



Agriculture and Food Research Initiative (AFRI) FY 2015 Annual Review

ESTABLISHED BY THE 2008 FARM BILL and re-authorized in the 2014 Farm Bill, the Agriculture and Food Research Initiative (AFRI) is the nation's leading competitive grants program for agriculture. It is the flagship funding program the National Institute of Food and Agriculture (NIFA) uses to combat major agriculture-related societal challenges through research, education, and extension. AFRI is one of NIFA's major programs through which to address the six Farm Bill priority areas.

USDA-NIFA APPROACH

AFRI, with its broad funding portfolio, addresses every facet of agriculture, including food production, farming and 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. In addition, AFRI-awarded programs deliver this science to communities through extension programs, which allows the public to make informed decisions that impact their daily lives.

With the world's population expected to exceed nine billion by 2050, NIFA works to solve the challenges of meeting the food, clothing, fuel, and shelter needs of all people. In order for NIFA to address these critical issues, we partnered with food and agricultural scientists and educators with expertise in: plant health and production and plant products; animal health and production and animal products; food safety, nutrition, and health; bioenergy, natural resources, and environment; agricultural systems and technology; and agricultural economics and rural communities. NIFA partners with the scientific community to provide federal financial assistance grants to address critical issues in United States agriculture in the areas of global food security, water for agriculture, childhood obesity prevention, food safety, sustainable bioenergy, and climate change.

FUNDING PORTFOLIO

The **Agriculture and Food Research Initiative (AFRI)** is NIFA's flagship competitive grants program. The purpose of AFRI is to support research, education, and extension work that address key problems of national and regional importance in sustaining all components of food and agriculture. AFRI is authorized under the 2014 Farm Bill and supports work in six priority areas: 1) plant health and production and plant products; 2) animal health and production and animal products; 3) food safety, nutrition and health; 4) bioenergy, natural resources and environment; 5) agriculture systems and technology; and 6) agriculture economics and rural communities.

In FY 2015, AFRI received \$325,000,000 to administer and support basic and applied research, education, and extension programs (Table 1, Page 4). These programs expanded our existing investments and created new opportunities to address the food and agricultural sciences. Due to the type of funds AFRI receives, the program can continue to expend funds until they are all applied to scientific projects; therefore, all funds may not be obligated in one year. However, AFRI has a scientifically-based annual approach to the expenditures of all funds to support the challenges of food and agriculture.

Over the past five years (Figure 1, Page 3), AFRI has received \$1,445,917,906 to advance research, education, and extension activities. This level of investment shows a gradual upward trend in funding, representing a 23 percent increase in funding from \$264,470,000 in 2011 to \$325,000,000 in 2015.

NIFA works continuously to ensure the public understands the relationship between the AFRI portfolio and the six Farm Bill priorities. While it is easy to see the relationship within the Foundational programs, the Challenge Areas and Fellowships programs aren't as obvious. Therefore, a breakout of the expended funds (Figure 2, Page 4) to date is shows the multiple disciplinary work of the entire AFRI program.

AFRI offers Food and Agricultural Science Enhancement (FASE) grants (Table 6, Page 8) 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 (NIFA identifies these states as Experimental Program to Stimulate Competitive Research states). In FY 2015, approximately 14 percent of AFRI funds supported FASE grants.

AWARDS OVERVIEW

OVERVIEW OF THE APPLICATION PROCESS

While most AFRI program areas do not request letters of intent (LOIs), 624 were submitted for consideration. Scientific program staff review LOIs in order to plan for the appropriate expertise on peer review panels. In addition, assessing LOIs ensures that proposed projects fit appropriately within AFRI program area priorities. FY 2015 was the seventh year that AFRI solicited competitive grant applications; 37 programs solicited applications that year addressing the six AFRI priority areas and X challenge areas. A total of 2,694 competitive grant applications, requesting \$1,793,235,471, were received and reviewed through a competitive peer review process (Table 2, Page 4). An additional 884 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 \$689,574,878 was available to the program.

More than 545 experts from across the country participated in peer review panel evaluations to help select the most meritorious projects for funding (Table 3, Page 5). 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.

Awards totaling \$280,747,198 were made to the 569 highest-ranked applications distributed across the program (Table 4, Pages 6-8).

The success rate for AFRI applications in FY 2015, 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 17 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 8). The mean award size for research projects was \$450,527 for up to five years, excluding FASE grants and Conference grants. These excluded grant types are often shorter in duration and have lower budget limitations than do standard research awards. The average award for integrated projects was \$932,231 for up to five years, excluding FASE grants and Conference grants. AFRI provided funds totaling \$683,188 in support of 27 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. Forty-eight 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 52percent to fund applied work to address specific problems, needs, or opportunities. 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. Multi-disciplinary teams conducted 73 percent of the AFRI awards made in 2015.

INSTITUTION TYPE DEMOGRAPHICS

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 2015 dollars awarded is available by institution type (Table 8, Page 9).

STUDENT SUPPORT BY PROGRAM AREA

Competitive grants administered by AFRI provide jobs to train the next generation of agricultural professionals. In 2015, AFRI provided funding for more than 1,910 students and post-doctorates for more than 1,868 years, cumulatively (Table 9, Page 9).

CROSSCUTTING SCIENTIFIC AREA

AFRI makes awards that span several topics of major importance to USDA. Table 7 (Page 8) includes the crosscutting areas, number of awards, and total amount of funding for each area.

FISCAL YEAR (FY) 2015 AGRICULTURE AND FOOD RESEARCH INITIATIVE (AFRI) REVIEW

The purpose of AFRI is to support research, education, and extension as well as integrated programs by awarding grants that address key problems of national, regional, and multi-state importance in sustaining all components of agriculture. Providing this support requires that AFRI advance fundamental sciences as well as translational research and development in support of agriculture and coordinate opportunities to build on these discoveries. This will also require that AFRI support education and extension that delivers science-based knowledge to people, allowing them to make informed practical decisions. To this important and critical mission the AFRI program accomplished the following in FY 2015:

1. Administered \$325 million dollars on behalf of the American public to advance food and agriculture.
2. Published 7 Request for Applications (RFAs) that accepted 2,694 proposals in support of 37 program area priorities.
3. Provided 569 peer-reviewed competitive awards which is 22% more than the previous year's report.
4. Supported and trained 1,910 students and postdoctorates towards future careers in the food, agriculture, and social sciences.
5. Facilitated a success rate of 17% - the highest rate in three years.
6. Partnered with and ensured diversity amongst 545 experts to ensure the highest quality science was funded.
7. Obtained an increase in program funding of approximately 3% during tight fiscal times.
8. Advanced the most crucial societal challenges addressing food and agriculture.

AFRI 2015 ANNUAL REVIEW DATA

FIGURE 1: AFRI HISTORICAL FUNDING

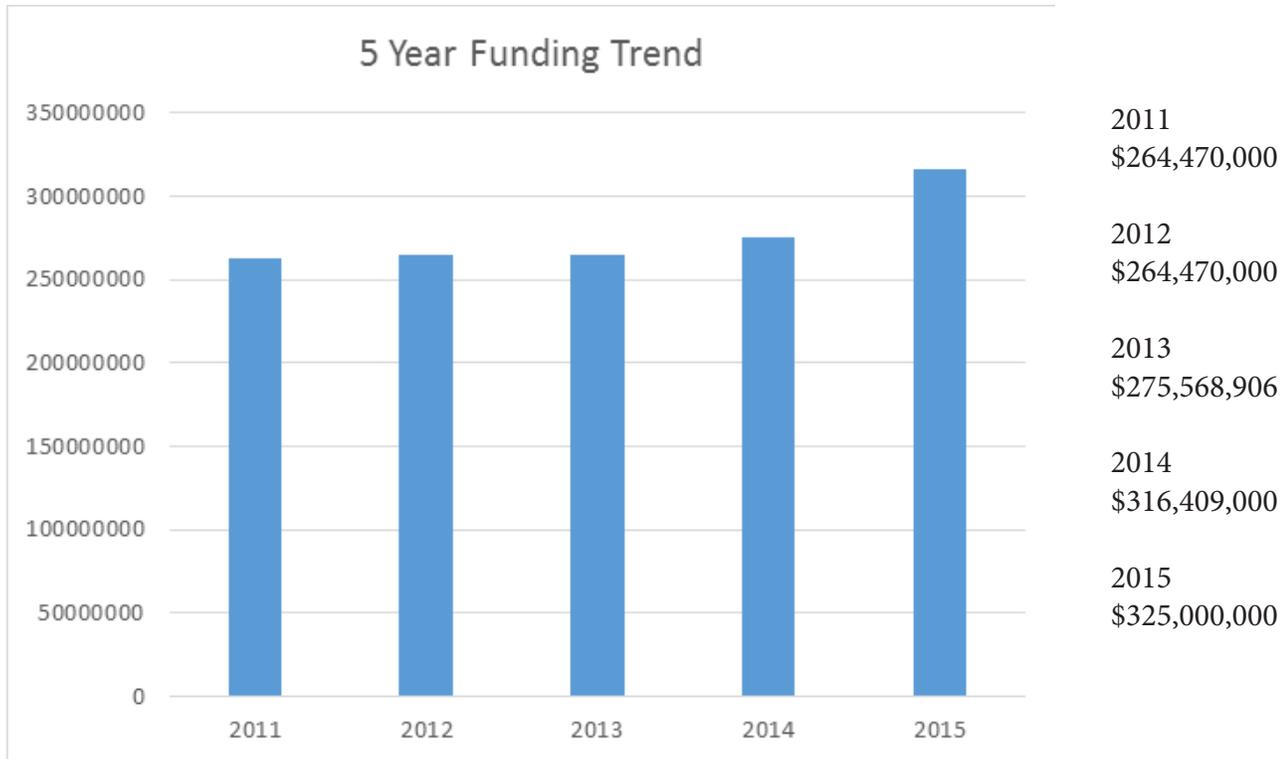


FIGURE 2: AFRI FUNDING BY FARM BILL PRIORITY

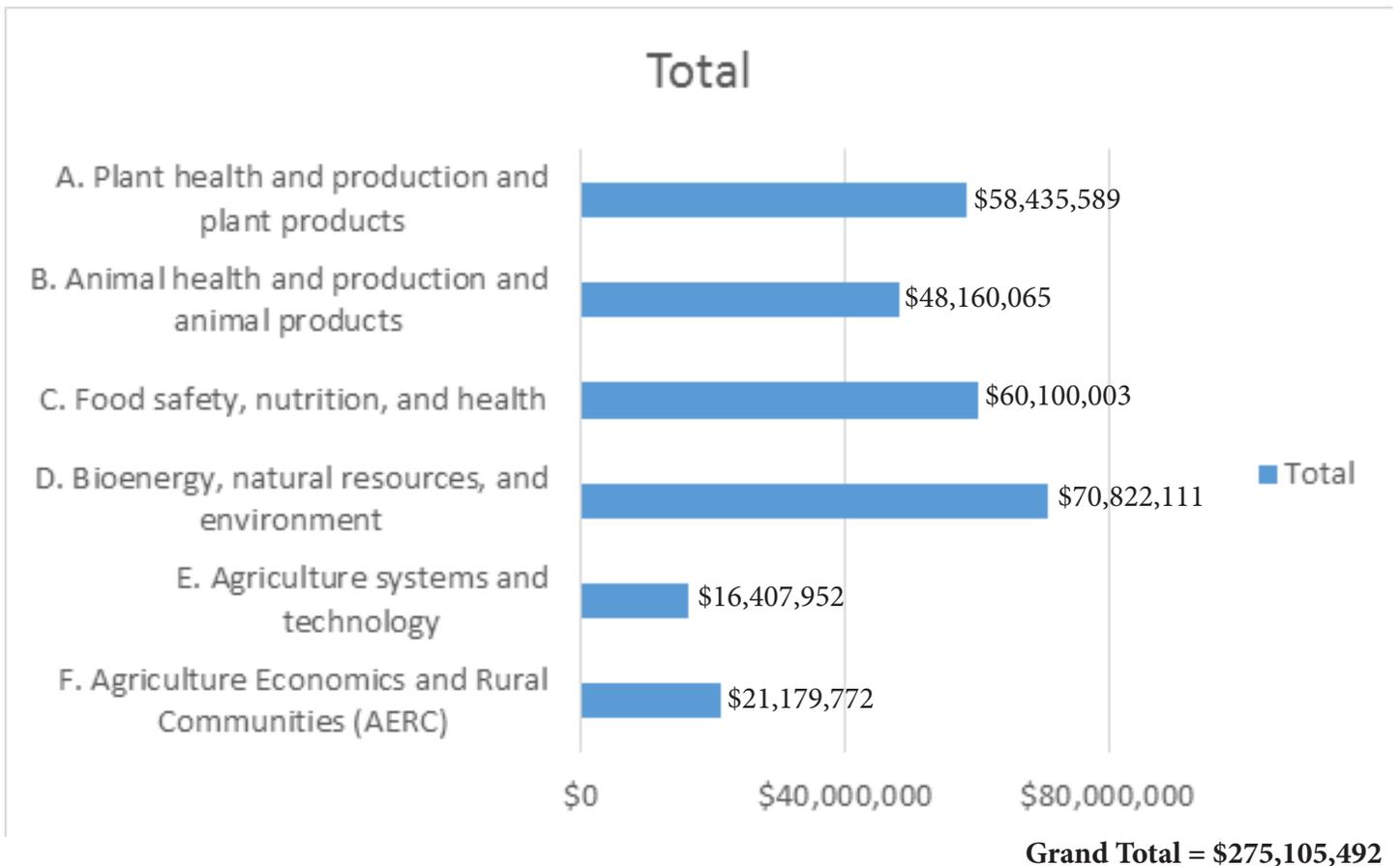


TABLE 1: AFRI PROGRAM FUNDS

AFRI funding allocations by Program Area

AFRI Programs	Rounded to the nearest Million
Bioenergy	\$ 33
Childhood Obesity Prevention	21
Climate Change	9
Food Safety	22
Food Security	37
Water for Agriculture	14
Foundational Programs	117
Education and Literacy Initiative	16
Inter-agency Agreements	28
Program Administration	28
TOTAL	\$325

TABLE 2: NUMBER OF AFRI APPLICATIONS AND TOTAL DOLLARS REQUESTED, RECOMMENDED FOR FUNDING, AND AWARDED FOR FY 2015 FUNDS

Applications	Number	Funding
Requested	2,694	\$1,793,235,471
Recommended for Funding	884	689,574,878
Awarded	569	280,747,198

TABLE 3: PEER REVIEW PANEL CHARACTERISTICS

Characteristic	Number	Percent
Geographic Region		
Northeast	94	18.5
North Central	134	26.4
Southern	178	35.0
Western	102	20.1
Type of Institution*		
Land-Grant University		
1862 Land-Grant University	314	61.8
1890 Land-Grant University	42	8.3
1994 Land-Grant University	1	0.2
Public Non-Land-Grant	42	8
Private College/University	24	4
Federal	43	8
Industry	22	4
Private Research	10	2
Other*	7	1
USDA EPSCoR	96	18
Small or Mid-Sized Institutions	35	6
Hispanic-Serving	15	3
Other Minority Serving Institutions (MSI)	15	3
Type of Position		
Professor	162	30
Associate Professor	143	26
Assistant Professor	140	26
Federal	43	8
Industry	24	4
Other (Senior Lecturer)	31	6
Expertise Representation		
Researcher	426	78
Educator	27	5
Extension	40	7
Producer	1	0
Industry	20	4
Other	11	2
Gender/Minority Representation		
Non-Minority Male	185	34
Non-Minority Female	143	26
Minority Male	134	25
Minority Female	77	14

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

TABLE 4: FUNDING BY PROGRAM

AFRI Program	Number of Applications	Number of Awards	Fiscal Year 2015 Funding
Foundational Programs			
Plant Health and Production and Plant Products			
Biology of Agricultural Plants	139	23	\$8,242,198
Insects and Nematodes	97	18	5,477,377
Understanding Plant-Associated Microorganisms	99	14	5,632,890
Controlling Weedy and Invasive Plants	34	10	3,930,882
Plant Breeding for Agricultural Production	62	14	3,850,339
Plant Photosynthetic Efficiency and Nutrient Utilization	42	7	2,885,606
Animal Health and Production and Animal Products			
Animal Breeding, Genetics, and Genomics	31	4	1,575,014
Animal Reproduction	62	15	4,584,785
Animal Health and Disease	166	30	11,439,625
Ecology and Evolution of Infectious Diseases	2	2	2,120,354
Tools and Resources - Veterinary Immune Reagents	3	1	495,001
Improved Nutritional Performance, Growth, and Lactation of Animals	89	13	6,181,136
Dual Use of Animals for Dual Benefit	5	4	5,700,000
Animal Well-Being	17	3	1,500,000
Food Safety, Nutrition, and Health			
Improving Food Safety	91	15	4,914,990
Function and Efficacy of Nutrients	68	12	4,879,301
Improving Food Quality	87	17	4,819,821
Food Specific Molecular Profiles and Biomarkers of Food and Nutrient Intake, and Dietary Exposure	1	0	0
Bioenergy, Natural Resources, and Environment			
Microbial Communities in Soil	58	17	7,080,736
Agro-Ecosystem Management	71	17	6,350,613
Agriculture Systems and Technology			
Nanotechnology for Agricultural and Food Systems	111	13	5,158,675
Agricultural Engineering	104	13	5,457,257
National Robotics Initiative	3	3	2,963,970
Agriculture Economics and Rural Communities			
Small and Medium-Sized Farms	31	10	4,729,793
Markets and Trade	52	11	4,778,502
Environment	27	7	3,045,599
Innovation for Rural Entrepreneurs and Communities	39	8	3,107,512
Critical Agricultural Research and Extension (CARE) Program			
CARE	39	7	977,673
Exploratory Program			
Exploratory Research	157	19	1,891,624
Challenge Areas			
Childhood Obesity Prevention			
Integrated Research, Education, and Extension to Prevent Childhood Obesity	66	28	15,750,187
Extension Interventions to Prevent Childhood Obesity	16	3	2,543,306
Supplemental Nutrition Assistance Program and Expanded Food and Nutrition Education Program	7	2	2,000,000
Climate Change			
Regional Approaches to Climate Change	5	2	3,937,025

TABLE 4: FUNDING BY PROGRAM (CONTINUED)

AFRI Program	Number of Applications	Number of Awards	Fiscal Year 2015 Funding
Climate Change (Continued)			
Climate and Microbial Processes in Agroecosystems	25	6	3,884,080
Climate Resilient Land Use for Agriculture and Forestry	36	2	855,000
Climate Synthesis and Assessment	1	1	324,000
Interagency Climate Change	5	5	4,999,895
National Cereal Germplasm Phenotyping	1	0	0
Impacts of Climate Change on Animal Health and Production	1	0	0
Climate Change Mitigation and Adaptation in Agriculture	13	0	0
Plant Feedstock Genomics for Bioenergy	2	0	0
Food Safety			
Prevention, Detection, and Control of Shiga toxin-producing <i>Escherichia coli</i> (STEC) from Pre-Harvest through Consumption in Beef Products	1	1	4,999,943
Prevention, Detection, and Control of Food-borne Viruses in Food: A Focus on Noroviruses	1	1	4,850,600
Enhancing Food Safety through Improved Processing Technologies	20	6	5,147,958
Effective Mitigation Strategies for Antimicrobial Resistance	41	9	5,677,192
Prevention and Control of <i>Salmonella</i> and <i>Campylobacter</i> in Poultry Flocks and Poultry Products, Including Eggs	4	0	0
Global Food Security			
Translational Genomics for Improved Fertility of Animals	4	3	1,675,020
Translational Genomics for Disease Resistance in Animals	3	3	1,798,601
Extension-Driven Disease Prevention and Control in Animals	2	2	1,193,046
Minimizing Diseases due to Fungal Pathosystems	4	3	3,241,666
Management of Arthropod - or Nematode - Vecteded Plant Pathogens	3	2	1,425,000
Improved Sustainable Food Systems to Reduce Hunger and Food Insecurity Domestically and Globally	11	7	4,892,468
Mitigating Crop and Livestock Losses	3	3	3,077,500
Minimizing Losses from Pests and Diseases of Livestock	2	2	2,922,500
Agricultural Production Systems	62	6	11,804,199
Breeding and Genomics	41	5	4,180,000
National Strategy for Sustainable Production	12	3	590,000
Improving Sustainability by Improving Feed Efficiency of Animals	3	0	0
Minimizing Losses from Dairy Diseases with Major Impact on Production, Marketing, and/or Trade	1	0	0
Oomycete Pathosystems in Crop Plants to Minimize Disease	2	0	0
Program Delivery and Implementation of Wide-Area Pest Monitoring	1	0	0
Sustainable Bioenergy			
Development and Sustainable Production of Regionally Appropriate Biomass Feedstocks	7	7	30,549,000
National Loblolly Pine Genome Sequencing	1	1	2,925,000
Plant Feedstock Genomics for Bioenergy	2	2	2,000,000
Investing in America's Scientific Corps: Stimulating a New Era of Students and Faculty in Bioenergy	2	0	0
Water for Agriculture			
Water for Agriculture	34	10	12,012,730
Understanding Decisions and Behaviors Connected with Agriculture and Post-Harvest Processing Industry Water Use	22	2	971,385
Understanding the Human Health Impacts to Exposure from Non-Traditional Water Used in Agriculture	19	4	1,469,885

TABLE 4: FUNDING BY PROGRAM (CONTINUED)

AFRI Program	Number of Applications	Number of Awards	Fiscal Year 2015 Funding
Food, Agriculture, Natural Resources and Human Sciences Education and Literacy Initiative (ELI)			
Predocctoral Fellowships	105	40	2,914,206
Postdoctoral Fellowships	186	55	8,029,033
Undergraduate Research and Extension Experiential Learning Fellowships	116	16	4,335,500
Grand Total	2,694	569	\$280,747,198

TABLE 5: TOTAL DOLLARS AND PERCENT OF FUNDING FOR DIMENSIONS OF FY 2015 AFRI AWARDS

Award Dimension	Funding	%
Fundamental Research Mission-Linked	\$134,161,304	48
Applied Research	147,024,351	52
Multi-Disciplinary	201,825,944	73
Single Discipline	75,775,000	27
Integrated Research		
Education and Extension	242,568	0
Research and Education	19,431,182	7
Research and Extension	26,221,540	9
Research, Education, and Extension	110,668,890	39
Single Function Projects		
Research	124,864,043	44
Education	1,167,010	1
Extension	50,000	0

TABLE 6: NUMBER AND TOTAL DOLLARS OF FY 2015 AWARDS PROVIDED FOR EACH CATEGORY FASE GRANT

Award Type	Number	Funding
Postdoctoral Fellowships	55	\$8,029,033
Predocctoral Fellowships	40	2,914,206
New Investigator Awards	3	823,027
Strengthening Awards		
Research Career Enhancement Awards	1	65,908
Equipment Grants	4	131,038
Seed Grants	23	3,296,479
Standard Strengthening Research Project Awards	52	20,261,640
Strengthening Coordinated Agricultural Projects	7	11,065,640
Total	185	46,586,971

TABLE 7: CROSS-CUTTING AREAS OF SCIENCE IMPORTANT TO AFRI AND USDA

Award Type	Number	Funding
Animal Genome	29	\$15,319,207
Animal Health	74	43,500,825
Food Safety	50	35,677,558
Forest Biology	22	32,146,920
Global Change	54	50,293,462
Integrated Pest Management	29	16,840,484
Plant Genome	16	12,946,320
Sustainable Agriculture	77	58,475,757
Water Quality	31	12,765,918

TABLE 8: APPLICATIONS BY TYPE OF INSTITUTION

Type of Institution	% of Applications Submitted	% of Applications Awarded	% of Total Dollars Awarded
Land-Grant University			
1862 Land-Grant University	76.43	78.38	81.58
1890 Land-Grant University (including Tuskegee)	3.04	2.28	1.54
1994 Land-Grant University	0.00	0.00	0.00
Public Non-Land-Grant University or College	6.98	5.98	7.52
Private University or College	5.94	5.98	4.39
Federal Agency/Department	2.00	2.28	1.76
Industry/Other*	5.61	5.10	3.21

*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 2015 AWARDS

Program	Supported	Graduate Students	Postdoctoral Students	Undergraduate Students	Subtotal
Foundational Programs					
Plant Health and Production and Plant Products	Number Months	42 475	80 1,281	34 913	156 2,669
Animal Health and Production and Animal Products	Number Months	11 151	33 711	31 750	75 1,612
Food Safety, Nutrition, and Health	Number Months	9 144	45 1,027	6 161	60 1,332
Bioenergy, Natural Resources, and Environment	Number Months	31 162	28 721	39 184	98 1,067
Agriculture Systems and Technology	Number Months	8 120	39 706	9 179	56 1,005
Agriculture Economics and Rural Communities	Number Months	18 135	37 707	4 37	59 879
Exploratory Research Program	Number Months	7 16	7 58	9 66	23 140
Critical Agricultural Research and Extension	Number Months	7 104	11 171	1 20	19 295
Challenge Area Programs					
Sustainable Bioenergy	Number Months	4 24	32 127	9 150	45 301
Climate Change	Number Months	130 803	321 3,000	105 1,123	556 4,926
Food Safety	Number Months	39 506	98 881	92 599	229 1,986
Global Food Security	Number Months	156 719	117 1,856	38 687	311 3,262
Childhood Obesity Prevention	Number Months	99 542	41 966	10 73	150 1,581
Water for Agriculture	Number Months	6 34	12 119	4 48	22 201
Fellowships					
Education and Literacy Initiative	Number Months	0 0	25 562	26 592	51 1,154
Total	Number Months	567 3,935	926 12,893	417 5,582	1,154 22,410