acre for winter wheat; by \$61.85 per acre for spring wheat; \$31.50 per acre for oats; \$34.64 per acre for barley; \$61.30 per acre for soybean; and \$98.64 per acre for corn by planting superior varieties (hybrids) compared to other entries they could have selected from the performance trial information. Formula Grant: Hatch and Smith-Lever

In Washington State, about 55 percent of the 2,270,000 acres sown to wheat were **Washington State University** (WSU) cultivars, while about 15 percent of the 230,000 acres sown to barley were WSU cultivars. The proportional earnings from WSU wheat and barley cultivars harvested were \$538 and \$10 million, respectively. The WSU cereal variety testing program provided information to growers, which enabled them to select improved cultivars vs. average cultivars. It was estimated this information is worth about \$25 million per year to farmers in increased yield and quality returns. Formula Grant: Hatch

Best Management Practices

Cotton producers in Texas have difficulty in mechanically controlling stalks following harvest resulting in high cost in tillage and a habitat favorable for boll weevil reproduction. A chemical stalk destruction program was introduced by **Texas AgriLife** Extension Service that reduces tillage and helps manage the cotton boll weevil, a destructive pest of cotton. Chemical stalk destruction has been adopted on 55 percent or 543,164 of the total planted acreage of 987,570 acres in the Rio Grande Valley, Coastal Bend, the Brazos River Valley and the Blackland Prairies. Due to improved stalk destruction, reduced fuel consumption, equipment costs and labor, the educational program is estimated to have resulted in a total increase in net returns of \$5,532,030 annually, with a value added of \$3,465,988 and has brought about additional employment of 51 jobs in the region. Formula Grant: Hatch and Smith-Lever

Homeowners, including farmers, rely on the **Connecticut Agricultural Experiment Station** diagnostic services to solve plant pest problems. Diagnoses of insect and plant disease problems were performed on 9,738 samples submitted by stakeholders in person or by mail. Results and suggestions for control were forwarded back to the stakeholders along with written information on the pest. In about 30 percent of the inquiries, stakeholders visited the diagnostic laboratories to see a staff member for advice. Diagnostic test results provided immediate new knowledge on what was causing the decline or premature death of plants. Treatments of pesticides were applied as remedies. During these activities, an extensive powdery mildew problem of pumpkins was discovered. Growers requested biological controls and other options to reduce pesticide use and costs. In field and laboratory experiments, a 50 percent by volume aqueous solution of milk-based foliar sprays was used to reduce crop damage. There was a savings of about \$68.00 per acre in fungicide costs. Application of this method statewide on 1,559 acres of pumpkins would save growers about \$106,000. These results have application to powdery mildew infections of other plants as well. Expected long-term benefits include less human exposure to pesticides, thereby reducing health risks, and a cleaner environment. Formula Grant: Hatch

Data collected by **Oklahoma State University** from the 2006 fields indicated that typical nitrogen topdress rate was 110 pounds per acre. The average recommended rate from reference strips was about half the typical rate at 53 pounds of nitrogen per acre. In 2007, the average nitrogen rate applied to these fields was reduced by farmers to 80 pounds per acre. While farmers did not completely accept the recommendation of 53 pounds of nitrogen per acre; they did apply an average of 25 percent less nitrogen than typical. Assuming nitrogen costs 50 cents per pound, farmers saved an average of \$15 per acre or over \$3,750,000. Formula Grant: Hatch and Smith-Lever

Michigan State University held meetings in 10 locations in early January through February 2007 for 1,021 producers. From those that were surveyed, more than 80 percent of growers attending a training session indicated that they would use information learned to make management decisions, including pest management decisions. Over 50 percent felt that the decisions would earn or save them money in the upcoming growing season. Growers expected to save \$151,100 over 11,450 acres or an average of about \$13.20 per acre. Formula Grant: Smith-Lever

Past Soybean Rust monitoring activities in North America, in general, and in Kentucky, specifically, have been very successful. As a result, soybean producers have a high level of confidence in the monitoring activities. They trust the output of the sentinel network to let them know when to spray and when not to spray fungicides for soybean rust management. In 2007, it is estimated that \$207 million was saved in the U.S. by soybean producers not spraying a fungicide for soybean rust control on 28.76 million acres. The **University of Kentucky** estimated that 400,000 acres were not sprayed with a fungicide as a direct result of soybean rust monitoring efforts. At an estimated cost of \$18 per acre, that represents a savings in Kentucky of \$7.2 million. Formula Grant: Hatch and Smith-Lever

A three-year project by **Oregon State University** was conducted to determine the nutrient uptake and optimum nutrient management of carrot seed production. These research results were used for publishing a peer-reviewed Extension bulletin and presentation of research results were made to the industry and to peer researchers. 72 percent of the acreage for which field agents made recommendations was managed according to the research results. 90 percent of growers have adopted the fertilizer management recommendations. Extrapolating the economic impact to all 2,300 acres of carrot seed produced, this project has potential to save hybrid carrot seed growers in central Oregon \$2.3 million annually. Formula Grant: Smith-Lever

Michigan State University researchers created a new hand-applied formulation of codling moth pheromone that permitted 6,000 point sources per acre of apples in less time than is required for rope dispensers, the industry standard. It also provided better disruption of codling moth mating using similar amounts of the pheromone. This new application method saves growers about \$35 per acre, more flexibility and significant time savings. Formula Grant: Hatch

Because of **University of Tennessee** Extension programs focused on precision agriculture and solutions for weed, insect and disease problems, 404 corn producers reported a 6 percent increase and 218 soybean producers reported a 9 percent increase in yield by using Extension's recommended practices for insects, weeds or plant diseases. Formula Grant: Smith-Lever

University of Maine Extension's Potato Integrated Pest Management (IPM) program monitored for pests and disease using insect traps, field scouts, and electronic monitoring stations. These monitoring efforts identified a very low population of aphids. Thus, most growers were able to skip at least one calendar aphicide application on approximately 58,000 acres, saving approximately \$1.22 million in chemical and application expense. The University also identified lower populations of European corn borer, with only three percent of acreage needing treatment, saving approximately \$341,000 in expense from the previous season. Both potato leafhopper and potato flea beetle were identified as having exceeded economic thresholds in some locations, requiring treatments to avoid an estimated \$365,200 in losses. Collectively, the monitoring efforts of the Potato Integrated Pest Management Program in 2007 resulted in approximately \$1.93 million in savings from reduced pesticide expense and targeted timely treatments to avoid losses. Formula Grant: Smith-Lever

Quality of Life in Rural Areas

Obesity is a risk factor for four of the ten leading causes of death of Arkansans. Arkansas has one of the highest obesity rates in the nation with 27 percent of adults being obese and 37 percent overweight. Childhood obesity is also of concern with 38 percent of children in grades K-12 at risk for being overweight. Annual medical expenditures related to obesity in Arkansas are in excess of \$663 million. More than half of these dollars come from state and federal government sources. 467 people participated in the **University of Arkansas** Extension “Reshape Yourself” program. 99 percent of participants indicated a positive attitude change related to food and nutrition. 79 percent of participants reported altering behavior to follow standard serving sizes. 87 percent of participants reported increased use of food labels. 50 percent of participants decreased weight for a total of 2,195 pounds were lost. 100 percent of participants reported an increase in walking, and 20,916 miles were walked. Of participants who were asked about or screened for blood pressure, cholesterol and glucose, 43 percent decreased blood pressure, 58 percent decreased blood cholesterol, and 43 percent decreased blood glucose. Formula Grant: Smith-Lever

The **University of Missouri** Extension delivered a three-course Community Development Academy which provided a strong emphasis on developing the capacity to work with others and participate in collaborative relationships. For 47 percent of the participants, the program translated into increased resources for their organization or community, with 16 estimating a combined value of \$955,250 in increased resources. Learning was used to mobilize 489 volunteers that provided over 9,000 hours, estimated to be of an additional value of \$145,080. Nearly half of participants successfully initiated, mobilized, or coordinated a new community project. Nine projects were related to community viability, nine to building inclusive communities, six to community leadership, and four to community decision-making. Formula Grant: Smith-Lever

Iowa State University Extension, in cooperation with the Iowa State Association of County Auditors, the Iowa Association of Counties and Help America Vote Act (HAVA) programs, developed a six-hour precinct election official (PEO) certification training for the Iowa Secretary of States Office. Participants of Iowa PEO certification training attend three, two-hour sessions to learn about requirements in Iowa law designed to ensure open, honest and fair elections. More than 2,700 precinct election officials in 64 counties have received certification training. The high level of satisfaction expressed by PEO training participants prompted the Iowa Secretary of States Office to expand the original agreement to conduct 90 trainings over 3 years to 180 trainings conducted over the same period. Program evaluations indicate that precinct election officials and county auditors believe that elections are running more smoothly and effectively since some or all of the precinct election officials completed certification. More than 95 percent of participants rated the program as very good and excellent and more than 97 percent said they would recommend the training to others. Formula Grant: Smith-Lever

The goal of West Virginia Community Education Outreach Service (CEOS) organization is to strengthen individuals and families through continuing education, leadership development and community involvement for the betterment of all. Among the various programs, **West Virginia**

University Extension provided educational materials to CEOS networks, trained leaders to work with volunteers, facilitated the Annual State Leadership and Enrichment Conference, and conducted six trainings for CEOS on leadership development and educational programming. Collectively, the CEOS members volunteered 392,000 hours of service, at a value of \$7,357,840, raised money to provide a number of scholarships which resulted in individuals being able to attend college, and 5,298 CEOS members from 46 counties increased their knowledge and skill in leadership. Formula Grant: Smith-Lever

The **University of Wyoming** Extension provided 39 educational programs including Big Horn Basin Saves. 477 individuals participated in educational programs (four were series of 4 - 8 weeks). The first year participants reported gaining knowledge and awareness. The Big Horn Basin Saves program reported \$91,311 saved by 54 participants during the 13-week program. Participants also reduced debt by \$11,676. Fifty-one of the 54 reported having made savings a regular habit. Formula Grant: Smith-Lever

University of Florida studies confirm the value of a significant adult in addition to a parent or guardian in the life of a child. In 2007, Florida 4-H engaged 10,925 volunteers in providing supportive learning environments for youth enrolled in programs in all 67 Florida counties and the Seminole Tribe. Over 10,000 are adults and 900 are youth volunteers. Using the Independent Sector calculation of \$18.76 per hour, 4-H volunteers contributed \$45,000,000 in volunteer time to the development of youth in Florida. Florida 4-H Youth Development improves the personal health and safety of youth by screening and selecting volunteers. In a 2007 statewide survey, 97.8 percent of youth indicated that 4-H provides a safe place to learn and grow and 98 percent indicated that they are learning work related skills as a result of their 4-H experience. Florida 4-H Youth Development is developing the workforce of tomorrow. Florida 4-H volunteers provided 9,884 learning environments for youth to learn and grow. A statewide survey of 593 youth surveyed in 2007. Formula Grant: Smith-Lever and 1890 Extension

Realities of the "war on terror" have contributed to a major change in the military culture of the National Guard and Army Reserve. Deployment of these soldiers as an army providing back up to active duty soldiers has changed to deployment as routine expectation. As a result, many youth and families have been suddenly confronted with challenges they did not anticipate. Operation: Military Kids (OMK) is a national collaborative effort being implemented in many states to address these challenges. **Rutgers University** in New Jersey OMK has focused on teens and expansion of leadership opportunities for them. New Jersey has expanded military kids to include: OMK Teen Speakers' Bureau, Hero Packs - Care Packages for Military Children, RSG! Trainings - Community Awareness Briefings, Mobile Technology Lab - Connecting with Technology, Project Young Heroes, and Teen Leadership Camp Out. The New Jersey Operation Military Kids program resulted in programs that influenced decision makers in policy development and critical issues impacting youth whose parents were deployed. The RSG! Trainings engaged communities and facilitated group service projects reaching over 470 youth and adults. The Teen Leadership Camp Out resulted in teens gaining leadership skills - evaluations documented that 92 percent will do something new or different, 85 percent have changed the way they think, act, or behave, 96 percent plan to use or share what they learned. 83

percent of participants indicated that because of the Leadership Camp Out they believe they can be better leaders. Formula Grant: Smith-Lever

Environment and Natural Resources

A **University of Nebraska Extension** program on water conservation impacted 600 crop producers who represented 1,050,000 acres or approximately 14 percent of Nebraska's of irrigated crops. Post-meeting evaluations completed by producers indicated that changes resulting from these workshops resulted in a saving of approximately 1.7 inches of water per acre per year or 142,000 acre feet of water or about 46 billion gallons of water. Producers also indicated a potential savings of \$11,000,000. This resulted in a reduction of 1.5 percent in irrigation water pumped in Nebraska. Formula Grant: Hatch and Smith-Lever

Remediation of lead (Pb)-contaminated lands for reducing the exposure to human health is a national priority. **Lincoln University (Missouri)** leaching experiments show that phosphate treatment effectively immobilized soil Pb and significantly reduced leachable Pb and plant uptake, which potentially lowers the ecological risk to water quality and plant communities. Formula Grant: Evans-Allen

University of Florida scientists have developed new technologies to reduce phosphorus runoff from phosphate mining in Florida. In response to a steady decline in one of the nation's largest freshwater lakes, the University of Florida has partnered with state and federal agencies to protect Lake Okeechobee. Keeping the aquifer clean - natural and constructed wetlands can be used to filter wastewater before it returns to the aquifer. These filter strip technologies are included in new mine reclamation regulations and have reduced phosphorus runoff into the Everglades by 70 percent and reduced the cost of residue removal, estimated at \$3,213 per acre. Formula Grant: Hatch

Extension faculty from **Oregon State University** contributed to the development of science-based plans to optimize wastewater use while minimizing environmental impacts. This program educates food processors and growers who irrigate about the value and appropriate use of this resource. Wastewater from food processing plants was applied at agronomic and environmentally sustainable rates to 50,000 acres of Oregon cropland. This turned nutrient-rich wastewater, formerly an environmental liability, into a plant-nutrient asset valued at almost \$1 million a year. Estimated costs for regulations-imposed wastewater treatment technology would have added \$4.5 to 6 million of annual operating costs to the larger wastewater producers. Growers receiving the effluent enjoy a triple benefit: it benefits their crops, it saves fertilizer costs, and it helps keep growers' markets viable by eliminating a threat to the processors with whom they contract. Formula Grant: Smith-Lever

Two major programmatic foci have been initiated by **Washington State University** Extension faculty to move critical land to a more sustainable level of management. These employ two basic strategies. The first is forest health, which is restored by proper thinning and other management practices enhancing fire resistance and improving the health of the land and watersheds. The second is invasive species, which are controlled by release of environmentally

friendly insects leading to effective biological control of invasive species. Forest health has been restored on 3600 acres in critical areas as a direct result of these extension programs. This led to a reduction of the risk of wildfire and an expected savings state and federal agencies of \$180 per acre or \$650,000 annually. Also, herbicide application on rangeland has been reduced by utilizing biological control mechanisms. This saved \$35 per acre on 138,000 acres in northeast Washington or \$4.8 million annually. Formula Grant: Smith-Lever

Animal Systems

Mastitis is the most costly disease of dairy cattle, reducing protein in milk, cheesemaker yields, shelf life, palatability, and dairy farm income. Milk quality is measured by the somatic cell count. To increase milk quality, 478 farms participated in the **University of Wisconsin Extension Milk Money** team process. As a result, producers adopted best management practices such as performing bulk tank cultures; culturing for clinical mastitis; keeping better treatment records; developing standard, written milking routines; wearing gloves during milking; training Spanish-speaking workers in best practices, consulting with dairy professionals, and using team management. After 4 months in the program, the average farm improved their milk quality by about 77,000 somatic cells per milliliter, about 25 percent, and increased income by \$1,650 per month. Formula Grant: Smith-Lever

Sheep numbers in Southwest Virginia increased 5 percent in 2007 according to USDA. With the renewed interest in sheep, **Virginia Cooperative Extension** assisted local sheep producers with production and marketing endeavors. A partnership between local producers and a regional retail grocery chain was formed. Sales to the local grocery chain increased from 116,000 pounds sold to over 225,000 pounds sold. As a result, over \$650,000 of lamb was purchased from approximately 55 local producers in 2007 resulting in an additional \$41,000 value being returned to producers. Formula Grant: Smith-Lever

Texas AgriLife Research and Extension measured the economic benefit from the Texas Beef Quality Assurance, drought management, and dairy and horse programs. Cattle producers reported saving \$9.47 - \$29 per weaned calf and 85 percent said knowledge gained in livestock handling and immunization protocols saved \$36.25 per head. 47 percent of dairy producers, 73 percent of Horse 101 and 94 percent of Beef Cattle Conference participants expected savings from adoption of practices. 78 percent of Mare/Foal workshops attendees set the savings at 5 percent - 8.2 percent per horse annually. Drought management practices produced returns of \$95 per cow. Southwest Beef Symposium valued at \$290 per person. Formula Grant: Smith-Lever and Hatch

Consumer demand for lamb and goat meat is rising and many farmers are raising small ruminants as a way to diversify their products and bring additional income to their operations. **Alabama A&M University** extension specialists developed 16 new numbered publications on sheep, goats and rabbits. As a result Alabama small ruminant producers have become more knowledgeable and stayed open to new and different management practices that allowed their operations to be more productive and profitable. Registration records showed that a total of 994 sheep and goat producers attended educational activities carried out by Alabama Cooperative

Extension Service. Post surveys indicated that 835 participants (84 percent) gained knowledge as a result of the educational activities. Moreover, 676 participants (68 percent) reported improvements in herd health and production efficiency, and 497 participants (50 percent) reported increases in profitability ranging from 2 to 15 percent. Formula Grant: 1890 Extension

The **University of Missouri** plant scientists have developed management practices to reduce toxins present in the grass consumed by animals. The practices, taught at the workshops, involve cautious fertilization of pastures, moving cattle to nontoxic pastures during the late spring, and seeding in new plant varieties. Missouri farm families are beginning to adopt these management practices, which increase calf gains by a half-pound per day. If only half of the cattle producers adopt the management practices, Missouri's beef industry would realize an additional \$30 million in profits. If the state's cattlemen plant the forthcoming plant varieties on one-third of Missouri's pastures, the state will increase revenue to the beef industry by \$183 million annually; Missouri would see additional profits to other Missouri livestock industries, including dairy cattle and horses. Formula Grant: Smith-Lever

Research at **Mississippi State University** utilized and compared commercial strains of broilers used in Mississippi with the emphasis of better understanding growth rate, feed conversion, and carcass yields to diets with increased amino acid density. They found that increasing amino acid minimums 10 percent across all diets fed resulted in a 0.50 percent increase in breast meat yield. This resulted in an income over feed costs increase of \$0.051 per bird. However, increasing amino acids only to 35 days of age increased income over feed costs \$0.052 per bird. These results point to the importance of feeding modern commercial broilers levels of amino acids needed to overcome reduced feed intake, especially early in life. Formula Grant: Hatch

Langston University established a certified Dairy Herd Improvement laboratory that operates under the supervision of the National Dairy Herd Improvement Association to provide services to goat producers in the nation. Langston has also worked in cooperation with Texas A&M University to write a program that utilizes goat terminology instead of cow terminology. As a result, goat producers are now able to get records for their animals that reflect accurate information with the correct language. These records not only reflect higher fat and protein values for a doe, but also are easier to understand when used for genetic evaluation and for herd management. Currently, Langston University is serving 120 goat producers in 30 states. Information provided by the Langston University Dairy Herd Improvement Laboratory has allowed goat producers to demand higher prices for their animals during sales. Formula Grant: Evans-Allen and 1890 Extension.

Knowledge and Opportunity for Communities and Economic Development

A gap exists between the demand for design services to rural Iowa communities and the availability of those services. The Iowa's Living Roadways Community Visioning Program assists small Iowa communities to develop enhancement plans that reflect the values and identity of the community. The visioning process is sponsored by the Iowa DOT in partnership with **Iowa State University** Extension and Trees Forever. In 2007, 24 communities participated in community visioning or community planning programs. Iowa State University Extension also

conducted 12 Planning and Zoning workshops. Each community received a conceptual design plan, a project feasibility study and assistance in implementation planning. An impact assessment conducted shows that 94 percent of communities that participate in community visioning complete at least one project proposed during the process. Types of project completed include roadside plantings, signage or signage improvements, streetscape enhancements, downtown area improvements, parks and other infrastructure improvements such as storm water drainage, welcome centers and historic areas. Formula Grant: Smith-Lever

A Market Analysis and Branding Charrette for the Town of Cheraw was coordinated by **Clemson University**. Seven sessions were conducted with teams of planners, design architects and community development specialists. Extension recommendations were made. The Town of Cheraw secured an \$844,000 Opportunity Grant from the Department of Commerce. The total project impact was \$1.2 million in complete funding. Formula Grant: Smith-Lever

Since its inception in November of 2005 the Rural and Agricultural Business Enterprise Center of Central New York has provided technical assistance and business skills training to 259 individual businesses. Four business skills workshops have been provided by **Cornell University** with additional workshops with specific focus on accounting using both QuickBooks and the Cornell Farm Account Book and Labor Management. As a result of these efforts 526 jobs, including 244 full-time, 159 part-time and 123 seasonal positions, have been retained. In addition 14 new jobs have been created. Participants in the workshops have been able to apply the skills they have learned directly to their business to achieve their goals. Business owners receiving technical assistance have used the information they received to create business plans and have used financial analysis provided to secure finance. Formula Grant: Smith-Lever and Hatch

Nutrition and Healthier Food Choices

The economic impact of chronic disease on the United States economy is staggering. Seventy-five percent of the \$1.8 trillion the US spends on health care annually is spent on treating chronic diseases. Less than five percent of the annual health care spending goes toward chronic disease prevention – even less for at risk, low-income population groups. An evaluation by the **University of Connecticut Cooperative Extension** found as a result of participants completing their programs, 85 percent of parents participating in child nutrition workshops were able to identify healthier snack alternatives for their kids; 90 percent were able to identify dietary and sedentary lifestyle risk factors for the development of overweight /obesity in their children; 100 percent of children with phenylketenuria (PKU) attending the low protein cooking school tried recipes at the event and subsequently increased their diet variety at home. Moreover, 80 percent of incarcerated women attending food budgeting workshops were able to better utilize food stamp dollars when purchasing food after release from prison. Formula Grant: Smith-Lever

A community-based Strong Women Healthy Hearts program was designed by the **University of Arkansas** to reduce cardiovascular disease risk factors in overweight, sedentary midlife and older women. Intervention subjects participated in a twice-weekly 12-week program that

included walking or aerobic dance and behavioral strategies to increase physical activity and heart-healthy eating. Compared to controls, intervention subjects reported larger decreases in energy intake and sweets servings per day; and increased fruit and vegetable servings per day. The intervention group increased average steps per day compared to a decrease in controls. Self-efficacy for dietary and physical activity behaviors increased significantly in the intervention group. BMI, body weight and waist circumference decreased in intervention subjects and increased in control subjects. Formula Grant: Smith-Lever

Processing, Engineering and Technology for Food and Bio Products

In basic research by **North Carolina A&T University**, four plants commonly used in folk medicine in different parts of the world were studied for their antimicrobial activities on select foodborne pathogens and anticarcinogenic activities on cancer cells. This project enabled the research team to identify natural bioactive agents with moderately strong anticancer properties from *Rosa canina* and *Phytolacca americana*. These bioactive agents may be helpful in cancer prevention and alternative treatment. In vitro tests showed that crude extracts from *Rosa canina* and *Phytolacca americana* significantly reduced the growth and proliferation of colon, breast, and cervical cancer cells; three prominent cancer types that affect both African-American men and women. Formula Grant: Evans-Allen

Because of the increasing demand for goat milk products, **Langston University (Oklahoma)** has conducted much-needed training courses for goat milk cheeses and goat milk soap production in addition to their annual cheese-making workshops. Goat producers without cheese-making and soap-making experiences were taught basic skills. The majority of them have recently started cheese-making and/or soap-making at home and several are going commercial. By making goat milk products and adding value to goat milk, goat producers are increasing their income in goat production. Formula Grant: 1890 Extension

Montana and neighboring state industries are seeking innovative markets for new biocontrol tools and new crops, such as camelina, that have been catalyzed by **Montana State University (MSU)**. These industries work directly with the Biobased Institute to explore potential licensing for various products. MSU researchers are working with Wyoming Biodiesel to manufacture composite coal pellets (Bio-Koal™). These pellets are composed of 70 percent coal residue and 30 percent camelina oil and generate approximately 10,400 BTU/pound, whereas, the original coal generates 8,400 BTU/pound. The pellets have reduced carbon emissions relative to 100 percent coal and can be used in any coal-burning generator. Formula Grant: Hatch

The Ohio State University researchers are expanding utilization of products with known functionality or nutraceutical value and give consumers greater informed consumer choice, including the bioavailability of the desired substance in the food, than they presently have. Soft, chewy candies such as gummies are a large part of the US confectionery industry. Starch-set gummies offer an alternative to gelatin but are associated with shortness, a texture fault in gummy candies. Research has resulted in discovering how to make gummy confections using fruit juice concentrate such as grape, pomegranate and strawberry along with soy protein isolate substituting half of the wheat starch. This nutritionally enhanced product provides anthocyanins,

isoflavones, and soy protein. Oral health can also be targeted with these gummies and further product development and human clinical trials are planned to ascertain their effectiveness. An invention disclosure, fruit juice and soy gummy confection, has been filed at OSU's Office of Technology Licensing and Commercialization. Formula Grant: Hatch

A new biosafety processing plant was established at **Michigan State University** to provide researchers with the opportunity to conduct pilot scale studies to validate many of the models developed over the past five years. Tests in 2007 quantified the efficacy of low-energy x-ray irradiation for pasteurization of ground beef patties and verified inactivation rates for inoculated, whole muscle beef. A novel method to estimate thermal kinetic parameters of nutraceuticals was developed and spray-dried powders from grape pomace and cull blueberries were produced successfully on a pilot-size spray drier. The continued study of new approaches to improve cooling effectiveness and efficiency in post-harvest handling of tart cherries has resulted in improvements in cooling and indicators of product quality. Formula Grant: Hatch

Three varieties of crab appetizers were developed by **University of Maine** researchers: Curry, Jalapeno cheese, and Italian. Sixty-six consumers evaluated each on appearance, flavor, texture, and overall acceptability. The results show that minced meat by-products from Jonah crab can be used to create a consumer acceptable crab appetizer product. This research is likely the first to show that cooked crustacean proteins can form gels upon further treatment, and that the crab mince can be used as a primary ingredient in new value-added food products. Formula Grant: Hatch

Farm Management for Sustainability

Many socially disadvantaged farmers fail to use USDA Programs due to various reasons such as: past problems with USDA, unfamiliar with USDA programs, or reluctant to visit local office. Six extension associates from the **University of Arkansas at Pine Bluff** were placed in six areas of the state which had a high concentration of socially disadvantaged farmers. These extension associates worked directly with approximately 130 socially disadvantaged farmers to provide them with knowledge on USDA loans. As a result 57 socially disadvantaged farmers submitted applications and received \$6,028,696 in operating loan funds. Formula Grant: 1890 Extension

The **Florida A&M University Cooperative Extension** Small Farm Program identified several alternative enterprises for use by its small farm clientele interested in diversifying their farming operation. This program includes incorporating effective crop management to improve profitability. Introduction of alternative market outlets through various marketing channels including school districts throughout the southern region. One successful alternative crop was hot peppers which successfully improved income by \$2,500 per acre. This crop continues to have value-added significance in improving the livelihood and income of small farmers especially in North and Northwest Florida. Formula Grant: Evans-Allen

The **Alcorn State University Extension** Sustainable Animal Production Program resulted in 620 **Mississippi** producers being educated on best management practices for improved production efficiency of pasture-raised pork through workshops on production management practices, a

demonstration on management practices, and seminars on management practices. As determined through evaluation of (pre-post) test and observation by extension educators and animal science specialists, 80 percent of producers gained additional knowledge of best management practices for pasture-raised pork production and 20 percent have adopted practices that improve production. Formula Grant: 1890 Extension

The **University of Vermont** Extension provided financial management services that were targeted established farmers, new farmers needing financial management skills, and farmers exploring alternative agricultural opportunities. Of farmers participating in marketing, production, and record-keeping workshops: 178 sold directly to consumers after applying skills learned; 129 used financial statements to identify farm management problems; 43 showed increased farm profitability after applying skills to address management problems in farm operations; and 20 completed evaluations, with all 20 ranking farm viability services as critical to their overall success. Formula Grant: Smith-Lever

Markets, Trade, Policy, and International Development

Several next-generation, larger-scale pasture-based dairies owned by three New Zealand investment groups began development and operation in Missouri because of ongoing CSREES-funded dairy grazing research and extension efforts being conducted by the **University of Missouri**. These efforts include development of low-cost winter feeding systems for beef cattle. The largest of these dairies manages more than 3,000 cows and the smallest, 500 cows. The New Zealand groups have invested over \$50 million to date and more farms are being developed. One of the investment groups began operating a 500-cow operation in February 2007. By 2008, expansion and growth already planned by these new dairies is estimated to increase the total new investment to \$63 million, generate \$28 million in annual milk sales, add \$87 million in total annual economic impact and sustain 777 additional jobs in the state of Missouri. Formula Grant: Smith-Lever and Hatch

Food Safety

Food handlers representing 464 food establishments attended safe food handling educational programs conducted by **Clemson University** and **South Carolina State University**. The approximate economic value of the trainings in South Carolina was \$31,577,550 due to a reduction in the likelihood of medical costs incurred due to of incidence of foodborne illness. A total of 219,771 people are served by food establishments represented by participants in the training. Formula Grant: Smith-Lever and 1890 Extension

Nebraska leads the nation in commercial livestock slaughter; hence, meat safety is an economic and public health issue for citizens, producers, and industry. Since 2000, the **University of Nebraska** Extension has helped over 1,100 processors adopted Hazard Analysis and Critical Control Points (HACCP). Extension is a prominent provider of ServSafe, with more than 700 food service employees participating last year. As a result, the incidence of E. coli bacteria found in Nebraska ground beef samples decreased from 59 positive tests in 2001 to 20 positive tests in 2007. School Food Service providers reported a 90 percent increase in Standard Operating Procedures, an 84 percent increase in knowledge about the process approach to HACCP, and a 40 percent increase in knowledge about categorizing recipes/menu items into one of the three HACCP processes as a result of their training. Formula Grant: Smith-Lever and Hatch

Extension has been the key provider of food safety education in the state of Iowa. During this report period, 531 people have taken ServSafe and SuperSafeMark Food Safety certification courses through **Iowa State University** Extension. Food safety certification was awarded to 478 participants reflecting a 90 percent pass rate on certified exams. Formula Grant: Smith-Lever

As a result of a **Pennsylvania State University** program, six times as many pre-purchase animal biosecurity diagnostic kits have been used by producers and veterinarians since the start of the program in 2002 (52 in 2002, 297 in 2007). The kit contains collection and shipping vials for milk, feces, and blood. The milk is sampled for mastitis pathogens, and the serum sample is examined for bovine viral diarrhea (BVD), infectious bovine rhinotracheitis (IBR), and bovine leukosis virus (BLV). The fecal samples are examined for Salmonella and Clostridium perfringens. There was a 47 percent increase in the use during the last year. The purpose is to isolate the potential for disease pathway through purchased animals coming onto the farm. Land O Lakes milk cooperative has duplicated and distributed the Penn State BioSecurity poster to their co-op members (<http://vetextension.psu.edu/biosecurity/docs/biosecuremain.jpg>). The sign identifies the farm facility as a restricted biosecurity area.

Education

A **University of Minnesota** Extension program for Native American youth increased their academic performance on standardized achievement tests following the four week Exceptional Student Education program. A Terra Nova pre and post-test was administered. There was an 8.4 percent increase in math proficiency, and a 5.8 percent in science proficiency during the four week program.

Summary

CSREES believes that this new Plan of Work and Annual Report of Accomplishments is not only reducing burden on the States from the old Plan of Work and Annual Report requirements, it is also providing much needed supporting documentation for CSREES Portfolio reviews, the PART process for OMB, the budget submission, and other external requirements. As part of this documentation, we have been able to more efficiently and accurately link the outcomes from the Annual Report of Accomplishments via the Knowledge Areas to the CSREES and USDA strategic plans, and thus, to our goals and objectives, and to our portfolios. Many of the outcomes from this summary document have already been used in the CSREES Portfolio reviews, the budget process, and in a request for evidence of performance from Congress.

A separate, more detailed 2007 Annual Report Summary document focusing on a statistical summary has also been prepared and is available on the CSREES Plan of Work website.