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NATIONAL INSTITUTE OF FOOD AND AGRICULTURE

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Before the Subcommittee on Agriculture, Rural Development,
Food and Drug Administration, and Related Agencies

Mr. Chairman and Members of the Subcommittee, I appreciate the opportunity to present the President's 2016 Budget for the National Institute of Food and Agriculture (NIFA), one of the four agencies in the Research, Education, and Economics (REE) mission area of the United States Department of Agriculture (USDA).

NIFA's vision is to catalyze transformative research, education, and extension to address our nation's most pressing societal challenges. The investments that Congress authorizes for research, education, and extension are making significant headway to address a multitude of challenges facing food, agriculture, and the human sciences. NIFA's strong partnership with our nation's land-grant universities and other colleges, farmers and livestock producers, and public and private entities is bolstering exemplary research, education, and extension to find real solutions to problems related to food security and safety, nutrition and public health, natural resource stewardship, jobs, and economic health.

NIFA Programs

NIFA supports the future of agriculture and the nation's wellbeing through its forward-thinking investments in four critical science, education, and engagement programs. These are: Food Production and Sustainability; Food Safety and Nutrition; Bioenergy, Climate, and Environment; and Youth, Family, and Community. The agency provides support for federal assistance programs to achieve priorities of the 2014 Farm Bill. NIFA brings together the best and brightest minds in science, education, and extension to form multidisciplinary, outcomes-based teams that work on a wide array of significant agricultural problems, many of which have a global impact.

Proposal

The President's 2016 budget proposes approximately $1.5 billion in discretionary funding. The budget includes significant increases for NIFA's flagship competitive grants program, the Agriculture and Food Research Initiative (AFRI), and funding for several new programs. The latter includes a new $20 million competitive awards program for the research and extension programs for the 1862 and 1890 Institutions, $80 million for two new Innovation Institutes focused on the bioeconomy, $2.5 million for a new program to attract veterans in the agricultural sector, and a $10 million endowment fund for Hispanic-serving institutions. The proposed budget also includes increases to support minority-serving institutions added through the 2014 Farm Bill, and $1 million for increased support for youth-serving institutions.

Agriculture affects all facets of health—human, animal, plant, environmental, and economic—either directly or indirectly. The President's budget proposal will support the development of a comprehensive approach to address the nexus between agriculture-health. New, multidisciplinary approaches and innovative solutions are needed to address agricultural production, plant and animal health, nutrition and childhood obesity, food safety, climate variability, and natural resources and the environment and, ultimately, the economic health of our nation's rural communities. The approaches and solutions can only be achieved through targeted and sound investments. NIFA will support cutting-edge science through initiatives that advance sustainable agricultural production systems and provide for an abundant and quality food supply. The proposed initiatives in this request also will enhance the renewable agricultural and forestry enterprises that underpin the bioeconomy and support resiliency of rural communities, create jobs, and promote economic viability.

Agriculture and Food Research Initiative

The President's 2016 budget proposal requests $450 million for AFRI. AFRI is NIFA's flagship competitive grants program for research, education, and extension. Funding provided previously by Congress has significantly improved our nation's food and agricultural systems. Funding requested for AFRI in Fiscal Year (FY) 2016 will ensure that this important program can continue to contribute to: safeguarding our nation's food supply; improving nutritional and health outcomes; protecting the environment and natural resources; and enhancing the competitiveness of American agriculture, thus, bolstering the U.S. economy.

Agriculture and Health Initiatives

The President's budget will support new agriculture and health initiatives in the areas of pollinator health, antimicrobial resistance, and feedstocks for biobased products.

NIFA's previously funded research and extension efforts on honey bees, integrated pest management, and production agriculture have resulted in research-based tools and extension programs to manage pests while ensuring that pollinators are protected. Farmers and others have conveyed the urgency of protecting honey bees and pollinators, and the current challenge is providing sufficient resources for hastening the development of tools and management protocols that will protect pollinators. As part of the President's government-wide pollinator initiative and in response to a number of studies and calls for action, NIFA will establish a Pollinator Health Initiative to address biological, environmental, and management factors that contribute to the wide-scale decline of honey bees and other pollinators. This initiative will promote problem-solving partnerships between commodity groups that depend on bees and other pollinators to pollinate their crops, pollination service providers, honey-producers, and public and private sector researchers. As part of the Department's total of $79 million (+$30.4 million above the FY 2015 enacted level), NIFA is providing a total of $27 million under AFRI in support of this important Administration initiative.

The Antimicrobial Resistance Initiative will lead to increased science-based knowledge about animal health management and production practices that can eliminate the threat and risk of antimicrobial resistance, as articulated in the President's Executive Order on combating antibiotic-resistant bacteria. This initiative will develop sustainable and integrated food safety systems and reduce public health risks along the entire food chain, from primary producer to the consumer. Our expectation is that this approach will ensure producers do not lose access to management tools in their production systems. As part of the Department's total of the $77 million (+$57 million above the FY 2015 enacted level), NIFA is providing a total of $33.5 million in support of this important Administration initiative.

Multiple studies across America and other parts of the world have raised concerns about antimicrobial resistance (AMR). In an effort to develop and deploy science-based approaches to managing antibiotics while ensuring livestock producers continue to have access to all of the management tools, NIFA has funded two Coordinated Agricultural Projects aimed at developing approaches to mitigate AMR in food animals. One is a study on the ecology of antibiotic-

resistant microbes to model decreased antibiotic use on dairy farms; a second is applying whole genome analyses to understand AMR in microbial communities. Yet, again, the challenge is the lack of sufficient funds and the urgency of needing research-based tools and extension programs by producers and society.

NIFA funding is currently supporting the Bioenergy Alliance Network of the Rockies (BANR). The project uses beetle-killed wood and other forest residues for the production of advanced liquid biofuel and biobased products. By harvesting, transporting, and processing over 42 million acres of forest infested with bark beetle in the western United States, BANR will help improve forest management, reduce forest fire potential, mitigate greenhouse gas, and generate clean renewable energy and co-products with potential for job creation and a cleaner future for America. NIFA believes the potential of using renewable, agriculture- and forestry-based feedstocks provide tremendous opportunity to promote the economic well-being and global preeminence of the United States, and BANR is an example of the potential of the bioeconomy. The Feedstocks for Biobased Products Initiative will support the production of sustainable bioenergy and advance a sustainable bioeconomy through agricultural systems that provide the high quality feedstocks for biobased products to promote our nation's economic health. Funding will support the development and sustainable production of regional biomass feedstocks that will generate non-food biobased products, chemical intermediates, or alternative jet fuel. In addition, funding will support the analysis of related federal and state economic, environmental, and other policies, and the impacts on the feedstock supply chain. The initiative will include educational and extension activities to provide the emerging bioeconomy with a workforce that is skilled and experienced in a multidisciplinary and problem-solving framework, knowledgeable of the bioeconomy value chain, and trained in a wide range of technical, educational, socio-economic, and scientific competencies.

Impacts of Climate Variability and Change

The variable climate, droughts, intense weather, and heat stress seen in the last few years are impacting farmers and livestock producers. For example, summer heat stress negatively affects 75 percent of the U.S. swine herd, causing annual losses to U.S. pork producers exceeding $375 million. Results from one NIFA-funded project showed that when sows are heat stressed during gestation, piglets born had impaired intestinal function leading to reduced nutrient uptake and poor growth. The expectation is that this work will lead to management

approaches to minimize the effect of heat stress on pigs. Farmers and farm groups are reaching out to NIFA, the land-grant universities, and Cooperative Extension system to ask for help in supporting improved agricultural production and management systems that can help mitigate the impact of these environmental constraints. As part of the President's Climate Action Plan, NIFA will support projects that will create resilient and sustained agroecosystems that may be impacted by climate disruptions. NIFA will focus on developing improved crop and livestock production systems and on climate and land use to understand the patterns, processes, and consequences of changes in land use, land condition, and land cover at multiple spatial and temporal scales. NIFA will also concentrate its efforts on the interactions between climate variability, human activities, and the landscape mosaic comprising natural and production systems.

NIFA's Water for Agriculture program will focus on supporting the development of solutions for water management that could potentially impact public health, food, climate, energy, and the environment. This program will address critical water resources issues such as drought, excess soil moisture, flooding, availability, and quality and quantity in an agricultural context. For example, an AFRI-funded project is developing an early warning system/decision-making tool for agricultural producers to minimize crop production losses and to maximize water use efficiency during drought events. This project will couple together three primary research activities: meteorological forecasting, hydrologic modeling, and crop stress monitoring.

Improving Nutrition and Health

NIFA supports integrated approaches to improving nutritional outcomes and health. One such project promotes education on nutrition and health to promote sustainable healthy eating and adequate physical activity by helping teens develop integrated gardening, food preparation, and food preservation. In 2016, AFRI will continue to address childhood obesity prevention for children and adolescents ages 2-19. This is a population at great risk, and includes those eligible for USDA nutrition education and food assistance programs, the Supplemental Nutrition Assistance Program, and child nutrition programs.

Foundational Science

Research investments will continue building a foundation of knowledge critical for solving current and future societal challenges and the priorities of the 2014 Farm Bill. With continuing complexity of agricultural production systems and markets, as well as susceptibility to droughts and variable climate, the development of tools and technologies that farmers rely

on—for example, development of crop varieties and animal breeds, pest management, sensors for food safety, and improved nutritional and health outcomes—will require a robust investment in obtaining fundamental knowledge. In the last few years, for example, NIFA's foundational science funding is supporting research on riparian zones to mitigate impact of agriculture nitrogen and phosphorus use on water quality and greenhouse gas emissions. Such research is of critical importance to ensure producers can continue to make sound production and management decisions. The ultimate goal of this study is to create a geospatial database of riparian zone attributes that are critical in understanding and solving nutrient loading in waters that contribute to hypoxic zones, such as in the Gulf of Mexico.

The Critical Agricultural Research and Extension program will support projects aimed at catalyzing the developing tools and technologies that agricultural producers can deploy in their production systems. The Exploratory Research Grants program will fund projects that develop proof of concept for untested innovative ideas, especially high risk-high reward work that may lead to significant improvements in U.S. agriculture.

Strengthening Education and Literacy Initiative

Through the education and literacy initiative (ELI), NIFA will continue to develop a diverse workforce that contributes to the national food and agricultural system. In several recent surveys it has been discovered that there is almost a 10-fold difference in the number of jobs created in the food and agricultural systems and the number of graduates from community colleges, four-year colleges and universities, and doctoral and postdoctoral training programs. It is critically important that our nation, in partnership with public and private enterprises, continues to offer support for experiential education of America's youth in the food and agricultural systems so they are endowed with the skills to enter the workforce and be effective. Without such investments, we might very well see many of these jobs being outsourced, negatively impacting our nation's global preeminence. Based on formal survey data and focused conversations with leaders in the private sector, non-governmental sector, and public sector, in 2015, NIFA added a focus on promoting experiential learning for undergraduate students, along with significant increases for doctoral and postdoctoral trainees. In 2016, NIFA is proposing a K-14 component to ELI, in part, to enhance knowledge of food systems in children. Specifically, within the food, agricultural, natural resources, and human sciences, ELI funding will be used to develop pathways to identify and replicate best practices to engage youth in science, technology, engineering, and mathematics fields; enhance the capacity of

institutions to produce graduates with the skills to address challenges in the food and agricultural systems; and advance science by supporting graduate and post-graduate education.

Competitive Capacity Awards Program

The Administration is committed to supporting the research and extension capacity, the backbone of our nation's efforts in ensuring a preeminent food system. Along with the existing capacity/formula programs, in 2016, NIFA proposes a new program that will complement existing competitive programs by addressing national and regional problems in food, agriculture, natural resources, nutrition, human sciences, and animal health through investments in areas such as plant and animal breeding, improved management of crop and livestock production, water, improved nutrition—particularly in underrepresented populations—and food safety. A total of $20 million, to be matched 100 percent with non-Federal funds, is proposed to support this new Competitive Awards Program, which will draw the best research and extension proposals from the knowledge base of land-grant institutions by using a competitive system approach.

Public-Private Partnerships for Innovation Institutes

The President's Council of Advisors on Science and Technology (PCAST) report in 2012 recommended the creation of multidisciplinary, Innovation Institutes that focus on emerging challenges to agriculture. Consistent with the PCAST recommendation, and as part of the Administration's multi-agency initiative to support continued investment and innovation in the manufacturing sector, the FY 2016 Budget includes $80 million to establish two new Institutes that focus on the bioeconomy. The expectation is that the successful grantees will create an innovation ecosystem by leveraging 100 percent monetary and intellectual resources from non-public sources. Funding will support a competitive selection process that leverages public-private partnerships in transformative and translational research.

The Biomanufacturing Institute will establish processes and platforms that lead to high-value intermediate and end-use product. It will also improve the efficiencies and economics of biomass feedstock logistics systems. The institute will support commercialization of products developed from basic and applied research, and will build domestic capability and the workforce for ongoing and future bio-manufacturing and bio-products development.

The Nanocellulosics Institute will fill critically needed knowledge necessary for promising discoveries of phenomena, processes, and properties of cellulose at nanometer scale to

industrial scale production. It will develop applications for the wide use of nanocellulosic materials to realize and market their commercial and economic potential.

Food and Agriculture Resiliency Program for Military Veterans (FARM-Vets)

Understanding how best to attract our nation's veterans to the agricultural sector will help produce the next generation of farmers, producers, and entrepreneurs. This is critically important as our nation is facing an aging farm population and workforce transitioning to retirement, especially in rural areas where labor shortages are acute. The proposed FARM-Vets competitive program, which complements funding for veterans set aside in the Beginning Farmers and Ranchers Development Initiative, promotes basic and applied research to explore career opportunities and pathways, therapeutic interventions, resource conservation, and best practices to attract veterans into the food and agriculture sector. Funds totaling $2.5 million will be used for projects to help veterans develop farming and ranching skills, business plans, and agriculture systems management.

Food Safety Outreach Program

NIFA supports a food safety outreach program to help owners and operators of small to mid-sized farms, producers, and processors to learn about and implement food safety guidelines, particularly those resulting from the Food Safety Modernization Act (FSMA). This program was initiated in FY 2014 with $2.5 million in funding from the Food and Drug Administration (FDA) to support projects for education and outreach with a goal of including a more robust technical assistance component in future years. In FY 2015, NIFA received $2.5 million for food safety outreach activities to complement the FDA FSMA initiative. In FY 2016, NIFA will be the sole agency supporting the education needs required as part of the FSMA regulation. The proposed $5 million will enhance the FDA-initiated program and emphasize outreach to all farmers and will focus on sustainability, conservation, and environmental practices.

Minority-Serving Institutions

Minority-Serving Institutions (MSI) provide educational opportunities to those who have historically faced inequality in their access to higher education. NIFA continues to support the MSIs that provide programs in food, agricultural, natural resources, and human sciences. The 2016 budget proposes increases in the Evans-Allen, 1890 Capacity Building Grants, 1890 Extension, and 1890 Facilities programs to accommodate Ohio's Central State University as the 19th 1890 land-grant university. The budget includes increases totaling $13 million for these programs. The proposed budget also requests increases in the 1994 Research, Tribal Colleges

Education Equity, and Extension Services at 1994 Institutions programs to accommodate the College of the Muscogee Nation in Oklahoma and the Keweenaw Bay Ojibwa Community College in Michigan. The budget proposes $10.3 million to assist the institutions in developing new partnerships, building research and extension capacity, and serving a larger American Indian student population.

Grants for Youth-Serving Institutions

The 2016 budget proposes $1 million for Grants for Youth-Serving Institutions to support pilot-demonstration projects in rural communities. This program is deemed a priority at the local and/or state levels to help children and youth develop the skills, knowledge, and competencies they need to have healthy and successful lives.

Hispanic-Serving Agricultural Colleges and Universities Endowment Fund

The Hispanic/Latino community is the fastest growing sector of the American population. The President's budget proposes $10 million to establish an endowment fund for the Hispanic-Serving Agricultural Colleges and Universities (HSACU). This investment is needed to assist HSACUs compete effectively for NIFA competitive grants. Funds from this endowment will help develop a skilled and marketable Hispanic workforce critical for the unprecedented demand needed in the food and agriculture sector. Additionally, as Hispanics have historically been underrepresented in such professions as science, technology, engineering, and mathematics, our nation could face serious shortages in many critical professions, including the agricultural sciences. Increasing investment in HSACUs will help close this educational gap while addressing our nation's need for a qualified workforce.

Other Programs

The 2016 Budget continues many programs at the 2015 funding level including the Sustainable Agriculture Research and Education Program, Crop Protection/Pest Management, and the Food and Agriculture Defense Initiative. Over the last three years, Congress provided NIFA additional resources for improvements in its grants application systems. This investment has significantly improved, modernized, and streamlined the agencies grants processes. As a result, overtime payment to staff was reduced by 80 percent. This also contributed to the development and use of knowledge discovery tools for priority setting, reduced time for making awards, and improved reporting systems. NIFA needs to continue making investments to

complete the modernization effort and to sustain the same over the long term. The budget proposes $9.8 million for NIFA's grants management systems.

Consolidation of Science, Technology, Engineering and Mathematics Programs

The budget supports the consolidation of NIFA's Science, Technology, Engineering and Mathematics (STEM) programs as part of the government-wide initiative. Affected NIFA programs include the Institution Challenge Grants, Multicultural Scholars Grants, and Graduate Fellowship Grants; Secondary/2-year Post Secondary Education Program; Women and Minorities in STEM Fields; and Agriculture in the Classroom.

Management Initiative

Finally, the President's budget includes a proposal to eliminate the old account structure from NIFA's predecessor agencies, and create a single unified account to house all NIFA programs. Merging all funding lines within a single account structure will mirror the reorganization of the agency as a national institute with a unified mission and provide opportunities to streamline the administration of funds. The merger will not impact the function or funding level of any program, but will help simplify the management of funds within the financial systems.

Conclusion

The National Institute of Food and Agriculture, with its university and other partners, is committed to finding practical, science-based solutions to solve our nation's critical societal challenges. This budget proposal will assist NIFA in accomplishing its mission and ensuring that groundbreaking science discoveries create a better future for the nation and world.

Mr. Chairman, this concludes my statement. I will be glad to answer any questions the Subcommittee may have.