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Food, Nutrition, Agriculture, and Natural Resource Sciences in the FY 2015 Budget

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HIGHLIGHTS

– On February 7, 2014, the Agricultural Act of 2014 (H.R. 2642), commonly called the Farm Bill, became law. The bill authorizes funding for competitive agriculture research grants and other research programs in fields such as biomass.

– The spending caps set forth in the Budget Control Act leave little room for increases in food and agricultural R&D. The Agriculture and Food Research Initiative (AFRI) competitive grant program would decrease by $58 million from the FY 2014 budget request.

Table 1. Food, Nutrition, Agriculture, and Natural Resources Sciences in FY 2015

(budget authority in millions of dollars)

	FY 2013	FY 2014	**FY 2015**	Change FY 14-15	
	Actual	Estimate	**Budget**	Amount	Percent
US Dept of Agriculture R&D					
NIFA					
Food Safety	21	21	**26**	5	23.8%
Food Security	37	42	**37**	-5	-11.8%
Natural Resources	30	32	**32**	0	0.0%
Nutrition	114	127	**123**	-4	-3.2%
Renewable Energy	65	64	**57**	-7	-10.9%
ARS					
Food Safety	98	112	**110**	-2	-1.8%
Food Security	140	138	**150**	12	8.7%
Natural Resources	175	201	**200**	-1	-0.5%
Nutrition	80	86	**89**	3	3.5%
ERS					
Food Safety	1	2	**2**	0	0.0%
Food Security	4	4	**4**	0	0.0%
Nutrition	15	16	**16**	0	0.0%
Renewable Energy	2	2	**2**	0	0.0%
Forest Service					
Natural Resources	280	293	**275**	-18	-6.1%
Dept of Health and Human Serv					
FDA					
Food Safety	1,134	1,218	**1,481**	263	21.6%
NIH					
Food Safety	229	235	**235**	0	0.0%
Nutrition	1,524	1,561	**1,561**	0	0.0%
Nutrition-Obesity	812	834	**834**	0	0.0%
Dept of Energy					
Bioenergy Technologies	185	232	**253**	21	9.0%
Biological and Environmental Research	561	610	**628**	18	3.0%
U.S. Geological Survey					
Water Resources	197	207	**210**	3	1.4%

Source: Agency budget justifications and other budget documents.
All figures rounded to the nearest million. Changes calculated from unrounded figures.

INTRODUCTION

Agricultural research is crucial to provide a safe, nutritious, affordable, and sustainable food supply for the growing world population; to preserve the competitive position of U.S. agriculture; and to provide jobs and revenue to support the U.S. economy. The President's Council of Advisors on Science and Technology (PCAST), in its December 2012 *Report to the President on Agriculture Preparedness and the Agriculture Research Enterprise*, states that agricultural research is at a crossroads, concluding that "Waning public investment in agricultural research in the United States contributes significantly to the risk of losing its international leadership in agriculture," and calls for increased public investment in agricultural research to meet growing challenges. Failure to address the current research-funding deficit will have serious negative consequences, not just to our food and agricultural system but also to the entire U.S. economy and global food security.

FOOD SAFETY

R&D funding for food safety primarily resides within the United States Department of Agriculture (USDA) and Department of Health and Human Services (HHS), specifically within the Food and Drug Administration (FDA).

Food safety is a key goal and challenge area at the USDA National Institute of Food and Agriculture (NIFA). The budget request is $26 million for FY 2015, an increase of $5 million from the FY 2014 estimate. Funding will support a program in research, education, and extension to improve food safety. Funding will support an integrated food safety research program that will continue to focus on minimizing antibiotic resistance transmission through the food chain and minimizing microbial food safety hazards of fresh and fresh-cut fruits and vegetables, expand food safety education to new audiences, and pursue new research strategies and technologies to create a healthier and higher quality food supply.

The USDA Agricultural Research Service (ARS) budgets 110 million for food safety. The research is designed to yield science-based knowledge on the safe production, storage, processing, and handling of plant and animal products, and on the detection and control of toxin producing and/or pathogenic bacteria and fungi, parasites, chemical contaminants, and plant toxins.

The USDA Economic Research Service (ERS) FY 2015 budget of $2 million remains the same as the FY 2014 estimate. ERS conducts food safety research that focuses on several areas: estimation of food-attributable fractions of foodborne illness from time series data; examination of the effects of the Food Safety Modernization Act (FSMA) across the fresh produce supply chain; and exploration of China's fundamental institutional and regulatory approaches in food safety.

The FY 2015 President's budget proposes an increase in FDA's food safety budget of $263 million. Additional funding for FDA's food safety program will support mission-related research activities, including advancement of rapid detection and confirmatory methods for identifying microbial and chemical hazards in food and feed and furthering partnerships with CDC, USDA and NIH to evaluate and implement innovative technologies into FDA's compliance and surveillance programs. The majority of FDA's food safety research is performed by the Center for Food Safety and Applied Nutrition, the Center for Veterinary Medicine, and research collaborations with academic institutions through its Centers of Excellence program. FDA's Food Safety Initiative will focus on implementing the FSMA by establishing a prevention-focused food safety system. Budget increases allow for continuation of mission critical research essential for supporting science-based food safety prevention standards, understanding and detecting foodborne hazards, and developing intervention strategies.

Also within HHS, the National Institutes of Health (NIH) budgets $235 million for food safety in FY 2015. The National Institute of Allergy and Infectious Diseases (NIAID) is the primary NIH institute that conducts and supports research related to food safety. NIAID will continue to focus on advancing drugs, vaccines and diagnostics for emerging pathogens and agents of bioterrorism. NIAID is also working to extend understanding of how microbes develop resistance, and to develop and evaluate vaccines and therapeutics against drug-resistant microbes. NIAID will continue to support its infectious and immunologic disease research portfolio, to support critical research of food allergies.

FOOD SECURITY

The term "food security" can apply to both domestic and global food needs and has been recognized as a high priority on the global level by

the G20, as well as the U.S. federal government. The USDA strategic plan emphasizes food security, and includes the goal to "Help America promote agricultural production and biotechnology exports as America works to increase food security." The FY 2015 budget for each of the USDA Research, Education and Economics (REE) Mission Area agencies includes funding to address food security. Research on food security is also supported by the National Science Foundation (NSF) and the U.S. Agency for International Development (USAID).

The FY 2015 NIFA budget proposes $37 million for efforts to improve food security. This represents a $5 million decrease compared to FY 2014 enacted levels. NIFA programs that address food security include the Agriculture and Food Research Initiative (AFRI) competitive grants program and the Sustainable Agriculture Research and Education Program. Examples of NIFA research on food security include efforts to improve feed efficiency and extend knowledge to producers to enhance reproductive fertility in food animals, and efforts to develop more sustainable, productive, and economically viable plant and production systems.

The FY 2015 ARS budget includes $138 million to accomplish the agency's food security goal. FY 2015 includes a highlighted priority to invest $25.9 million in genetic resources and tools that will strengthen U.S. agricultural productivity and resilience by developing new breeds, lines, and strains with better climate adaptation, drought tolerance, disease resistance, nutritional value, enhanced production efficiencies, and reduced environmental impact. Other areas of ARS research that support food security include research on livestock and crop production and protection.

The ERS and NASS also play important roles in food security. The FY 2015 ERS budget proposes $4 million for such research in FY 2015 while $2.5 million is proposed for NASS to conduct its Tenure, Ownership, and Transition of Agricultural Land (TOTAL) survey which analyzes long-term effects and policy scenarios focused on fundamental issues such as food security and resource sustainability.

The NSF Biological Sciences (BIO) Directorate's Division of Integrative Organismal Systems (IOS) supports research and education aimed at understanding the diversity of plants, animals, and microorganisms as complex systems interacting with their environments. The President's FY 2015 budget includes $218.2 million, of which 43 percent will be

available for new research grants. Among the IOS programs impacting food security are the Plant Genome Research Program (PGRP) and the Basic Research to Enable Agricultural Development (BREAD) Program.

The FY 2014 request for USAID includes $1.0 billion for the Feed the Future initiative to fight chronic food insecurity and support the New Alliance for Food Security and Nutrition. The total amount designated for R&D in FY 2015 has yet to be determined. USAID also supports the Consultative Group on International Agricultural Research (CGIAR) program, an essential component of global long-term agricultural R&D, and the Collaborative Research Support Programs (CRSP). USAID does not provide budget details for these programs.

NUTRITION AND OBESITY

This section will focus on the NIH and the USDA, which fund more than 90 percent of nutrition-related research and training, although many other federal agencies contribute to nutrition research.

In FY 2015, the NIH estimates that it will award $1.6 billion in grants for nutrition-related research and $834 million in obesity-related research. Although many NIH institutes and centers invest in nutrition R&D, the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), the National Heart, Lung and Blood Institute, and the National Cancer Institute are the lead contributors. NIDDK will contribute approximately $465 million to extramural research on **Digestive Diseases and Nutrition** in FY 2015, an increase of $1061 million above the FY 2014 enacted level. In 2015, NIDDK will continue to support multidisciplinary research to better understand the important role of the gut microbiome in addressing obesity and type 2 diabetes, along with other metabolic conditions, as part of the Human Microbiome Project.

The USDA ARS budgets $89 million for the **Human Nutrition Research Program** in FY 2015. The proposed funding will continue to support research focused on providing higher quality, healthy foods that satisfy consumer needs in the United States and abroad. ARS research also studies the maintenance of health throughout the lifespan along with prevention of obesity and chronic diseases via food-based recommendations.

The USDA NIFA estimates $123 million will support ongoing nutrition-related research, education, and extension activities in FY 2015. In FY 2015, $20.9 million is available for the **Childhood Obesity Prevention Challenge Area** of AFRI. AFRI projects will focus on identifying the behavioral factors that influence obesity; developing valid behavioral and environmental instruments for measuring progress in obesity prevention efforts; and nutrition research that leads to the development and evaluation of effective programs to prevent obesity. New grants totaling $5.9 million will fund research, education, and extension efforts focused on populations at the greatest risk for obesity, including those eligible for USDA nutrition education and food assistance programs. The foundational area of **Nutrition, food safety and quality, and health** will address links between diet and health, as well as the bioavailability of nutrients.

USDA NIFA also supports nutrition research conducted through the Small Business Innovation Research (SBIR) Program. The SBIR Program will solicit research proposals to develop affordable food ingredients and/or food formulations that contribute to the prevention of obesity while maintaining good sensory characteristics, and aims to develop and implement interactive programs for nutrition educators and teachers to increase nutrition awareness and improve health to address obesity among children.

USDA ERS has set aside funds of $16 million for nutrition research in FY2015. ERS will conduct research to better understand the nutrition choices consumers make, as well as family participation in nutrition assistance programs to improve Federal and State coordination and delivery. In 2015, ERS will expand child nutrition pilots to identify successful nutrition-improving changes for schools to adopt.

NATURAL RESOURCES

The President's proposed funding for ARS environmental stewardship research remains steady at $200 million and addresses the need for production agriculture systems to meet food, fiber, and fuel needs in an economically and environmentally sustainable manner. The FY 2015 budget reallocates $44 million to study the impact of climate change on agriculture. This research will study the performance of crop production systems under various climate change scenarios. ARS will engage the Regional Climate Hubs network in support of the Long Term

Agroecosystem Research network to assess adaptation of resilient crop management systems across the nation.

Proposed funding for NIFA natural resources and soil conservation research is $32 million, an increase of $2 million over 2013 enacted. These funds will address the impact climate variability will have on crop production system resilience with respect to invasive species, diseases, and water availability. Water resources research will examine irrigation efficiency in the face of water limits due to competing urban and industrial uses. Proposed funding for the Sustainable Agriculture Research and Education Program remains level at $23 million, only 38 percent of its congressionally authorized funding level. SARE funding supports innovative on-farm research to develop sustainable crop production systems.

The proposed Forest Service research budget of $275 million is a reduction of $18 million from the 2014 estimate. This research supports the development of productive and sustainable forest ecosystems and seeks to develop markets for underutilized or un-merchantable timber resources produced in forest management operations. Nanotechnology research is directed at the use of renewable forest materials as alternatives to petroleum-based products in industrial and biomedical devices.

The President's proposed budget for water resources research at the US Geological Survey (USGS) is $210 million, an increase of 6.6 percent over FY 2013 enacted funding. These funds support monitoring and research essential to understanding the water resource impact of agricultural production systems. $3 million would be specifically directed at climate and drought impacts on ecosystems.

Proposed funding for the EPA Office of Research and Development would decline to $144.1 million, a 7 percent reduction. However, within the ORD budget, reallocation of funding resources will allow EPA to increase its research program by $4.3 million on the potential environmental impacts of hydraulic fracturing on water quality and aquatic ecosystems. This work in cooperation with Department of Energy and USGS expands the current program that is examining the impact of hydraulic fracturing on drinking water.

RENEWABLE ENERGY

Unlike fossil fuels, which are exhaustible, renewable energy sources regenerate and can be sustained indefinitely. This section will focus on renewable energy from biomass, which is any organic matter derived from plants or animals available on a renewable basis: wood and agricultural crops, herbaceous and woody energy crops, municipal organic wastes, as well as manure. Bioenergy is energy derived from the conversion of biomass, where biomass may be used directly as fuel, or processed into liquids and gases. Biomass can be converted directly into liquid fuels, called biofuels. The two most common types of biofuels in use today are ethanol and biodiesel.

The Biomass Research and Development Act of 2000 established the Biomass Research and Development Board, annual Initiative solicitation, and the Technical Advisory Committee. The Biomass Research and Development Board is an interagency collaborative composed of senior decision-makers from federal agencies and the White House, co-chaired by the USDA and the U.S. Department of Energy (DOE). USDA and DOE annually implement the Biomass Research and Development Initiative (BRDI).

The Energy Independence and Security Act (EISA) of 2007 sets aggressive goals: Move renewable fuels into the marketplace, reduce the nation's dependence on foreign sources of energy, and reduce Greenhouse Gas emissions from the transportation sector. EISA established production volumes under the Renewable Fuel Standard Program (RFS), seeking to increase the supply of renewable fuels to 36 billion gallons by 2022.

USDA NIFA **funds biomass research through discretionary and mandatory funding**. In FY 2015, NIFA will provide approximately $34 million in funding through the Sustainable Bioenergy Program for continuation awards to support our ongoing investments in bioenergy. Funding will support five regional projects with activities in 22 states involving 32 universities plus nine federal and eight industrial partners. These regional projects link research for sustainable biomass production, logistics of handling feedstocks for biofuels, and education programs to create the needed skilled workforce. BRDI is authorized in the Agriculture Act of 2014 at $3 million in USDA, a cut from the 2013 enacted funding of $40 million.

The DOE Bioenergy Technologies Office focuses on developing advanced biofuels to help meet the RFS goals. The office would invest $253 million in FY 2015, with an emphasis on the development of innovative processes to convert cellulosic and algal-based feedstocks to bio-based gasoline, jet, and diesel fuels at a cost of $3.00 per gallon of gasoline equivalent. In collaboration with the U.S. Departments of the Navy and Agriculture, commercial-scale biorefineries to produce military-specification fuels will be demonstrated.

The DOE Office of Biological and Environmental Research (BER), within the Office of Science, and USDA's NIFA have two main joint funding opportunities managed through DOE. The Plant Feedstock Genomics for Bioenergy research program funds approximately $5 million for fundamental research building on plant genomics for improvement of biomass traits relevant to biofuels production and to accelerate breeding of dedicated bioenergy feedstocks. The Systems Biology of Microbes to Enable Next-Generation Biofuels Production research program funds approximately $8 million for fundamental research aimed at advancing systems biology understanding and developing genetic tools for microorganisms relevant to deconstruction of plant biomass and synthesis of next generation biofuels.