

COOPERATIVE STATE RESEARCH, EDUCATION AND EXTENSION SERVICE

FY 1999 ANNUAL PROGRAM PERFORMANCE REPORT

The Cooperative State Research, Education, and Extension Service (CSREES) was created by the Department Reorganization Act of 1994 which merged the former Cooperative State Research Service and the former Extension Service into a single agency. The mission of CSREES is to achieve significant and equitable improvements in domestic and global economic, environmental, and social conditions by advancing creative and integrated research, education, and extension programs in food, agricultural, and related sciences in partnership with both the public and private sectors.

CSREES is an enabling agency which provides Federal financial assistance, program planning and coordination, and leadership to a widely dispersed, university-based research and education system. Information regarding appropriation authorities and CSREES' programs can be found in the CSREES Strategic and Annual Performance Plans.

Only federal employees were involved in the preparation of this report.

CSREES PERFORMANCE SUMMARY	
Strategic Goal/ Management Initiative	FY 1999 Performance Goals
Goal 1: An agricultural production system that is highly competitive in the global economy.	Develop new and value added products
	Improved animal production systems.
	Reduce production costs and improve environmental stewardship
	Improved risk management skills and practices of agricultural producers, processors, and marketers.
Goal 2: To provide a safe and secure food and fiber system.	Expand efforts to recover, preserve, and establish networks to distribute food.
	Develop and improve detection and prevention methods to reduce pathogens
	Develop improved surveillance and education programs.
	Decrease contaminants in the food supply.
	Enhance Risk Assessment and Management Strategies
Goal 3: To achieve a healthier, more well-nourished population.	To improve the health of citizens through changes in diet, quality of food, and food choices.
	Molecular and cellular basis of nutrition.
Goal 4: To achieve greater harmony between agriculture and the environment.	To develop, transfer and promote the adoption of efficient and sustainable agriculture, and other resource conservation policies that ensure ecosystem integrity and biodiversity.
	To develop, transfer and promote efficient and sustainable technologies that protect water quality.
	To understand the impacts (benefits and harmful effects) of global environmental change.
	To understand the compatibility of agricultural practices on the natural resource base and environment.
Goal 5: To enhance economic opportunity and the quality of life among families and communities.	To improve approaches for understanding changing characteristics of communities and families.
	Improve economic and social indicators of community well-being.
	To understand the impact of agricultural technologies and practices on the environment, people, and communities.
MI 1: Strengthen the Federal/State Partnership	Identify and implement funding opportunities that promote the agricultural research, extension, and education capacity of minority-serving institutions
	Encourage the participation of minority institutions in agency outreach efforts.
	Solicit and obtain input from CSREES stakeholders to address agricultural research, extension, and education issues and to develop approaches to problem-solving.
	Identify and foster partnerships with other Federal agencies to increase outside interest and support of CSREES activities.
MI 2: Integration of Research, Extension, and Education	Develop and maintain an agenda for promoting the integration of research, extension, and education where possible.

CSREES PERFORMANCE SUMMARY	
Strategic Goal/ Management Initiative	FY 1999 Performance Goals
MI 3: Improved Information Management Systems	Enhance the Current Research Information System (CRIS)
	Implement and Maintain the Research, Extension, and Education Information System (REEIS) for Use by the REE Agencies, USDA, and their Partners and Customers in Accessing Information
MI 4: Improving Financial Management within USDA	Implement integrated financial management systems in USDA
	Correct internal control deficiencies in a timely manner
	Maintain and provide access to reliable cost accounting information
	Clean and timely audit opinion on audited financial statements
	Compliance with Debarment and Suspension and Drug-Free Workplace Programs

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

Objective 1.1: To produce new and value-added agricultural products and commodities.

Key Performance Goal

Develop new and value added products

CSREES funding has resulted in increased earnings for farmers through developing new and value-added agricultural products. **Virginia** has developed a process for turning corn fiber into the sweetener Xylitol which could raise the value of corn fiber from five cents per pound to nearly \$2. Illinois has developed a process for producing butanol from corn. **Florida** has developed a process for turning leftover corn and other plant material into ethanol, reserving the grain for animal and human use. **Colorado** has created a canola-based motor oil that works just as well as the petroleum version, cuts hydrocarbon emissions by a third and disposal is worry free. **Delaware** has developed a new soybean-based hydraulic fluid that outperforms most other vegetable-based products. **Arizona** has found meat byproducts from cattle, swine, and ostrich, unfit for human consumption make perfect pet treats. **Illinois** has developed a mutant strain of bacteria that is used to produce butanol from corn, which can be used in food applications since petroleum-based butanol is not desirable for food applications because of impurities derived from the petrochemical.

CSREES funded research in **Alabama, Florida, and Georgia** in cooperation with the USDA Agricultural Research Service has released 10 wheat, four barley, and three triticale varieties, plus eight new germplasm sources. The improvements increases the efficiency of domestic producers and help them compete in foreign markets. **New York** researchers have released four new wheat varieties with superior milling quality and yield.

With CSREES funding, **Florida** researchers found a gene from pond algae that will help wheat plants grow quicker and stronger on less fertilizer. A private company has licensed the technology. **Wisconsin** has discovered that applying soluble calcium to potatoes between July and September reduces tuber defects and losses to soft rot in storage and prevents yield reductions in hot weather. This improvement in potato quality nets growers an additional \$100 an acre.

The Small Business Administration conducted a survey of all Phase II recipients under the Federal-wide Small Business Innovation Research (SBIR) Program from 1983 through 1988 and reported that 30 percent of CSREES Phase II recipients had achieved some degree of commercial success as measured by sales of products or services. Two years later a questionnaire was sent to all Phase II winners through 1995. Concentrating on recipients from 1988 through 1995 found that better than 50 percent had achieved some degree of commercial success. This would indicate a significant improvement in the rate of commercialization through successful Small Business Innovation Research grant recipients. The extent of sales ranged from \$10,000 to nearly \$50 million with the median being around \$600,000. The USDA SBIR program administered through CSREES increased from \$10.9 million in FY 1997 to \$13.3 million in FY 1999.

Research and education programs from ongoing partnerships are helping U.S. producers survive and thrive at a time when new free trade agreements are altering the global landscape. These research and education programs are helping producers meet the challenges of changing domestic markets, consumer demands for high quality products at affordable prices, and complex environmental and safety regulations. Researchers at **Illinois** have found that high quality soybeans command higher prices in European and Japanese markets. Some foreign buyers are now specifying oil and protein contents in their contracts, and the USDA has added a measure of these contents to official standards. The Illinois studies provide producers with incentives they need to revise soybean grades for more than 60 percent of U.S. exports. Similar research has improved the quality of U.S. corn exports.

The National Research Initiative Plant Genome Program generated important basic research results that are enabling the rapid development of new plant species with enhanced traits for increasing yield, developing new products or improving quality. The program focused on four major areas of research: 1) cloning agriculturally important genes; 2) developing new technologies for genomic mapping, gene manipulation, isolation, or transfer in plants; 3) creation of new germplasm lines/varieties; and 4) software development for genome databases. Over time, results will lead to better production strategies, with potential for increased returns to producers/processors and improved products for consumers.

South Carolina has developed a packaging film from shrimp and crab shells. These films are produced with materials that exhibit natural antimicrobial properties and other capabilities that suggest possible applications for food processing, wound dressings, or other uses.

1999 Data: No aggregated quantifiable data to present.

Analysis of Results: The performance goal was met through the research and extension work of the CSREES State partners.

Objective 1.2: To increase global competitiveness of the U.S. agricultural production system.

Key Performance Goals

Improved animal production systems.

CSREES funding in biotechnology research is having good results. A breakthrough vaccine developed by **Minnesota** saves producers \$200 million a year and protects baby chicks against the three major threats to poultry (Marek's, bursal (IBD), and Newcastle diseases), at the same time.

Idaho has demonstrated the usefulness of polymerase chain reactions in detecting the presence of the Ikt gene and thereby differentiating among strains of Pasteurella organisms which have been implicated in serious disease in wild and domestic sheep and other ruminants. The PCR procedure offers the potential for rapid monitoring of animal populations to determine if they are compatible-based on their microbial flora, or if intermingling populations is likely to result in disease transmission. Results will lead to improvements in human health.

A team of faculty from **Rutgers, the State University of New Jersey, the University of Maryland -Eastern Shore, and Sussex County (New Jersey) Community College** are using grant funds to produce interactive software illustrating concepts within animal nutrition. Modules are being developed by a team of content specialists and instructional technologists recruited from throughout the Northeast and Mid-Atlantic region. The first three completed modules are in the areas of the nutrition of reproduction and pregnancy, carbohydrate chemistry, and carbohydrate digestion. Eventually, the modules will be available to nutrition instructors across the nation.

Mississippi has found a way to shorten the time needed to run the RT-PCR (reverse transcriptase polymerase chain reaction) test that accurately and now quickly detects and identifies infectious bronchitis virus in poultry. Thus, by more accurately and quickly identifying this virus, birds can be vaccinated properly, thereby increasing producer income and saving the industry money.

Nebraska applied DNA Polymerase Chain Reaction (PCR) technology to pseudorabies. These powerful tests provide fast, accurate results for "singleton reactors," single pigs that test positive in standard tests within otherwise negative herds. The advanced tests and procedures developed by Nebraska scientists have helped regulators, veterinarians and producers make significant progress in the fight against pseudorabies. Many labs across North America and abroad now use Nebraska's tests and procedures. Nebraska is 99 percent free of pseudorabies and is expected to be pseudorabies-free by early 2000. The national campaign is on target to meet its goal of eradicating pseudorabies from U.S. swine by the end of 2000.

Utah State University researchers developed a vaccine for Aleutian disease which had threatened the mink ranching industry. Millions of dollars in losses were averted (last year mink brought in about \$3 million to the economy). Savings include significant contributions to the county tax base employment. Patent royalties from the vaccine will also benefit the state.

Wisconsin found that meat cuts from cattle supplemented with vitamin E stayed fresh-looking up to three days longer on supermarket shelves. The cost of the vitamin E supplementation is \$3 per animal and the increased value of the color extension is \$20-\$30 per animal. Producer groups in **California, Iowa and Missouri** have implemented the technology and are selling meat from cattle that have received the vitamin E supplements.

Wisconsin dairy scientists have developed a way to heat-treat soybeans so that cows can use more than 20 percent of the protein. After proper heat treatment, up to 50 to 60 percent of the protein escapes rumen bacteria and is available for cows use in milk production increasing yield by 3 to 5 pound per day per cow.

California developed the "J-5" vaccine which prevents coliform mastitis infections in dairy cattle. The use of the J-5 vaccine to prevent mastitis saves the California dairy industry an estimated \$11 million a year--about \$52 per cow, or roughly 25 percent of a producer's profit margin. The preventive strategy also reduces the use of antibiotics, protecting consumers from possible drug residues.

Reduce production costs and improve environmental stewardship.
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A weather station network operated by **Texas A&M** delivers timely information on water evaporation and soil moisture to farmers on the Texas North Plains. In 1998, information provided by the network helped farmers save precious groundwater by cutting two inches of water from the 20 to 22 inches normally applied during the growing season. Because they pumped less groundwater, farmers saved \$10 million in fuel costs.

Georgia scientists have identified a combination of products that are just as effective as methyl bromide in controlling weeds, insects and disease-causing organisms. In their studies, the tobacco, tomato and pepper plants grown in plots treated with the new combination were comparable to those in plots treated with methyl bromide. The research will help farmers stay competitive with those in developing countries that will still be able to use methyl bromide.

1999 Data: No aggregated quantifiable data to present.

Analysis of Results: The performance goal was met through the research and extension work of the CSREES State partners.

Objective 1.3: To improve decision-making on public policy issues related to the productivity and global competitiveness of the U.S. agricultural production system.

Key Performance Goal

Improved risk management skills and practices of agricultural producers, processors, and marketers.

On August 31, 1999, CSREES launched a new farm crisis Web site -- "Helping Rural America Face Crisis" at <http://www.reeusda.gov/farmcrisis.htm> -- to provide informational resources to the public about the various elements that constitute disaster for farmers, ranchers, and agribusinesses. The Web site contains links to information from the land-grant system about how the system is responding to farm crises, as well as links to programs that help rural and urban residents survive crisis and disaster. The Web site's coverage of farm crises will change as the crises change. In fall 1999 the emphasis was on the effects of heat and drought on eastern states, and on the effects of hurricanes on southeastern U.S. seashores. A special section links to sites designed to educate and inform children about crisis and disaster.

When agricultural economists analyzed a trade problem 15 years ago, it took almost five years to get results. Now, **Purdue's** computerized Global Trade Analysis Project (GTAP) is being used by more than 140 research groups around the world to analyze the effects of trade, transportation and protective trade barriers on everything from textiles to climate change. One World Bank official said GTAP "has done for model building what Ford did for motorcars."

CSREES' *Small Farm Digest* is distributed three times a year to about 30,000 farmers, producers, and consumers. CSREES and its university partners completed a National Plan for Small Farms, outlining implementation strategies, goals for research, education and outreach, and expected impacts. The National Plan was adopted by the National Commission on Small Farms. The second National Small Farms Conference, co-sponsored by USDA and organized by Lincoln University (Missouri), drew several hundred participants in October 1999 in St. Louis. The conference was organized around practical workshops on six issues of significance to operators of small and mid-size farms.

1999 Data: No aggregated quantifiable data to present.

Analysis of Results: The performance goal was met through the research and extension work of the CSREES State partners.

Goal 2: To provide a safe and secure food and fiber system.

Objective 2.1: To improve access to an affordable, healthful, and culturally relevant food supply.

Key Performance Goal

Expand efforts to recover, preserve, and establish networks to distribute food.

Alabama, Arizona, Florida, Indiana, Maine, Massachusetts, South Dakota, and Washington reported Gleaning and Food Recovery programs. In an effort to expand the food supply for low income families, Washington State EFNEP has developed a Gleaning Project in which volunteers are recruited and trained to harvest produce after the commercial harvest. Analysis of data from the 1997 season, showed that 50 volunteers harvested 110,000 pounds of produce; 77% was donated to the local emergency feeding site, and 23% was taken home by the gleaners. Of the food taken home by the gleaners, 9% used fresh in meals, 48% was preserved by the family for later use, and 43% was shared by others. The conclusion was that the gleaning program was expanding the food supply for many families in EFNEP and other families in Washington.

1999 Data: No aggregated quantifiable data to present.

Analysis of Results: The performance goal was met through the research and extension work of the CSREES State partners.

Objective 2.2: To improve food safety by controlling or eliminating food-borne risks.

Key Performance Goals

Develop and improve detection and prevention methods to reduce pathogens.

CSREES funding is enabling research and development of rapid detection methods to improve food safety by controlling or eliminating food-borne risks. **Florida** researchers are doing comparisons between chemical methods and new rapid detection kits for scombroid toxin. Kits appear to have great applicability and utility to the industry, and some are capable of being efficient and accurate screening tools. In **Kansas**, the most recent studies of chemical residue detection have focused on *Fusarium* mycotoxins, dioxins, and heterocyclic amines in beef tissues. Kansas State is evaluating the impact of processing on these compounds and the formation of other compounds during processing. The Southeast Dairy Foods Research Center, which is operated jointly by **North Carolina State University** and **Mississippi State University**, received two new patents and filed four new disclosures. One, a phage defence rotation strategy, has been commercialized and implemented by a large multinational company. Center activities focus on the functionality of milk components that affect the quality, flavor and texture of dairy foods, microbial and genetic technologies related to spoilage and safety, and novel biological and thermal processing techniques. These activities create dairy ingredients with higher commercial value, accurate detection methods for the presence of pathogens, and opportunities to improve vitamin delivery. A

University of Arkansas research team has modified tissue culture tests for both *Campylobacter jejuni* (Campy) and *E. coli* 0157:H7 to determine whether the bacteria are harmful and at what level of pathogenicity. The new tests take from 12 to 24 hours to produce results, significant improvements over the previous methods that required from 48 to 72 hours for Campy and from 72 to 96 hours for *E. Coli*. **California** is working on an 8 hour test for detecting the *E. Coli* bacterium. **Nebraska** scientists devised fast (30 minute), accurate tests that food processors can use in their plants to check for traces of peanut or egg allergens in processed foods and on equipment.

In **Washington**, 90 cases of food poisoning were linked to a traditional homemade cheese called queso fresco. This traditional food, popular with the Hispanic community, is usually made from raw, unpasteurized milk. **Washington State** food scientists found they could easily modify the recipe so cheese makers could use pasteurized milk.

Land-grant food scientists and extension educators are helping food producers bring safer food to the market and helping consumers relax. Though cases of *salmonella* food poisoning from eggs are rare, research by **Purdue**, **North Carolina State** and **Texas A&M** may make it nearly nonexistent. **Purdue's** low temperature, pasteurization process kills *salmonella* on the egg shells without cooking the eggs.

Michigan Agricultural Experiment Station scientists have developed a simple test to determine if meat and poultry products have been cooked properly. The enzyme-linked immunosorbent assays (ELISAs) use naturally occurring proteins to determine if the endpoint temperature is high enough to kill bacteria, including *E. coli*. The tests work much like litmus paper -- a drop of meat juice is placed on part of a test strip and the strip changes color to indicate proper doneness.

Researchers at **Missouri** have developed an alternative to nuclear fuel-based radiation. A small accelerator has been developed that creates an invisible beam of electrons. It does not present problems of radioactive contamination or disposal of spent fuel. The new Missouri technology is 100 percent effective in killing microorganisms in hamburger meat. The technology is not yet cost competitive, but offers an alternate route to food safety with significant future potential.

1999 Data: No aggregated quantifiable data to present.

Analysis of Results: The performance goal was met through the research and extension work of the CSREES State partners.

Develop improved surveillance and education programs.

The Expanded Food and Nutrition Education Program (EFNEP) provides education to low-income adults and youth to prevent food-borne illness. Interactive, experiential learning approaches are used to reach an ethnically, linguistically diverse audience. As a result, 66 percent of 112,000 adult graduates improved in 1 or more food safety practices and 46 percent of 111,755 youth improved practices in food preparation and safety.

CSREES created and is hosting USDA's Web site dedicated to the Secretary of Agriculture's Community Food Security Initiative (http://www.reeusda.gov/food_security/foodshp.htm). The Web site contains graphics created by USDA's Economic Research Service, and community food security information from throughout USDA. CSREES will soon expand the Community Food Security Initiative home page to include more detailed information that can be directly used by nonprofit groups and other grass-roots partners to decrease hunger, improve nutrition, and help families move from poverty to self-sufficiency.

Florida is housing the country's National Food Safety Database, set up to educate consumers, the food industry and educators on the causes of food poisoning and on food safety guidelines currently features more than 4,000 documents on its web site (www.foodsafety.org), with new information added daily. The site's easy-to-use search system offers rapid access to food safety information nationwide. A hot topics button features the latest breaking news on food safety. In addition to news and the latest government reports, visitors to the site can download and print a variety of food safety publications, including fact sheets on each of the leading causes of food-borne illness as well as recommended methods to use to prevent food-borne illness. The database receives more than 77,000 requests for information each week. They also have produced "Let's Have a Killer Cookout... Not!" - an interactive CD-ROM that provides children in grades 3-12 with an interactive way to learn about food safety. Over 300 schools across the U.S. currently use the CD-ROM to train children about food safety and implementation is still growing.

Studies say that 97 percent of foodborne illness could be avoided simply by improving food handling practices at home and in restaurants. A food safety program at **Purdue** provided training to the 275 community-based emergency food organizations that serve 240,000 meals per month. About 3 million people in the United States are homeless and rely on soup kitchens and food banks for food. **Cornell** is working with New York City's 640 soup kitchens training volunteers in food safety and handling issues.

National program leaders at CSREES are working closely with several partners in support of the President's Food Safety Initiative. CSREES, the Cooperative Extension System, the Food and Drug Administration (FDA), and USDA's Food Safety and Inspection Service planned and coordinated two national education conferences that brought together state core teams. The teams received training and education enabling them to develop and implement state HACCP (Hazard Analysis and Critical Control Point) planning and marketing strategies. A new food safety program was initiated addressing microbial contamination in fruits and vegetables. In November 1998, a national food safety conference was held. The proceedings from this conference contributed to the content of the interagency working group food safety research plan. As a result of a joint USDA-FDA conference held in April 1999, food safety education and outreach programs for growers of fresh fruits and vegetables were developed. In collaboration with HHS, a Joint Institute for Food Safety Research is being established under the President's Council of Food Safety.

Cooperative Extension System toxicologists and environmental chemists from the University of **Idaho**, University of **California** at Davis, **Oregon** State University and **Michigan** State University joined forces to found ExToxNet. The group previously developed an extensive database of pesticide toxicology information profiles written in lay language. The group expanded a Worldwide Web site which offers a refereed educational and instructional resources guide, frequently asked questions (FAQ) section in self-tutoring style and multiple affiliate contacts in each state. ExToxNet draws more than 70,000 hits per month on the Internet, with more than 8,000 from the Worldwide Web. Topics covered range from weighing the risks of adverse health effects to diet changes that can help us avoid cancer. The Internet offers a very cost-effective method of providing toxicology and environmental chemistry information to the public and other professionals.

1999 Data: No aggregated quantifiable data to present.

Analysis of Results: The performance goal was met through the research and extension work of the CSREES State partners.

Objective 2.3: Minimize threats to plant and animal production.

Key Performance Goals

Decrease contaminants in the food supply.

At **Missouri**, scientists are combining genetically altered soybean varieties with new herbicides to reduce weed control costs by 33 percent. Nebraska has developed weed management software that is being used to cut herbicide applications by 20 to 30 percent on nearly 1 million acres. These researchers have teamed up with **North Carolina** State scientists to expand the use of the weed management software nationally.

The **Purdue** University Integrated Pest Management Collaborative Research Support Program (IPM CRSP) in Central America has given technical assistance to Central American countries to help resolve food safety issues related to the import of fruits and vegetables. They set up research and development programs aimed at reducing the use of pesticides and increasing crop performance during production and post-harvest handling. The Purdue program has helped nearly 20,000 fruit and vegetable crop producers and shippers reduce reliance on pesticides and thus gain greater access to U.S. markets. Improved product quality and safer food supplies mean greater selection of fresh fruits and vegetable at lower costs to U.S. consumers during winter and early spring marketing periods. Eighteen hundred small farmers operating as a cooperative are now using the Purdue IPM CRSP production and post-harvest strategies developed for snow peas. Growers with San Juan Agro-Export have been able to reduce their pesticide applications in snow peas from 15 to four per growing season, while increasing their product quality, lowering their product rejections and increasing their returns per hectare.

1999 Data: No aggregated quantifiable data to present.

Analysis of Results: The performance goal was met through the research and extension work of the CSREES State partners.

Enhance Risk Assessment and Management Strategies

Kansas State Research and Extension has conducted tests on the reaction of these meats to irradiation. The findings concluded that irradiated beef responded extremely well when vacuum-packed. Bacterial counts remained low, and color and taste were unaffected. Irradiation is an economical way of safely treating meat products. Irradiation could provide an extra margin of safety from food-borne pathogens. If processors build irradiation facilities next to their processing or distribution centers, the costs could be as low as about 1 cent per pound. If the irradiation has to be contracted out, it could cost 5 cents to 7 cents per pound. **Iowa** found that the term irradiation has greater acceptance for those who have heard it explained in an educational setting. Many states have implemented an irradiation education program for consumers.

Maine Cooperative Extension joined the Food and Drug Administration, Maine Department of Agriculture, Maine Department of Marine Resources and members of the seafood industry to form the Northern New England Seafood Alliance. The Alliance offered HACCP courses for over 550 seafood processors. In 1998, Cooperative Extension also joined USDA to provide educational HACCP seminars for 10 meat and poultry processors. When surveyed, 88 percent of respondents have completed a HACCP plan for their operation.

1999 Data: No aggregated quantifiable data to present.

Analysis of Results: The performance goal was met through the research and extension work of the CSREES State partners.

Goal 3: To achieve a healthier, more well-nourished population.

Objective 3.1: To optimize the health of consumers by improving the quality of diets, the quality of food, and the number of food choices.

Key Performance Goals

To improve the health of citizens through changes in diet, quality of food, and food choices.

Evaluations of the Expanded Food and Nutrition Education Program (EFNEP) -- which observed its 30th anniversary in 1999 -- show that EFNEP graduates learn valuable skills of benefit not only to themselves but also to society. As a result of this program, 92 percent improved their diets to more closely follow the USDA Food Guide Pyramid recommendations, 84 percent improved food resource management skills, 89 percent improved nutrition practices, and 66 percent improved safe food handling practices. The ability to choose a more nutritious diet at lower cost has a big pay-off in terms of food security; 41 percent of graduates report that they less often run out of food before the end of the month. A cost-benefit study of EFNEP found families saved \$2.48 on food expenditures for every \$1 spent on implementation of EFNEP, reducing the need for emergency food assistance. A **Virginia** study indicated that \$10.64 in reduced health care costs for were achieved for every \$1 spent to implement EFNEP. Such evidence shows that nutrition education can play an important role in improving food security within communities. Society benefits from EFNEP because money saved by EFNEP graduates can be used to purchase other goods and services and may reduce the need for emergency food resources. **Louisiana State** Extension reached nearly 4,000 families and more than 9,000 youth with information. Of these, 95 percent made positive dietary changes, increasing consumption of milk, fruits and vegetables; 48 percent said they ran out of food less often before the month's end. **Oregon State's** EFNEP program uses peers to teach others about best food choices with similar results -- 87 percent of participants said their kids ate breakfast more often.

Sisseton Wahpeton, South Dakota, and **United Tribes, North Dakota**, developed Nutrition and Dietetics teaching programs that are important to the Indian population given the high level of diabetes and obesity and related health issues found in the communities served by those Tribal Colleges.

1999 Data: No aggregated quantifiable data to present.

Analysis of Results: The performance goal was met through the research and extension work of the CSREES State partners.

Molecular and cellular basis of nutrition.

Nebraska and **Texas A&M** have developed efficient system for producing eggs that are high in omega-3 fatty acids, which reduces heart disease. **Wisconsin** has developed a process for producing eggs that are 25 percent lower in fat and cholesterol. A company that licensed the method sold more than 36 million eggs in 18 months. **Michigan** has patented a process that extracts 96 percent of the cholesterol from egg yolks while maintaining the egg's original protein and flavor. This process will soon be commercialized, is economical and works on an industrial scale.

A new "wonder peanut" developed at the University of **Florida** beats olive oil in healthful benefits. The SunOleic 97R peanut, not only surpasses olive oil in cholesterol-lowering properties, it offers growers better yields than the industry standard, "Florunner" - 10 to 14 percent more peanuts per acre. It offers manufacturers and retailers a three- to 15-fold increase in product shelf life, and has a more than 80 percent oleic fatty acid content, which is more than regular peanuts, olive oil, or canola oil. The new peanut's chemistry, in conjunction with a low-fat diet, was shown to help reduce coronary risk factors by lowering blood cholesterol levels in postmenopausal women.

1999 Data: No aggregated quantifiable data to present.

Analysis of Results: The performance goal was met through the research and extension work of the CSREES State partners.

Goal 4: To achieve greater harmony between agriculture and the environment.

Objective 4.1: To protect the natural resource base to ensure both sustainability and economic viability for multipurpose use (e.g. agriculture, forestry, wildlife, recreation, etc.)

Key Performance Goals

To develop, transfer and promote the adoption of efficient and sustainable agriculture, and other resource conservation policies that ensure ecosystem integrity and biodiversity.

Programs coordinated by extension specialists at **Florida, Penn State, Purdue, Texas A&M** and **Cornell** are teaching school maintenance personnel how to use Integrated Pest Management (IPM) practices to reduce or eliminate pesticides in and around their schools. The number of school districts in Florida routinely spraying pesticides has dropped from 75 percent to 40 percent. Forty percent of Pennsylvania school districts also are now implementing IPM programs, and an IPM curriculum is being developed for use in public school science classes. In Texas, IPM is being promoted to more than 400 school districts.

CSREES funding has enabled states to develop more environmentally friendly alternatives to traditional waste disposal. **Oregon** has found uses for 6,000 tons of waste from alfalfa seed production as part of a compost mix for mushroom growers. **California** has recycled more than 1.2 million tons of plant waste into compost for various crops. 4-H youth in **Texas** have started a used oil recycling program for use in making asphalt for Texas roads. **Delaware and New York** have discovered that altering poultry diets can reduce phosphorus levels by up to 80 percent in poultry litter, making it suitable as fertilizer for crops. **Wisconsin** Extension has helped more than 200 industries turn waste into recycled products. Wisconsin found that sludge from paper mills improve the nutrient and moisture-holding capacity of area soils. Likewise, **Louisiana** found that the ash/lime/fiber waste mixture from a local paper mill significantly increased the nutrients of acidic, low-calcium soils. **Pennsylvania** has a patented technology that uses recycled paper as mulch to establish turf grass in lawns. **Georgia, Indiana, Florida, Maine, and Tennessee** have reported successful composting education programs for yard waste.

California has developed immunoassays similar to the ones used for home pregnancy tests. These assays are inexpensive but highly sensitive and specific. They allow monitoring for pesticide residues in many matrices including soil and water for environmental monitoring. We have applied them in programs to monitor and minimize farm worker exposure to pesticides. They are being used in Japan, Australia and several other countries to monitor food and feed for pesticide contaminants. A tremendous potential is for residue analysis in developing countries to allow their produce to enter international markets. Assays have been developed in the laboratory for over 60 pesticides as well as mycotoxins, heavy metals, and numerous industrial products. They have been provided gratis to regulatory and environmental agencies

(CDFA and EPA) and are sold commercially in several countries. Kits also have been used to teach environmental analysis in high schools and colleges. Improved monitoring of pesticide residues in soil, water, and food and feed products as well as farm worker exposure to pesticides.

1999 Data: No aggregated quantifiable data to present.

Analysis of Results: The performance goal was met through the research and extension work of the CSREES State partners.

To develop, transfer and promote efficient and sustainable technologies that protect water quality.

Using best management practices introduced by **California** Extension, farmers reduced sediments in the San Joaquin River by 720,000 tons since 1991. **North Carolina** Extension demonstrated new technologies to farmers, saving \$50,000 in nitrogen costs and reducing nitrogen use by 250 farmers in the Neuse River basin. **Illinois** has found a native aquatic plant, called hornwort, which soaks up atrazine, thus dropping atrazine levels in water by a factor of two every three days. **Minnesota** isolated a soil bacteria that degrades and mineralizes atrazine in a fast and economical way. Several states helped test private water sources to help conserve water from private wells and springs. **Maryland** Extension's educational package helps landowners understand riparian forest buffers and their functions and value in agricultural, urban and forested settings. It is now being used as a model in **Pennsylvania and Virginia**.

An eight-year study by **Auburn** scientists shows constructed wetlands eliminate odors and remove most of the pollutants from wastewater that can adversely affect the environment. Constructed wetlands have successfully treated all wastewater generated by a 500-pig operation in **Alabama**. The treated wastewater meets federally mandated discharge criteria. This method has been used as a prototype by many communities and farming operations.

New **Arkansas**-adapted rice varieties are tested to determine the amount and timing of nitrogen fertilizer needed for profitable grain yields under Arkansas conditions. Results show that newer varieties need all of their nitrogen for early growth rather than split applications in early- and mid-season, which worked best for older varieties. Arkansas researchers also developed a simple tool, called the Rice Plant Gauge, to determine at mid-season if the field needs more nitrogen. Applying only the amount of nitrogen plants can use reduces the risk of nitrates in runoff water entering surface water supplies.

University of **Arkansas** and the Agricultural Research Service, USDA, developed an economical chicken litter treatment that changes phosphorus to a form that has no negative environmental impact. The treatment is to mix alum with the chicken litter before it is applied to the land. Fields where alum-treated litter was applied had 87 percent less phosphorus in the runoff water than fields where the same amount of litter with no alum was applied. Based on this research, alum treatment of poultry litter is now recommended and is widely practiced in areas of concentrated poultry production.

Louisiana State University developed a biodegradable product that can clean up spilled oil in hard-to-get-to places. The product uses milled bagasse – the fibrous leftovers from sugar production – to soak up spilled oil and create an environment that sustains the bacteria that digest the material. The product can be applied to vegetated wetlands and promote oil disappearance without having to be recovered later. It's naturally absorbent and has an uncanny ability to absorb the same amount of oil whether it is wet or dry. And treating it with ammonia creates a nitrogen-rich environment for the 'bugs' that digest the oil. With ammoniated bagasse, 98 percent of spilled oil will be gone within 90 days. The material holds the oil and doesn't let it be displaced by water. And, it's self-composting and actually turns crude oil into humic material – soil. Louisiana has licensed the technology to a corporation and is working with that corporation to construct prototype reactors to commercialize the ammoniating process.

1999 Data: No aggregated quantifiable data to present.

Analysis of Results: The performance goal was met through the research and extension work of the CSREES State partners.

Objective 4.2: To enhance the stewardship of national resources to minimize negative environmental consequences on agricultural production.

Key Performance Goals

To understand the impacts (benefits and harmful effects) of global environmental change.

No-tillage is one of the best crop production practices for erosion control. **Ohio** found that no-tillage also removes carbon dioxide from the atmosphere and puts it back into the soil as new organic matter (humus). This improves the quality of the soil and helps reverse the greenhouse effect. However, no-tillage relies almost exclusively on herbicides for weed control. Soil quality becomes an issue and the addition of compost to no-tillage soil may be called for.

A University of **Maryland** researcher is conducting research to determine the role that UV-B radiation plays in the growth and development of plants. The research centers on Eastern tree species and selected crops, such as soybeans. Once the mechanisms of response to UV-B radiation have been identified, breeding programs and recombinant techniques can be used to enhance plants' tolerance of UV-B radiation. Application of the basic research conducted in this project could have significant economic impact for agricultural and forest production. And while this project does not directly involve human or animal health issues, the techniques used in the analysis of DNA changes caused by UV-B in plants may also be useful in investigations of other organisms.

1999 Data: No aggregated quantifiable data to present.

Analysis of Results: The performance goal was met through the research and extension work of the CSREES State partners.

To understand the compatibility of agricultural practices on the natural resource base and environment.

Albuquerque Technical-Vocational Institute and **New Mexico State University** designed 3 courses and revised 5 others in Pest Management and Soil Science for students to transfer to New Mexico State's School of Agriculture to pursue studies in these areas.

Texas Agricultural Experiment Station and Agricultural Research Service, USDA, scientists have created single crop, farming system, and hydrologic computer models that can be integrated with information generated from natural resource data bases. These models have been used to examine the impact on production and the environment of selected management decisions (e.g., varying timing and amount of fertilizer, herbicide, and pesticide applications on a farm field; or varying methods of applying animal wastes in a watershed). The models also have increased the information available on elevation, soil, land use/land cover, and climate. These models have been adopted around the world and have impacted local, state and national policy. Organizations such as the Natural Resource Conservation Service, Environmental Protection Agency, the World Resources Institute, and state water districts and environmental agencies have used the models to examine the cost/benefit ratio associated with national programs, to study long term agriculture's impacts on soil erosion and water quality for developing national policy, and to quantify the environmental effects of changes in regional production and management

practices. The models also were used to identify sources of sediments and nutrients in aquifers, rivers, lakes, and estuaries in the continental U.S. and to develop recommendations for improving water quality in targeted regions.

Results of an **Indiana** study demonstrate that environmental risks do exist for commercial production of transgenic fish. The negative economic impact of an accidental release of a transgenic fish on the environment could be huge. For example, if the transgenic fish has a mating advantage combined with reduced viability such that the least fit males get the majority of matings, the transgene could drive the species to extinction with possible detriments to any other species which depend on the extirpated population for survival. At the very least, the methods developed by Purdue researchers to determine the environmental risk of the introduction of transgenic animals to the wild can be used to help regulatory agencies make decisions about transgenic animal production.

1999 Data: No aggregated quantifiable data to present.

Analysis of Results: The performance goal was met through the research and extension work of the CSREES State partners.

Goal 5: To enhance economic opportunity and the quality of life among families and communities.

Objective 5.1: To increase the capacity of communities and families to enhance their own economic well-being.

Key Performance Goal

To improve approaches for understanding changing characteristics of communities and families.

A Memorandum of Understanding (MOU) was signed with the Department of Defense to develop children and family programs for Defense installations. This partnership places 4-H youth development and technology specialists from 16 states in Army Major Commands to provide technical assistance to Army staff working in child and youth services. A goal is to establish 4-H youth development programs in all 123 Army installations in the next two years.

CSREES Community Leadership Programs take on a variety of formats across the country. In **Louisiana**, of the 400 graduates of the Community Leadership and Economic Development Program, 46 percent have either run for an elected office or been appointed to a board, commission, etc. In **Wisconsin**, 3,206 adults and 2,109 youth participated in county level partnerships related to youth development. In **Connecticut**, the People Empowering People participants improved their communications skills, increased their knowledge of community resources and presented local workshops on a variety of community issues. In **South Carolina**, graduates of the Public Issues Management School became certified facilitators and addressed community issues regarding land use and woodlands management plans.

1999 Data: No aggregated quantifiable data to present.

Analysis of Results: The performance goal was met through the research and extension work of the CSREES State partners.

Objective 5.2: To increase the capacity of communities, families, and individuals to improve their own quality of life.

Key Performance Goal

Improve economic and social indicators of community well-being.

CSREES funded programs are working to help small businesses remain viable and profitable. Fourteen States reported programs in education for small business owners or prospective owners. **The University of Maine Cooperative Extension** provided direct assistance to 1,200 entrepreneurs across the state, helping to add 250 new jobs to the Maine economy. Missouri developed an experiential learning strategy in its newly developed Home Based Business curriculum. As a result of this workshop, 50 percent of participants determined to go forward with their plan for a home-based business, 30 percent determined that they needed to give more thought to starting such a business and 20 percent decided not to start a business at this time. These business owners sharpened their management skills, generated new jobs and improved profitability by participating in this 11-week Cooperative Extension training program. Twenty-three participants have graduated from the Ocala/Marion FastTrac classes. Some reported results were: a business that grew from an annual profit of \$1 million to \$8 million; a business that went from one employee to 21; a business that has added three new product lines; and two firms who discovered losses due to poor financial management in time to save their businesses.

An **Arizona** Extension program has helped 6,000 single parents and displaced homemakers in Pima County complete their education and find jobs. The program offers job-related scholarships, job-seeking skills, and job placement. Participants who move on to college have achieved a 100 percent graduation rate; it has become a national model for similar programs across the United States.

It is difficult for Tribal Colleges to recruit and train quality faculty with cultural knowledge essential to success in such a setting. **Little Big Horn College** in **Montana** provides professional development with a focus on innovative teaching methods and assistance in preparation of class materials. This improved the quality of education and job satisfaction among faculty.

The Cooperative Extension System (CES) reaches over 132,000 child care providers through training programs. Over 1.1 million children are reached as a result of this training and with age appropriate curricula. CES developed over 500 new curricula and leveraged over \$10.4 M for child care programs. In addition, the 4-H youth development program reaches over 80,000 youth in 900 after-school programs and about 230,000 youth in summer programs. The Children, Youth and Families at Risk initiative reaches 32,000 children in child care programs in approximately 285 communities.

1999 Data: No aggregated quantifiable data to present.

Analysis of Results: The performance goal was met through the research and extension work of the CSREES State partners.

Objective 5.3: To understand the impact of agricultural technologies and practices on the environment, people, and communities.

Key Performance Goal

To understand the impact of agricultural technologies and practices on the environment, people, and communities.

In **Colorado**, a study was completed on the use of swine waste as a crop fertilizer in northeastern Colorado. The project, which measured the effects of swine effluent on soil and water, was prompted by a growing number of large and corporate hog farms being established in the region. Results of the study, presented to county officials, industry representatives and agricultural professionals, showed that, if handled properly, using swine effluent as a nitrogen source for crops is as safe as the proper use of commercial fertilizers.

Citizen opposition to environmental projects is being experienced across the country. At issue are topics such as “property rights” and “human rights.” **Missouri** has been monitoring and evaluating attitudes of citizens in areas where major new environmental initiatives have recently been implemented. Findings from these studies have been so illuminating that the research team has been asked to present their findings to Federal and state officials.

1999 Data: No aggregated quantifiable data to present.

Analysis of Results: The performance goal was met through the research and extension work of the CSREES State partners.

Management Initiative 1: Strengthen the Federal/State Partnership

Key Performance Goals

Identify and implement funding opportunities that promote the agricultural research, extension, and education capacity of minority-serving institutions.

As a result of USDA’s 1997 Civil Rights Action Team (CRAT) report, increased efforts were made to ensure that research and extension programs meet the needs of underserved populations. For example, under programs targeted to the Nation’s Tribal Colleges and Hispanic-Serving Institutions, awards were made to enhance faculty competencies, update and expand curricula, enhance library resources, encourage the use of new technologies such as distance education, and recruitment and retention of multicultural students.

Encourage the participation of minority institutions in agency outreach efforts.

Workshops were presented at several minority-serving institutions to develop new and expanded partnerships, identify staff development and other needs and provide training on how to write grant proposals in anticipation that these institutions will be better prepared to compete in a broader range of grant programs.

Solicit and obtain input from CSREES stakeholders to address agricultural research, extension, and education issues and to develop approaches to problem-solving.

CSREES obtained input from the land-grant university system on national priorities in the development of the FY 2001 budget. CSREES co-sponsored a Food Safety National Conference with the Agricultural Research Service for the purpose of prioritizing food safety research. A public meeting was convened by CSREES to obtain stakeholder input on the implementation of the Initiative for Future Agriculture and Food Systems. CSREES participated in the joint USDA-Federal Drug Administration conference on food safety. CSREES convened a meeting with land-grant university stakeholders and others to discuss current and future priority needs under our pest management programs. CSREES collaborated with land-

grant university partners in developing guidelines to implement provisions of the Agricultural Research, Extension, and Education Reform Act of 1998 relating to plan of work requirements under formula programs and other requirements.

Solicit and obtain input from CSREES stakeholders to address agricultural research, extension, and education issues and to develop approaches to problem-solving.

CSREES received approximately \$35 million from other Federal agencies in FY 1999 to further activities that are of mutual interest to CSREES and the contributing agencies. For example, in FY 1999 CSREES received approximately \$2.8 million from the U.S. Army to support research on agriculturally-based remediation technologies to restore contaminated military and civilian sites.

Management Initiative 2: Integration of Research, Extension, and Education

Key Performance Goal

Develop and maintain an agenda for promoting the integration of research, extension, and education where possible.

CSREES collaborated with the land-grant university system to implement provisions of the Agricultural Research, Extension, and Education Reform Act of 1998 requiring that certain percentages of formula funds be dedicated to integrated extension and research activities.

CSREES initiated implementation of the Integrated Research, Education, and Extension Competitive Grants program to support integrated activities in water quality, food safety, and pest management.

Management Initiative 3: Improved Information Management Systems

Key Performance Goals

Enhance the Current Research Information System (CRIS)

CSREES collaborated with land-grant university partners and other USDA agencies to enhance the Current Research Information System (CRIS) to improve CRIS' ability to provide current information on the research programs of USDA and the State Agricultural Experiment Stations. CRIS technical data is now available worldwide through the Internet. A new CRIS taxonomy has been developed which has involved the reclassification of 19,000 active projects by universities, ARS, ERS, and FS. The group working on this project received the Secretary's Honor Award for their efforts.

Implement and Maintain the Research, Extension, and Education Information System (REEIS) for Use by the REE Agencies, USDA, and their Partners and Customers in Accessing Information

CSREES has completed a National Needs Assessment for REEIS and is continuing development of the policy and technical requirements and the design and unveiling of the REEIS prototype - a platform linking approximately 39 different USDA supported databases.

Management Initiative 4: Improving Financial Management within USDA

Key Performance Goals

Implement integrated financial management systems in USDA

On behalf of the Research, Education, and Economics (REE) mission area, the Agricultural Research Service (ARS) continued to work with the Office Chief Financial Officer (OCFO) and the National Finance Center (NFC) in the planning, design and modification of the Department-sponsored financial system improvement initiatives. The REE agencies, including CSREES, continued to work with NFC on implementing new and modernized financial systems.

Correct internal control deficiencies in a timely manner

CSREES continued its compliance with Federal Managers' Financial Integrity Act (FMFIA) reporting requirements, including the timely completion of audit report recommendations and the timely correction of any FMFIA weaknesses that are identified.

Maintain and provide access to reliable cost accounting information

CSREES continued to work with the OCFO and NFC to implement and employ cost accounting principles to the maximum extent necessary to accomplish the agency mission.

CSREES performed all necessary biennial reviews of user charges as required by OMB Circular A-25, User Charges reviewed agency operations for new potential user fee situations.

Clean and timely audit opinion on audited financial statements

On behalf of the REE agencies, ARS coordinated the preparation of yearly Consolidated Financial Statements of the agencies in accordance with Departmental prescribed procedures, and as required under the Chief Financial Officer's Act.

Compliance with Debarment and Suspension and Drug-Free Workplace Programs

CSREES continued to require all recipients of grants and/or cooperative agreements to comply with debarment and suspension and drug-free workplace requirements.