United States Department of Agriculture
National Institute of Food and Agriculture
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AGRICULTURE AND FOOD RESEARCH INITIATIVE (AFRI) 2013 SYNOPSIS

PROGRAM OVERVIEW

THE AGRICULTURE AND FOOD RESEARCH INITIATIVE (AFRI) is the nation's leading competitive grants program for agriculture and is the key funding program NIFA uses to combat major societal challendges through research, education, and extension.

With the world's population expected to exceed nine billion by 2050, NIFA focuses on solving the challenge of feeding, clothing, and sheltering all people. Funded projects focus on the major AFRI challenge areas of sustainable energy resources, managing the effects of climate change, food safety and hunger, food security, and preventing childhood obesity.

With a broad funding portfolio, AFRI programs address every facet of agriculture, including ranching, renewable energy, aquaculture, nutrition, forestry, food safety, rural communities, farm efficiency and profitability, and traditional and innovative breeding techniques. AFRI advances fundamental sciences as well as translational research and development in support of agriculture and coordinates research opportunities to build on these new discoveries. Other AFRI awarded programs then deliver this science to communities through extension, allowing the public to make informed decisions that impact their daily lives.

Established by the 2008 Farm Bill and re-authorized in the 2014 Farm Bill, AFRI is one of NIFA's major programs through which to address six priority areas (Table 1, page 2). Within the framework of these six priority areas, in fiscal year FY 2013 AFRI focused on addressing five critical societal challenge areas: childhood obesity prevention, climate variability and change, food security, sustainable bioenergy, and food safety.

AFRI also supports research grants via its Foundational Program in the six AFRI priority areas to continue building a foundation of knowledge critical for solving current and future societal challenges. In addition, NIFA supports pre- and postdoctoral students via the NIFA Fellowships Grant Program.

In FY 2013, NIFA issued seven AFRI requests for applications (RFAs) for projects related to the challenge areas, foundational program, and the NIFA Fellowships. Those RFAs generated 2,696 applications, which were peer-panel reviewed. The top 423 projects were awarded $248,808,477 in NIFA funding (Table 2, page 3).

COMPETITIVE PROGRAM SOLICITATION

FY 2013 was the fifth year that AFRI solicited competitive grant applications. Thirty-one programs solicited applications in FY 2013 addressing the six AFRI priority areas and five challenge areas. A total of 2,696 competitive grant applications, requesting $1,703,184,753 were received and reviewed through a competitive peer review process (Table 2, page 3).

PEER REVIEW PANEL CHARACTERISTICS

Almost 700 experts from across the country participated in peer review panel evaluations to help select the most meritorious projects for funding (Table 3, page 3). AFRI ensures the widest participation of qualified individuals in peer review

by balancing the membership of panels carefully to reflect diversity in geographical region, type of institution, type of position,gender, and minority status. Additional expertise was brought to proposal evaluation by a number of scientists and other specialists through ad hoc reviews.

FUNDING PORTFOLIO

OVERVIEW

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SUCCESS RATE

Awards totaling $248,808,477 were made to the 423 highest-ranked applications (Table 4 pages 4-5). An additional 1,189 proposals were recommended— rated as Outstanding, High Priority, and/or Medium Priority—for funding by review panels and could have been supported, provided an additional $699,407,164 was available to the program (Table 2, page 3). The success rate for AFRI applications, calculated in terms of number of proposals funded (excluding conferences, supplements, continuing increments of the same grant, and NIFA Fellowships) divided by the number of proposals submitted for review, was 10 percent.

AWARD TYPES

AFRI awards are made in the form of single-function research; single-function education; single-function extension; and integrated research, education, and/or extension grants (Table 5, page 6). The mean award size for research projects was $748,616 for up to five years, excluding Food and Agricultural Science Enhancement (FASE) Grants and Conference Grants. These excluded grant types are often shorter in duration and have lower budget limitations than do standard research awards.

Integrated awards comprised 51 percent of the 2013 funding portfolio (Table 5, page 6). These projects bring together at least two of the three components of the agricultural knowledge system (e.g., research, education, and extension). Integrated projects hold the greatest potential to produce, transfer, and apply knowledge directly to end users, while providing educational opportunities to assure the development of agricultural expertise in future generations. The average award for integrated projects was $1,138,796 for up to five years, excluding FASE Grants and Conference Grants. The mean includes Coordinated Agriculture Projects (CAP), which support large-scale, multi-million

TABLE 1. SUMMARY OF THE RELATIONSHIP BETWEEN THE LEGISLATIVELY-DEFINED AFRI PRIORITY AREAS AND THE CHALLENGE AREAS. AFRI PROVIDED FUNDING FOR BOTH THE LEGISLATIVELY-DEFINED AREAS INDIVIDUALLY AND IN COMBINATION TO ADDRESS THE CHALLENGE AREAS.

AFRI PRIORITY AREAS ▼	CHILDHOOD OBESITY PREVENTION	CLIMATE CHANGE	FOOD SAFETY	FOUNDATIONAL PROGRAM	GLOBAL FOOD SECURITY	SUSTAINABLE BIOENERGY	NIFA FELLOWSHIPS
Plant Health and Production and Plant Products	–	●	–	●	●	●	●
Animal Health and Production and Animal Products	–	●	●	●	●	–	●
Food Safety, Nutrition, and Health	●	–	●	●	–	–	●
Renewable Energy, Natural Resources, and Environment	–	●	–	●	–	●	●
Agricultural Systems and Technology	–	●	●	●	–	●	●
Agricultural Economics and Rural Communities	●	●	●	●	–	●	●

▲ REQUESTS FOR APPLICATIONS

dollar projects to promote collaboration, open communication, and the exchange of information. CAPs greatly reduce duplication of effort and increase coordinated activities among individuals, institutions, states, and regions. CAP awards often have a longer duration but, as with many AFRI awards, are funded on a continuation basis, with funding coming as yearly increments to assure accountability and monitor ongoing success.

AFRI provided funds totaling $419,356 in support of 11 conference grants. These conferences brought scientists together to identify research, education, and extension priorities; provide an update on research information; and/or advance an area of science important to U.S. agriculture, food, forestry, the environment, and rural communities.

FUNDAMENTAL AND MISSION-ORIENTED RESEARCH

Forty-four percent of AFRI awards support fundamental research to deliver basic knowledge to advance applied research and conceptual breakthroughs in fields relevant to agriculture. Mission-linked awards accounted for the remaining 56 percent to fund applied work to address specific problems, needs, or opportunities (Table 5, page 6).

MULTIDISCIPLINARY AWARDS

Multidisciplinary awards encourage collaborations between institutions, agencies, and fields of study to solve complex problems and seek to initiate research in new areas of science and engineering that are relevant to agriculture, food, forestry, the environment, and rural communities. Eighty-five percent of AFRI awards made in 2013 are conducted by multidisciplinary teams (Table 5, page 6).

BROADENING THE FUNDING PORTFOLIO

AFRI offers FASE grants to enhance institutional capacity and attract new scientists into careers of high-priority areas of national need in agriculture, food, and environmental sciences. FASE grants provide support for postdoctoral fellowships; new investigators; and project directors at small, mid-sized, or minority-serving institutions with limited institutional success or at degree-granting institutions and state agricultural experiment stations in states where institutions have been less successful in receiving AFRI funding (these states are identified by NIFA as Experimental Program to Stimulate Competitive Research states). In FY 2013,

continued on page 6 >>

TABLE 2. THE NUMBER OF AFRI APPLICATIONS AND TOTAL DOLLARS REQUESTED, RECOMMENDED FOR FUNDING, AND AWARDED FOR FY 2013 FUNDS.

APPLICATIONS	NUMBER	FUNDING
Requested	2,696	$1,703,184,753
Recommended for Funding	1,189	699,407,164
Awarded	423	248,808,477

TABLE 3. CHARACTERISTICS OF FY 2013 AFRI PEER REVIEW PANELISTS BY NUMBER AND PERCENT

CHARACTERISTIC	NUMBER	PERCENT
GEOGRAPHIC REGION		
Northeast	157	23.0
North Central	172	25.2
Southern	216	31.6
Western	137	20.1
TYPE OF INSTITUTION*		
Land-Grant University		
1862 Land-Grant University	407	59.6
1890 Land-Grant University	61	8.9
1994 Land-Grant University	3	0.4
Hispanic-Serving	36	2.3
Public Non-Land-Grant	52	7.6
Private College/University	22	3.2
Private Research	5	0.7
Federal	79	11.6
Industry/Other	22	3.2
TYPE OF POSITION		
Professor	200	29.3
Associate Professor	179	26.2
Assistant Professor	169	24.7
Federal	76	11.1
Industry	20	2.9
Other (Senior Lecturer)	36	5.3
EXPERTISE REPRESENTATION		
Researcher	517	75.7
Educator	101	14.8
Extension Educator	55	8.1
Other	35	5.1
GENDER/MINORITY REPRESENTATION		
Non-Minority Male	286	41.9
Non-Minority Female	182	26.6
Minority Male	131	19.2
Minority Female	81	11.9
TOTAL PANELISTS		

**112 panelists represented the USDA Experimental Program to Stimulate Competitive Research (EPSCoR) states and 55 panelists represented small and mid-sized institutions.*

TABLE 4. NUMBER OF APPLICATIONS, AWARDS, AND TOTAL DOLLARS AWARDED FOR EACH AFRI PROGRAM, BY AREA, IN FY 2013

PROGRAMS BY REQUEST FOR APPLICATION (RFA)	APPLICATIONS	NUMBER OF AWARDS	FUNDING
FOUNDATIONAL PROGRAMS (COMBINED 2012/2013 RFA)			
PLANT HEALTH AND PRODUCTION AND PLANT PRODUCTS			
Biology of Agricultural Plants	179	16	$6,928,155
Controlling Weedy and Invasive Plants	70	10	4,500,000
Insects and Nematodes	166	2	498,751
Understanding Plant-Associated Microorganisms	182	3	505,389
Plant Breeding for Agricultural Production	123	18	8,552,500
ANIMAL HEALTH AND PRODUCTION AND ANIMAL PRODUCTS			
Animal Breeding, Genetics, and Genomics	35	1	34,000
Animal Health and Disease	211	30	10,055,054
Animal Reproduction	68	5	872,441
Ecology and Evolution of Infectious Diseases	3	3	2,831,288
Improved Nutritional Performance, Growth, and Lactation of Animals	128	22	8,687,504
Dual Use of Animals for Dual Benefit	3	3	4,722,616
FOOD SAFETY, NUTRITION, AND HEALTH			
Function and Efficacy of Nutrients	86	2	235,805
Improving Food Safety	60	14	4,229,450
Improving Food Quality	125	18	6,101,373
RENEWABLE ENERGY, NATURAL RESOURCES, AND ENVIRONMENT			
Microbial Communities in Soil	156	37	17,030,517
AGRICULTURE SYSTEMS AND TECHNOLOGY			
Nanotechnology for Agricultural and Food Systems	45	6	1,783,588
Engineering Products and Processes	77	12	5,055,625
National Robotics Initiative	4	4	3,178,895
AGRICULTURE ECONOMICS AND RURAL COMMUNITIES*			
Entrepreneurship and Small Business Development	28	6	2,955,660
Environment	24	3	1,490,371
Markets and Trade	60	16	5,492,998
Rural Development	20	2	715,492
Small and Medium-Sized Farms	31	1	12,500
Exploratory Program* Exploratory Research	3	3	300,000
CHALLENGE AREA PROGRAM			
SUSTAINABLE BIOENERGY			
Development and Sustainable Production of Regionally Appropriate Biomass Feedstocks	34	9	31,489,667
Impacts of Regional Bioenergy Systems on Water Availability and Quality	45	4	3,000,000
Investing in America's Scientific Crops: Stimulating a New Era of Students and Faculty in Bioenergy	2	2	1,981,268
Plant Feedstock Genomics for Bioenergy	2	2	2,000,000

**No awards obligated as of 12/31/2013*

TABLE 4. NUMBER OF APPLICATIONS, AWARDS, AND TOTAL DOLLARS AWARDED FOR EACH AFRI PROGRAM, BY AREA, IN FY 2013

PROGRAMS BY REQUEST FOR APPLICATION (RFA)	APPLICATIONS	NUMBER OF AWARDS	FUNDING
CHALLENGE AREA PROGRAM (CONTINUED)			
CLIMATE CHANGE			
Climate Change Mitigation and Adaptation in Agriculture	146	22	$16,892,521
Impacts of Climate Change on Animal Health and Production	1	1	500,000
National Cereal Germplasm Phenotyping	1	1	5,000,000
Regional Approaches to Climage Change	5	5	16,000,000
FOOD SAFETY			
Addressing Critical and Emerging Food Safety Issues	5	5	1,221,127
Effective Mitigation Strategies for Antimicrobial Resistance	1	0	0
Enhancing Food Safety Through Improved Processing Technologies	4	4	3,899,254
Prevention, Detection, and Control of Foodborne Viruses in Food: A Focus on Noroviruses	2	2	6,667,476
Improving the Safety of Fresh and Fresh Cut Produce	7	7	2,406,873
Prevention and Control of Salmonella and Campylobacter in Poultry Flocks and Poultry Products, including Eggs	3	3	1,500,000
Prevention, Detection, and Control of Shiga toxin-producing Escherichia coli (STEC) from Pre-Harvest through Consumption in Beef Products	1	1	4,476,973
GLOBAL FOOD SECURITY			
Conference or Workshop	24	6	244,356
Extension-Driven Disease Prevention and Control in Animals	2	2	1,194,886
Improved Sustainable Food Systems to Reduce Hunger and Food Insecurity Domestically and Globally	14	13	9,547,311
Improving Sustainability by Improving Feed Efficiency of Animals	3	3	2,925,000
Management of Arthropod - or Nematode - Vectored Plant Pathogens	2	2	1,425,000
Minimizing Diseases due to Fungal Pathosystems	3	3	3,241,666
Mimizing Losses from Dairy Diseases with Major Impact on Production, Marketing, and/or Trade	1	1	1,950,000
Mitigating Crop and Livestock Losses	66	7	5,750,000
Oomycete Pathosystems in Crop Plants to Minimize Disease	2	2	3,705,000
Program Delivery and Implementation of Wide-Area Pest Monitoring	1	1	1,170,000
Translational Genomics for Disease Resistance in Animals	3	3	1,732,706
Translational Genomics for Improved Fertility of Animals	3	3	1,741,175
CHILDHOOD OBESITY PREVENTION			
Community-Based Childhood Obesity Prevention	1	1	4,999,908
Integrated Research, Education, and Extension to Prevent Childhood Obesity	67	13	6,000,000
Transdisciplinary Graduate Education and Training in Nutrition and Family Sciences or Child Development or Related Fields to Prevent Childhood Obesity	4	4	3,375,033
NIFA FELLOWSHIPS			
Post Doctoral Fellowships	211	29	4,175,139
AFRI NIFA Fellowships Grant Program: Predoctoral Fellowships	143	25	1,826,166
GRAND TOTAL	2,696	423	$248,808,477

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approximately nine percent of AFRI funds supported FASE grants (Table 6, right).

TRANSCENDING TOPIC AREAS

AFRI makes awards that span several topics of major importance to USDA. Table 7, right, lists these crosscutting areas and identifies the number of awards and total amount of funding for each area.

INSTITUTION TYPES

AFRI engages a broad range of entities including land-grant universities (1862, 1890, and 1994), public non-land grant universities, private colleges and universities, private research foundations, federal institutions, individuals, and industry. A breakdown of submitted applications, funded applications, and FY 2013 dollars awarded is available by institution type in Table 8 (page 7)

TRAINING

Competitive grants administered by AFRI provide jobs to train the next generation of agricultural professionals. In 2013, AFRI provided funding for more than 1,999 students and post-doctorates for more than 1,581 years, cumulatively (Table 9, page 7).

TABLE 5. TOTAL DOLLARS AND PERCENT OF FUNDING FOR DIMENSIONS OF FY 2013 AFRI AWARDS

AWARD DIMENSION	FUNDING	%
Fundamental Research Mission-Linked	$103,289,420	44
Applied Research	129,991,305	56
Multi-Disciplinary	204,474,610	85
Single Discipline	36,157,768	15
Integrated Research, Education, and Extension	122,482,379	51
Single Function Research	111,748,346	47
Single Function Education	3,425,033	1
Single Function Extension	2,976,565	1

TABLE 6. NUMBER AND TOTAL DOLLARS OF FY 2013 AWARDS PROVIDED FOR EACH CATEGORY FASE GRANTS

AWARD TYPE	NUMBER	FUNDING
Postdoctoral Fellowships	29	$4,175,139
Pre-Doctoral Fellowships	25	1,826,166
New Investigator Awards	6	3,681,877
STRENGTHENING AWARDS		
Research Career Enhancement Awards	3	388,428
Equipment Grants	2	44,800
Seed Grants	15	1,809,743
Standard Strengthening Research Project Awards	23	11,359,509
TOTAL	103	$23,285,662

TABLE 7. NUMBER OF AWARDS AND AMOUNT OF FUNDING FOR CROSSCUTTING AREAS OF MAJOR IMPORTANCE TO AFRI AND USDA IN FY 2013.
SOME AWARDS ARE LISTED IN MORE THAN ONE AREA.

AREA	NUMBER	FUNDING
Animal Genome	20	$13,554,514
Animal Health	56	37,443,908
Food Safety	53	38,510,961
Forest Biology	11	8,950,500
Global Change	49	46,317,812
Integrated Pest Management	23	30,492,489
Plant Genome	20	22,563,662
Sustainable Agriculture	77	67,657,011
Water Quality	47	33,242,654

TABLE 8. PERCENT OF APPLICATIONS SUBMITTED, APPLICATIONS AWARDED, AND TOTAL FUNDS AWARDED BY INSTITUTION TYPE FOR AFRI IN FY 2013

TYPE OF INSTITUTION	% OF APPLICATIONS SUBMITTED	% OF APPLICATIONS AWARDED	% OF TOTAL DOLLARS AWARDED
Land-Grant University			
1862 Land-Grant University	74.81	81.80	85.13
1890 Land-Grant University	2.04	1.42	0.66
1994 Land-Grant University	0.07	0.24	0.02
Public Non-Land-Grant	5.79	6.15	7.22
Private College/University	6.42	4.26	2.90
Federal	3.86	2.60	1.99
Industry/Other*	7.01	3.55	2.08

**Includes Non-Federal Government, Private For-Profit, and Other Entities*

TABLE 9. NUMBER AND LENGTH OF TIME OF UNDERGRADUATE, GRADUATE, AND POSTDOCTORAL JOBS PROVIDED BY AFRI FY 2013 AWARDS

PROGRAM	SUPPORTED	GRADUATE STUDENTS	POSTDOCTORAL STUDENTS	UNDERGRADUATE STUDENTS	SUBTOTAL
FOUNDATIONAL PROGRAMS					
Plant Health and Production and Plant Products	NUMBER	126	59	52	237
	MONTHS	576	738	587	1,901
Animal Health and Production and Animal Products	NUMBER	36	18	101	155
	MONTHS	839	477	292	1,608
Food Safety, Nutrition, and Health	NUMBER	57	14	147	218
	MONTHS	1,026	285	386	1,697
Renewable Energy, Natural Resources, and Environment	NUMBER	52	13	26	91
	MONTHS	1,535	241	461	2,237
Agriculture Systems and Technology	NUMBER	63	12	9	84
	MONTHS	581	104	102	787
Agriculture Economics and Rural Communities	NUMBER	27	7	6	40
	MONTHS	473	102	72	647
Exploratory	NUMBER	2	0	2	4
	MONTHS	24	0	6	30
CHALLENGE AREAS					
Sustainable Bioenergy	NUMBER	10	4	13	27
	MONTHS	231	92	51	374
Climate Change	NUMBER	269	89	139	497
	MONTHS	2,020	1,031	1,066	4,117
Food Safety	NUMBER	79	20	36	135
	MONTHS	867	263	318	1,448
Global Food Security	NUMBER	116	32	154	302
	MONTHS	959	430	767	2,156
Childhood Obesity Prevention	NUMBER	54	6	95	155
	MONTHS	342	108	259	700
NIFA Fellowships	NUMBER	25	29	0	54
	MONTHS	576	696	0	1,272
TOTAL ALL PROGRAMS	**NUMBER**	**916**	**303**	**780**	**1,999**
	MONTHS	**10,049**	**4,567**	**4,358**	**18,974**

**Includes Non-Federal Government, Private For-Profit, and Other Entities*

AFRI INVESTMENTS: MAKING AN IMPACT

AFRI ADVANCES FUNDAMENTAL SCIENCES IN SUPPORT OF AGRICULTURE and coordinates opportunities to build on these discoveries. This necessitates efforts in education and extension that deliver science-based knowledge to people, allowing them to make informed practical decisions.

GLOBAL FOOD SECURITY

Local grocery stores are a critical piece of the infrastructure sustaining America's rural communities providing healthful food, creating and supporting local jobs, and generating taxes. Yet, these independently-owned businesses are struggling to survive. Researchers at Kansas State University is partnering with Affiliated Foods Midwest to identify rural grocery case study stores and will introduce a nutritional quality index system – NuVal – into those stores coupled with an extension nutrition education program with the help of a $500,000 grant. The research examines the impacts these interventions have on healthful food purchases and grocery food sales of rural residents.

FOOD SAFETY

The ability to predict and prevent foodborne disease outbreaks associated with produce is currently limited by a lack of models of foodborne pathogen transmission at any stage along the food production chain from farm to fork. North Dakota State University researchers are using a $147,603 grant to build on the foundation of a geographic information systems (GIS) enabled environmental model to predict prevalence in croplands. Produce growers, food safety auditors, and food safety researchers will benefit from the knowledge of how to accurately quantify and predict changes in the population size and mobility of this foodborne pathogen in produce cultivation environments.

SUSTAINABLE BIOENERGY

In FY 2010 a five-year grant was awarded to develop a high-quality reference genome sequence for loblolly pine. The $14.6 million project is led by a University of California, Davis team, and the genome assembly stages are led by Johns Hopkins University and the University of Maryland. In FY 2013 the team reached a major milestone and produced a draft genome assembly of loblolly pine. The data gained from the genome sequence is providing a valuable resource for gene discovery and is being used to accelerate breeding efforts to enhance the tree's use as a feedstock for biofuels and biopower.

CHILDHOOD OBESITY PREVENTION

Current dietary guidelines call for an increased consumption of vegetables and fruits, while reducing a reliance on processed products. Many low-income families do not eat healthy, vegetable-based meals and snacks because of the cost. As a result, these households' 9-14 year-old children have a greater risk of becoming obese. A $1.3 million grant is helping University of Southern California researchers target low-income clients of food pantries with a tested, message-tailoring tool called Quick! Help for Meals. Quick! Help creates customized booklets of recipes and food-use tips, each suited to an individual household's needs and preferences, improving family eating habits.

CLIMATE CHANGE

Only a small number of farmers have a clear understanding of management effects on greenhouse gas (GHG) emissions and soil carbon (C) sequestration. A Cornell University project, New Tools and Incentives for Carbon, Nitrogen, and Greenhouse Gas Accounting and Management in Corn Cropping Systems, seeks to provide small- to large-scale corn growers with low-cost soil assessment and greenhouse gas accounting tools. With the help of $3.8 million in funding, the project successfully created the Adapt-N tool. The tool is available online to corn growers in 26 states and includes new output data on greenhouse gas emissions.

Drought and heat have been major production constraints in many crops for centuries. As the problems become more serious and new technology becomes more economical, there is a worldwide interest in identifying and incorporating drought and heat tolerant genes in improved crop varieties. Cowpea has the potential to be an excellent source

of genes to study these issues. A $499,660 grant is helping Texas A&M University researchers map the genes controlling drought and heat tolerance in cowpea and develop single nucleotide polymorphism (SNP) markers, enabling efficient genetic manipulation and breeding of traits within cowpeas and other related crop species.