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Food, Nutrition, Agriculture, and Natural Resource Sciences in the FY 2014 Budget

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Highlights

- The FY 2014 U.S. Department of Agriculture (USDA) budget requests $383 million for competitive grants through the Agriculture and Food Research Initiative (AFRI), a substantial increase of $117 over FY 2012. The requested funding is to support and enhance AFRI's investment in basic and applied research to advance knowledge in the food and agricultural sciences, and to develop solutions to challenges in agriculture, food production, biomass production, food safety, nutrition and childhood obesity, and sustainable natural resources, including water and land use.

- PCAST cautions that U.S. agriculture faces a number of challenges in the years ahead and recommends that the U.S. increase its total

investment in agricultural research to $700 million per year, including an increase in the NSF budget for basic science relevant to agriculture to $250 million per year and an increase in USDA's budget for competitive funding of extramural research to $500 million per year.

Table 1. Food, Nutrition, Agriculture, and Natural Resources Sciences in the FY 2014 Budget (budget authority in millions of dollars)

	FY 2012	FY 2013	**FY 2014**	Change FY 12-14	
	Actual	Estimate 3/	**Budget**	Amount	Percent
US Dept of Agriculture R&D					
NIFA 1/					
Food Safety	22	22	**28**	6	27.3%
Food Security	36	34	**42**	6	16.7%
Natural Resources 4/	14	15	**13**	-1	-7.1%
Nutrition	122	114	**127**	5	4.1%
Renewable Energy 2/	76	62	**56**	-20	-26.3%
ARS					
Food Safety	106	107	**119**	13	12.3%
Food Security	140	140	**138**	-2	-1.4%
Natural Resources	189	190	**219**	30	15.9%
Nutrition	85	86	**95**	10	11.8%
Renewable Energy	33	33	**39**	6	18.2%
ERS					
Food Safety	1	1	**1**	0	0.0%
Food Security	4	4	**4**	0	0.0%
Nutrition	15	15	**16**	1	6.7%
Renewable Energy	2	2	**2**	0	0.0%
Forest Service					
Natural Resources	295	297	**310**	15	5.1%
Renewable Energy	13	13	**13**	0	0.0%
Dept of Health and Human Serv					
FDA					
Food Safety	1,172	1,152	**1,468**	296	25.3%
NIH					
Food Safety	257	259	**259**	2	0.8%
Nutrition	1,692	1,702	**1,707**	15	0.9%
Nutrition-Obesity	836	841	**843**	7	0.8%
Dept of Energy					
Bioenergy	199	270	**270**	71	35.7%
U.S. Geological Survey					
Water Resources	210	210	**223**	13	6.2%

Source: Agency budget justifications and other budget documents.
All figures rounded to the nearest million. Changes calculated from unrounded figures.
1/ Includes portion of AFRI funding that supports Education and Extension.
2/ Includes Mandatory Farm Bill funding for Biomass Research and Development Initiative.
3/ FY 13 estimate amounts are based on the Annualized Continuity Resolution per P.L.112-175
4/ Includes Soil & Water Conservation

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. Yet the nation has a serious deficit in federal funding for food and agricultural research, extension**,** and education. 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 to the entire U.S. economy and global food security.

Food safety

R&D funding for food safety primarily resides within the USDA and Department of Health and Human Services (HHS), specifically within the Food and Drug Administration (FDA). The largest portion of USDA's food safety R&D is found in the Agricultural Research Service (ARS), USDA's in-house scientific research agency, and the National Institute of Food and Agriculture (NIFA), USDA's major extramural research agency.

Food safety is a key goal and challenge area at NIFA. The budget request is $28 million for FY 2014, an increase of $6 million. Funding will support ongoing research, education, and extension to improve the safety of the U.S. food supply through new and improved rapid detection methods, pre- and post-harvest epidemiological studies, and improved food harvesting and processing technologies. Funding will continue to focus on minimizing antibiotic resistance transmission through the food chain, as well as minimizing microbial food safety hazards of fresh and fresh-cut fruits and vegetables. Funding also will support new grants to: 1) advance investigator-driven integrated research to solve complex food safety challenges in plant and animal food systems; 2) amplify applied research that advances education and outreach activities to traditional and non-traditional food safety audiences; 3) expand and improve strategies

for reducing antimicrobial resistance, enhance safety of fresh and fresh-cut fruits and vegetables, and improve processing technologies for enhancing food safety; and 4) integrate nutrition and food safety efforts to create a healthier food supply.

ARS' current food safety 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 President's budget requests $119 million for ARS, up by $13 million, to improve detection technologies for crops at high risk of infestation (e.g., aflatoxin), reduce pathogens and evaluate alternatives to antibiotics, and develop better identification and characterization of pathogens.

The USDA Economic Research Service (ERS) FY 2014 budget of $1.7 million is slightly higher than the FY 2012 estimate of $1.4 million. ERS conducts food safety research that focuses on several areas: investigating the safety of food imports and the efficacy of international food safety policies and practices; enhancing methods for understanding the benefits associated with reduced food safety risks; assessing consumer willingness to pay for safer food; evaluating industry incentives to enhance food safety; and examining regulatory options.

The FDA research budget for food safety is up considerably from the FY 2012 estimate by $296 million. Research includes development of rapid detection and confirmatory methods, as well as investigations in biotechnology, virology, in vitro testing, and laboratory enhancement. A majority of FDA's food safety research is performed by the Center for Food Safety and Applied Nutrition. External research centers include the Joint Institute for Food Safety and Applied Nutrition, the National Center for Food Safety and Technology, and the Western Institute for Food Safety and Security. FDA's Transforming Food Safety Initiative will focus on implementing the Food Safety Modernization Act by establishing a prevention-focused food safety system.

Also within HHS, the National Institutes of Health (NIH) has budgeted $259 million for food safety in FY 2014, basically unchanged from 2012, though almost certainly an increase from FY 2013 post-sequestration funding. The National Institute of Allergy and Infectious Diseases (NIAID) is the

primary NIH institute that conducts and supports research related to food safety. Examples of NIAID food safety research include: antibody-based therapeutics for botulism, immune tolerance network, immunoprotectants for toxins, vaccines to bacterial diseases, and antimicrobial oligomers for biodefense and emerging food borne infectious disease.

Food Security

The term "food security" can apply to both domestic and global food needs. Research on domestic food security – access to adequate food to lead an active, healthy life – is conducted primarily by the USDA Research, Education, and Economics (REE) Mission Area. Both USDA REE and the U.S. Agency for International Development (USAID) play important roles in global food security.

Food security is an important component of USDA programs and is specifically highlighted in the department's strategic plan, which includes the goal to "Help America promote agricultural production and biotechnology exports as America works to increase food security." The NIFA FY 2014 request proposes $42 million for efforts to improve food security. This represents a $6 million decrease compared to FY 2012 enacted levels. The ERS also plays an important role in food security and proposes $4 million for such research in FY 2014.

The FY 2014 ARS budget includes $138 million to accomplish the agency's food security goal. Since increased food consumption and demand pose threats to global stability, the ARS budget request includes an increase of $8.1 million to enhance livestock production and animal health. Also, ARS's animal, insect, plant, and microbial germplasm collections within the National Plant Germplasm System provide an essential reservoir of genetic diversity and traits useful in overcoming challenges like new pests, pathogens, and drought. The budget proposes an increase of $0.6 million to expand and enhance crop genetic resources.

The National Science Foundation (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 2014 budget includes a 6.1 percent increase for IOS, bringing total funding to $225.4 million, thereby allowing

43 percent of the IOS portfolio to be available for new research grants. The Plant Genome Research Program (PGRP) is critical to genome-wide investigations that support biotech development. The NSF budget request includes a $4.0 million increase for PGRP over FY 2012. The IOS's Basic Research to Enable Agricultural Development (BREAD) Program supports basic research on early-concept approaches and technologies for science-based solutions to problems of agriculture in developing countries. In FY 2014, NSF requests $6 million for the BREAD program.

The FY 2014 request for USAID's Feed the Future (FtF) Initiative is $1.1 billion. The amount designated for R&D in FY 2014 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.

Natural Resources

Multidisciplinary agricultural research is essential to develop new scientific knowledge and solve technical problems of agricultural sustainability and natural resource protection.

The President has proposed $219 million for USDA ARS research in natural resources and environmental stewardship. This research develops technology and crop management systems that support profitable production and tolerance to environmental stress, improve soil conservation, and reduce vulnerability to climate variability. Proposed ARS funding will include $10 million to expand programs to improve production efficiency using minimal inputs, $10 million to develop farming practices to help mitigate and adapt to climate change impacts, and $5 million to develop sustainable bioenergy to meet alternative fuels production goals.

The ARS budget includes $4 million to support the federal Big Earth Data Initiative to integrate multi-agency earth system data into accessible information systems, thereby enabling accurate modeling and prediction of emerging issues in food security and agricultural sustainability.

There are two major natural resource initiatives within the President's proposed budget for AFRI**.** One would increase the sustainability of

advanced biofuel feedstock production systems to better understand the effects of increased biomass production on land and water resources and rural economies. The other will examine the sustainability of agricultural production systems to develop strategies to help farmers manage and adapt to the impacts of climate variability and change.

The President has proposed $310 million for USDA Forest Service research of productive and sustainable forest ecosystems. $16 million is proposed to develop innovative forest management practices to make our forests more resilient to changing climate and to increase forest potential for carbon sequestration.

The proposed US Geological Survey (USGS) budget includes $222.9 million for water resources, an increase of $13.3 million above the 2012 enacted level. Proposed programs collect, manage and disseminate hydrologic data essential to understanding the geologic and hydrologic impacts of hydraulic fracturing, and assessing water resource sensitivity to drought, flooding and the potential effects of climate change.

The President's proposal for the US Environmental Protection Agency Office of Research and Development includes $8 million to expand interagency research on hydraulic fracturing to analyze potential impacts on air, ecosystem, and water quality. $1.3 million is proposed to assess potential impact of biofuel feedstock production on human health and ecosystems.

Nutrition and Obesity

The NIH and the USDA fund more than 90 percent of nutrition-related research and training, although many other federal agencies contribute to nutrition research. The Interagency Committee on Human Nutrition Research (ICHNR) was chartered in 1983 and reestablished in 2013, and includes representation from the departments of Agriculture, HHS, Defense, and Commerce; the National Aeronautics and Space Administration; the Veterans Administration; the Federal Trade Commission; NSF; USAID; and the White House Office of Science and Technology Policy. The ICHNR enhances coordination of human nutrition research conducted by all federal agencies and ensures that the research is focused and strategic, leading to results that provide clear nutrition information and guidance for Americans that wish to lead healthier lifestyles.

In FY 2014, the NIH plans to award $1.7 billion in grants for nutrition-related research, with $843 million funding 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 $0.5 million to extramural research on Digestive Diseases and Nutrition in FY 2014, an increase of $5.7 million or one percent above the FY 2012 level. In FY 2014, NIDDK's continuing obesity-related efforts include major observational studies to assess the health risks and benefits of weight-loss surgery in extremely obese adults and adolescents, as well as the Action for Health in Diabetes (Look AHEAD) trial evaluating the long-term health effects of weight loss in obese adults with type 2 diabetes.

The USDA ARS Human Nutrition Research Program budget requests $95 million for FY 2014. The proposed increase includes funding to provide a scientific evidence base to help set food policy, strengthen nutrition monitoring programs, and administer USDA's nutrition assistance programs. Enhanced funds for USDA's food composition survey and databases and the Dietary Reference Intakes (DRIs) are critical to USDA's food assistance programs, and for updating the 2015 edition of the *Dietary Guidelines for Americans*, currently underway.

The USDA NIFA estimates $127 million will support ongoing nutrition-related research, education, and extension activities in FY 2014. These include AFRI's Function and Efficacy of Nutrients Foundational Program and the Childhood Obesity Prevention Program. Research conducted through the Childhood Obesity Prevention Program will focus on children and adolescents ages 2-19 and will seek to identify the behavioral, social, cultural, and environmental factors that influence childhood obesity. The program will also implement effective interventions to promote healthy behaviors in children and adolescents that prevent overweight, obesity, and related diseases. Nutrition research funded through these programs will help to identify individual patterns of behavior in children and adolescents, as well as how children and adolescents respond to others, the environment and policy. Research will also address the need for transdisciplinary education in nutrition.

USDA NIFA also supports nutrition research conducted through the Small Business Innovation Research (SBIR) Program. SBIR will aim to increase

consumption of healthy foods that are low in fats, sugars, and salt and high in nutrients by soliciting research proposals that seek to understand the nutritional impact of foods, improve foods and diets, and apply nutritional information to consumer foods and food service systems.

USDA's ERS has set aside funds of $3.4 million for the Food Assistance and Nutrition Research Program. ERS will conduct research to understand how the Supplemental Nutrition Assistance Program (SNAP) and food access influence food purchases and food security. Additional research will look at factors that influence the success of the Healthy, Hunger-Free Kids Act of 2010.

Renewable Energy

The Biofuels Interagency Working Group continues to be co-chaired by the Secretaries of the Department of Energy (DOE) and USDA, and the EPA Administrator. These agencies perform basic and applied research for the genetic development of biomass, sustainable production of feedstocks, logistics, and biomass conversion into advanced biofuels and value-added co-products.

The goal of the DOE Biomass and Biorefinery Systems R&D program, renamed Bioenergy Technologies in FY 2014, is to ensure that cellulosic ethanol is cost-competitive by 2014. A total of $282 million, an $81.5 million increase over FY 2013, has been requested for the Biomass Program, marking a significant increase over FY 2013. Within the DOE Office of Science's Office of Biological and Environmental Research (BER), the Genomic Science Program (GS) receives a small ($13.0 million) increase over FY 2012, bringing the total request to $197.2 million for FY 2014. While the Bioenergy Research Centers received no increase (the request is $75 million for FY 2014), the Joint Genome Institute (JGI) receives a small increase of $1.3 million in the budget request over FY 2012. The JGI is an essential infrastructural component which uses tools from contemporary systems biology to understand and predict the energetic relationships between microbes and plants. The increase would support synthetic molecular toolkits that predict, design, construct, and test new biological systems for clean energy solutions.

DOE and USDA NIFA jointly administer the Plant Feedstock Genomics for Bioenergy and the Biomass Research and Development Initiative (BRDI)

programs to advance fundamental understanding of lignocellulosic biomass accumulation and other traits relevant to fuel production. As in FY 2013, there is no budget requested for BRDI in FY 2014, since it is a mandatory program that must be reauthorized in the next Farm Bill. For FY 2012, BRDI was funded at $40 million. For FY 2014, NIFA's budget includes $56 million for renewable energy research. Finally, the FY 2014 budget includes a request of $12.9 million, a slight decrease of $0.5 million from FY 2012, for research on sustainable and efficient production, harvest, and conversion of liquid fuels, chemicals, and other high-value products within the USDA Forest Service bioenergy and biobased products strategy.

Acknowledgement

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