United States Department of Agriculture

National Institute of Food and Agriculture

IMPACTS

NATIONAL INSTITUTE OF FOOD AND AGRICULTURE 2014 IMPACTS REPORT

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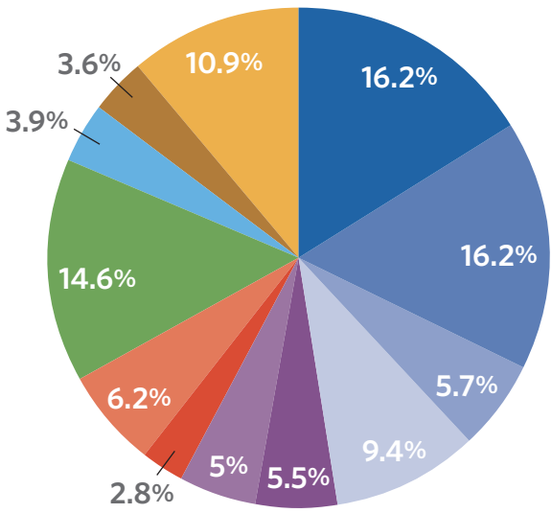
NIFA 2014 IMPACTS REPORT

AS A LEADER IN FOOD AND AGRICULTURAL SCIENCES, the U.S. Department of Agriculture's National Institute of Food and Agriculture (NIFA) seeks innovative solutions to issues related to agriculture, food, the environment, and communities. By supporting research, education, and Cooperative Extension programs at land-grant universities and other partner organizations, NIFA moves science from labs to farms and classrooms, to the dining table, and back again.

NIFA provides program leadership and more than $1 billion of congressionally-appropriated funding each year. NIFA's mission, vision, goals, and initiatives are linked to the strategic goals and priorities of USDA and the Research, Education, and Economics (REE) Action Plan. The resulting scientific progress enhances the competitiveness of American agriculture, bolsters the U.S. economy, enhances the safety of the nation's food supply, improves the nutrition and well-being of American citizens, and sustains the nation's environment and natural resources. NIFA grants also help institutions address shortfalls in curricula design, material development, faculty enhancement, instruction delivery systems, student experiential learning opportunities, scientific instrumentation for teaching, and student recruitment and retention.

The following projects highlight how NIFA-funding contributes to significant achievements in food, agricultural, natural resources, and human sciences.

NIFA FUNDING BY REE GOAL



GOAL 1A:	Crop and Animal Production	16.2%
GOAL 1B:	Crop and Animal Health	16.2%
GOAL 1C:	Crop and Animal Genetics, Genomics, Genetic Resources, and Biotechnology	5.7%
GOAL 1D:	Consumer and Industry Outreach, Policy, Markets, and Trade	9.4%
GOAL 2A:	Responding to Climate Variability	5.5%
GOAL 2B:	Bioenergy/Biofuels and Biobased Products	5.0%
GOAL 3A:	Water Availability: Quality and Quantity	2.8%
GOAL 3B:	Landscape-Scale Conservation and Management	6.2%
GOAL 4:	Nutrition and Childhood Obesity	14.6%
GOAL 5:	Food Safety	3.9%
GOAL 6:	Education and Science Literacy	3.6%
GOAL 7:	Rural Prosperity/ Rural-Urban Interdependence	10.9%
	TOTAL FY12 FUNDING BY REE GOAL	100%

LOCAL AND GLOBAL FOOD SUPPLY AND SECURITY

Photo by Mississippi State University Extension Service

BLUEBERRIES PASS PEACHES IN GEORGIA

University of Georgia horticulturists have developed several varieties of blueberries that are specialized as early- and late-season crops, as well as larger berries at a higher yield. As a result, Georgia peaches have taken a backseat as blueberry production has increased from 3,500 acres to more than 20,000 acres in recent years. With annual farm gate values approaching $254 million, the blueberry has become Georgia's number one fruit crop. In addition to improving yield, this research project included additional mechanical harvesting, reducing commercial production time to 3 years or less, and developing sound harvest management practices.

HEATING UP LETTUCE PRODUCTION

Lettuce contains a gene that halts seed germination if it gets too hot, and that could be trouble in California and Arizona—two states that produce more than 90 percent of the lettuce grown in the United States. Researchers at the **University of California-Davis** discovered a chromosome in wild Peruvian lettuce that allows for germination at higher temperatures and transferred that gene into commercial lettuce. The result is less water used to cool the soil, a longer growing season, and a reduced need for shipping—a combination that means more water for other uses, more money for farmers, more fresh lettuce for consumers, and reduced greenhouse gas emissions.

GENETICS MAY IMPROVE HOW CATTLE PROCESS NUTRIENTS

Animal science researchers at the **University of Missouri** are working to improve feed efficiency in beef cattle. Investigators have located the chromosomal regions responsible for growth performance that help cattle get the most out of what they eat. Armed with this knowledge, cattle producers will be able to build their herds by selecting and breeding stock that best possess this trait. These "feed conversion" genes are located on different chromosomes in different breeds, so herd improvement selection criteria will vary by breed. By increasing the nutritional efficiency of their herds, cattle producers will see higher profits by reducing the amount of feed it takes to raise cattle. This will also reduce the environmental footprint of beef production by reducing amount of manure and greenhouse gases.

USDA photo by Scott Bauer

RESPONDING TO CLIMATE AND ENERGY NEEDS

RESEARCH TEAM WORKS TO SUSTAIN CORN THROUGH WEATHER EXTREMES

American corn production covers about 95 million acres on 400,000 farms and brought in about $65 billion in 2013. Those numbers are impressive, and NIFA has provided $20 million in funding to sustain one of the nation's

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Photo by Stephanie Engle

most important farm crops through weather extremes. **Iowa State University** is leading a wide range of researchers from 10 land-grant universities and USDA's Agricultural Research Service in a **Sustainable Corn Project** to mitigate and adapt the Midwest "Corn Belt" to climate change. Since the project began in 2011, researchers have created a central database to better evaluate how drainage, cover crops, tillage, fertilizers, and crop rotations affect water, carbon, and nitrogen cycles under variable weather conditions. In addition, the team is training 159 students—undergraduate through post-doctoral—to become the next generation of scientists who can help increase future food production and ensure the integrity and resilience of natural resources.

GREEN ENERGY ALTERNATIVES: FROM STABLE WASTE TO POWER SOURCE

Morrisville (NY) State College has put the spurs to turning waste into sources of renewable energy. Researchers at **Morrisville's Renewable Energy Training Center** have discovered a way to convert horse manure and bedding into briquettes and then use those briquettes as fuel to heat two of the school's residence halls. Producing these briquettes is only a portion of the multi-million dollar grant, which funds the study of renewable energy sources, including solar and wind systems. The availability of horse manure and bedding material at Morrisville creates a "green" solution to the rising cost of fuel production, saves money the school used to spend in disposal costs, and gives students a living laboratory to accompany classes in renewable energy and sustainability.

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SUSTAINABLE USE OF NATURAL RESOURCES

USDA Photo

COVER CROPS SAVE IRRIGATION WATER AND EXPENSE

University of Nebraska researchers have demonstrated that reduced tillage or no-till farming can save on irrigation. The researchers determined that farm plots with cover crops or crop residue saved on irrigation water by as much as 60 to 110 millimeters per year, which saved farmers thousands of dollars per year on a 130-acre field. In these days of prolonged drought and severe wildfires across much of the United States, the practice of cover cropping and reduced-till agriculture can save farmers money in reduced pumping costs and leaves more water available for other uses.

NUTRITION AND CHILDHOOD OBESITY

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INVENTING HEALTHIER FATS

Prosperity Organic Foods, Boise, ID, used a NIFA-administered **Small Business Innovation Research (SBIR) grant** to develop an organic, healthy baking/cooking fat that raises energy expenditure to assist with healthy, sustainable weight management. The organic baking/cooking fat was derived from an organic buttery spread that is already in distribution in North America. The organic baking/cooking fat will be the first product line of its kind launched into the existing butter and margarine category to compete directly with non-spread forms of butter and shortening. The company has been awarded an SBIR Phase II grant, which allows them to conduct further research and development and prepare for product commercialization.

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IMPROVING THE QUALITY OF SOY FLAVOR

University of Kentucky researchers took on the task of sniffing out and removing the source of the unpleasant odors produced during soy protein manufacturing. They knew that if they found a way to remove the sulfur-containing odorants they could improve the flavor of soy-based products and promote consumer demand. The team discovered that the addition of an approved food additive called potassium iodate during the manufacturing process stopped a chemical reaction within the soybeans and practically eliminated the foul odor. The technology of this process, which has been patented and is undergoing trials in a large U.S. soy processing plant, is an example of how basic research funded by a NIFA competitive grants program has been transferred to private industry.

USDA grantee photo

CAMDEN GROWS: A COMMUNITY FOOD PROJECTS SUCCESS STORY

The Community Food Projects Competitive Grant Program provides funds to low-income community, non-profit organizations that develop projects to combat food insecurity, the state of having limited access to adequate food. These projects help communities provide for their own food needs and create new marketing opportunities that help both agricultural producers and low-income consumers. One such project, **"Camden Grows,"** produces and distributes fresh produce to the residents of **Camden, NJ**—documented as the poorest city of its size in America. Camden Grows helps community gardeners who grow surpluses to sell their produce in the city. Gardeners in Camden

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produced more than $2.3 million in produce on more than 27 acres in the city, offering fresh food to at least 15 percent of the city's 76,000 residents. Participants are growing 30 fruit trees and almost 500 square feet of berry bushes, with more to be planted this year.

FOOD SAFETY

NORTH CAROLINA A&T RESEARCH MAKES PEANUTS SAFER TO EAT

Peanuts are the 12th most valuable cash crop in the United States. Allergies to peanuts are among the most severe of all food allergies, affecting some 2.8 million people in the United States, including 400,000 school-aged children. Now, however, there is good news from the **North Carolina Agricultural and Technical State University (NC A&T)** where scientists have discovered a way to remove up to 98 percent of the allergens. Researchers

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found that by soaking roasted peanuts that have been shelled and skinned in a solution containing food-grade enzymes, they can virtually reduce or eliminate two key allergens. The process does not affect flavor, and treated peanuts can be eaten whole, in pieces, or as flour in various products. The process has been validated at the **University of North Carolina at Chapel Hill** through human clinical trials using skin prick tests. NC A&T officials expect hypoallergenic peanut products to hit store shelves soon.

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NOVEL PASTEURIZATION SYSTEM HELPS KEEP FOOD SAFE

A new microwave system developed by NIFA-funded researchers at **Washington State University** is now available to food companies to help reduce the chances of contamination in chilled or frozen meals. The microwave-assisted pasteurization system processes 8- to 20-ounce pre-packaged chilled meals. Shelf life exceeding 1 month at refrigeration temperatures are possible. The potential applications of this technology extends to controlling pathogens on fresh and minimally processed fruits and vegetables using lower temperature pasteurization and sophisticated packaging.

MIDDLE SCHOOL STUDENTS GET "HANDS ON" FOOD SAFETY EDUCATION

University of Tennessee educators have developed a food safety education curriculum for middle school students entitled **"Hands On: Real World Lessons for Middle School Classrooms."** Hands On is a free, interactive, research-based program that integrates science, social studies, math, language arts, and vocabulary that teaches students key food safety concepts and practices. Foodborne illnesses cause an average of 5,000 deaths per year and costing up to $37 billion per year in health care costs. Since adolescents frequently prepare after-school snacks, and even meals, it is important for them to receive this training. As of March 2013, Hands On has reached more than 34,000 students at 148 middle schools in 11 states.

EDUCATION AND SCIENCE LITERACY

GROWING NUMBERS OF FEMALE FARM OPERATORS MAKE TIMING RIGHT FOR ANNIE'S PROJECT

Annie's Project, an education program that is dedicated to empowering women in agriculture, develops the networks and skills women need to form successful partnerships. Across America, Annie's Project courses provide women in agriculture with answers, business skills, friendship,and confidence. The number of women owning farm businesses or becoming more involved in farm decision-making is growing nationally. For example, in New York's Chautaugua

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County, 228 women, or 16 percent, are primary farm operators according to the 2007 Census of Agriculture. Women farm owners/operators are on the rise, with a 3 percent increase from 2002 to 2007 in Chautauqua County. These women don't have to go it alone, as **Cornell Cooperative Extension** facilitates Annie's Project in New York and offers a 6-week program in risk management, farm business planning, marketing, and more.

USDA photo

HELPING AFGHANS STRENGTHEN THEIR EXTENSION CAPACITY

With NIFA-administered funding and collaboration from **USDA's Foreign Agricultural Service**, the **University of California-Davis** is leading a consortium of American universities (**Purdue, Washington State,** and **University of Maryland**) that is helping to strengthen the extension education system in Afghanistan. The **Afghanistan Agricultural Extension Project (AAEP)** initiated provincial model teaching farms, farmer field schools and on-farm demonstrations—now maintained and supervised by Afghan extension educators—to cover such topics as women in agriculture, greenhouse production, conservation agriculture, and improved grain storage methods to reduce postharvest loss. AAEP has trained nearly 8,000 extension educators, agricultural faculty, students and farmers and established more than 600 farmer field schools in 19 Afghan provinces since 2012.

RURAL PROSPERITY/ RURAL-URBAN INTERDEPENDENCE

TEACHING THE NEXT GENERATION OF AMERICA'S FARMERS AND RANCHERS

A team from the **University of Arkansas** used funding from NIFA's Beginning Farmer and Rancher Development Program to develop online educational modules and in-person training and mentoring to underserved groups.

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Photo by University of Arkansas

Project educators teach poultry, livestock, and agroforestry production to military veterans, Spanish-speaking individuals, women in agriculture, African-Americans, and economically and educationally disadvantaged groups. The team of university, non-profit, and USDA scientists trained approximately 300 veterans in the region, plus 650 veterans nationally through the Farmer Veteran Coalition. A total of 26,823 people used the online training—16,059 in English and 10,764 in Spanish. Evaluations showed that participants are using all modules, the most popular being poultry production and business development.

CREATING PRODUCTIVITY, JOBS, AND NUTRITION THROUGH SWEET POTATOES

Louisiana State University researchers have developed new varieties of sweet potatoes that are more disease and pest-resistent. As a result, sweet potato yields have increased by more than 20 percent and a new processing plant was constructed for high-quality frozen sweet potato products—a plant that now provides over 100 jobs in rural Louisiana. Sweet potatoes are an important crop for small farmers in Louisiana and neighboring states, and small-farm sector sweet potatoes are bringing higher prices. On a broader scale, multistate research funding from NIFA supports the **National Sweetpotato Collaborators Conference,** a group that since 1939 has exchanged information about all aspects of sweet potato production and post-harvest research and extension. Conference researchers have released 94 new sweet potato varieties that have been adopted worldwide.

USDA photo by Lance Cheung

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