

Statement by
Dr. Sonny Ramaswamy
Director of the National Institute of Food and Agriculture
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Chairman Roberts, Ranking Member Stabenow, and Members of the Committee, I am honored to have this opportunity to speak about the National Institute of Food and Agriculture (NIFA), whose mission is to catalyze transformative research, education, and extension to address 21st century agricultural challenges. At the outset, I would like to thank you and the Committee for your dedication to America's farmers and livestock producers. Your support of U.S. Department of Agriculture (USDA) agencies such as NIFA promotes the productivity and profitability of our farmers and the health and safety of all Americans.

I have had the privilege of traveling across America and experienced first-hand the impact of our data-driven, research and extension investments. For example, wheat blast, a crop disease caused by the fungus *Magnaporthe oryzae triticum* (MoT), can result in 30-100 percent crop loss. In spring 2016, work undertaken by Kansas State University scientist Barbara Valent and her colleagues helped prevent the devastating impact of this disease in the United States. With support from two NIFA Agriculture and Food Research Initiative (AFRI) grants totaling \$5.4 million, Dr. Valent and her colleagues from the University of Kentucky and USDA-Agricultural Research Service created a sensitive new method to detect the fungus. In tests, it accurately distinguished all known strains of MoT from more than 280 specimens of *M. oryzae* collected around the world. The method yields results in less than 24 hours and is sensitive enough to detect even trace amounts, and will protect our wheat production systems and enhance profitability.

Similarly, Michigan State University (MSU) Extension, with partial Smith-Lever extension funding from NIFA, deployed a rapid response to the crisis of lead contamination of water in Flint, Michigan. MSU specialists offered educational workshops and wrote several articles and fact sheets on lead poisoning; they facilitated the distribution of 12,000 gallons of milk to the Food Bank of Eastern Michigan. Milk can be used to mitigate the effects of lead

absorption, as it is rich in iron, vitamin C, and calcium. Additionally, MSU Extension worked with partner organizations to fund and distribute water filters and soil tests. MSU coordinated with Edible Flint, an informal cooperative of food producers, to focus new programs on lead in soils and educating people who grow their own food. Such grassroots work by Extension is crucial to the vitality of our communities in rural and urban America.

NIFA was established by the Food Conservation and Energy Act of 2008 (the 2008 Farm Bill) to find innovative solutions to issues related to agriculture, food, the environment, and communities. NIFA's investments are driven by the six priorities articulated in the 2014 Agricultural Act: Plant Health, Production, and Products; Animal Health, Production, and Products; Bioenergy, Natural Resources, and the Environment; Food Safety, Nutrition, and Health; Agriculture Systems and Technology; and Agricultural Economics and Rural Communities. NIFA supports user-inspired discoveries that transform lives: in the classroom, on farms, in communities across our great nation, and in other countries where often the need is greatest. My six-year term appointment as director expires in May 2018, with the position subject to an additional six-year term, as mandated in the 2008 Farm Bill.

NIFA is one of four agencies within USDA's Research, Education, and Economics (REE) mission area, and is authorized to direct federal funding through approximately 60 capacity, or formula based, and competitive grant programs that address key national and global challenges. NIFA invests in and advances agricultural research, education, and extension to solve societal challenges, thus ensuring nutritional security in the context of diminishing land and water resources, changing climate and extreme weather events, while promoting the health and well-being of all Americans and creating economic opportunities in rural communities. The agency promotes the education and training of our nation's workforce through programs offered to support K-12 education, along with undergraduate and graduate education. NIFA supports technology transfer and knowledge sharing through Cooperative Extension; additionally, the agency manages the Small Business Innovation Research (SBIR) grant program for USDA. The agency has approximately 350 employees and was funded at approximately \$1.53 billion in Fiscal Year 2017 through discretionary and mandatory lines; the agency also generates approximately \$50 million per year in interagency collaborations and reimbursable agreements with other federal agencies.

Organizationally, NIFA is divided into two units: programs and operations. The Civil Rights Office and Congressional Affairs Office report to the agency director.

Associate director Meryl Broussard oversees NIFA programs deployed through four institutes (Food Production and Sustainability; Food Safety and Nutrition; Bioenergy, Climate, and Environment; and Youth, Family, and Community), the Center for International Programs, and Planning, Accountability, and Reporting. Staff in the programs unit help develop science priorities based on congressionally mandated Farm Bill priorities, those of the White House and Secretary of Agriculture, and seek input from the vast array of stakeholders across America. They also deploy funding opportunities through Requests for Application (RFAs), work with external peer reviewers to select the best ideas for funding, undertake pre- and post-award management, and evidence based analysis of achievement of goals.

Associate director Robert Holland oversees the agency's operations through the Office of Grants and Financial Management, the Office of Information Technology, Budget, and Communications. A key role for the operations unit is implementing NIFA's grants modernization initiative to streamline the agency's grant application and award process. This business transformation initiative will result in increased efficiency and reduced costs (in system maintenance and staff time) for NIFA grantees and staff. NIFA is now using ezFedGrants, a new web-based grants and financial management system used by several USDA agencies, to support this initiative. Additionally, the information technology staff manages NIFA's Data Gateway, an online portal that allows users to find funding data, metrics, and information about research, education, and extension projects that have received grant awards from NIFA. The user can render and visualize data using various tools, including by State, Congressional District, and Science/Knowledge Area. NIFA is committed to increasing transparency and making technical advancements to ensure that data are easily accessible.

NIFA has been in existence for eight years, but its history goes as far back as the creation of the People's Department and land-grant Colleges in 1862. Landmark farm bills and other significant legislation passed by Congress have shaped the history of NIFA and its predecessor agencies. The Morrill Act of 1862 created land-grant institutions (LGUs) to enable children of the working class to have access to higher education with a focus on agricultural and mechanical skills. The Morrill Act of 1890 established the 1890 land-grant institutions to promote

educational opportunities for African Americans. The Equity in Educational Land-Grant Status Act of 1994 established the 1994 land-grant institutions to promote educational opportunities for Native Americans.

The Hatch Act of 1887 authorized strengthening the capacity of land-grant colleges to research agricultural problems faced by rural citizens by providing funds to create a series of agricultural experiment stations across America. The Cooperative Extension System was created through the 1914 Smith-Lever Act, as a partnership between the federal, state, and local (county/county equivalents) governments.

NIFA is committed to supporting the research, education, and extension efforts of its 112 land-grant partners through legislatively authorized capacity funds, comprising 49 percent of NIFA's annual appropriations. Several types of capacity funds for supporting research, Extension, and 4-H are available annually on a non-competitive basis and require a match at the state and local levels. The amounts allocated to each state depend on variables such as rural population, farm population, forest acreage, and poverty rates, as authorized by Congress.

Key capacity funding programs include Hatch capacity funding, which supports research and training of students at state agricultural experiment stations (SAES). McIntire-Stennis capacity funding supports forestry research and training at SAES, forestry schools, and land-grant forestry research programs. Renewable Resources Extension Act capacity funding supports forest and rangeland education programs that benefit landowners and managers, communities, and the environment. Animal Health and Disease Research capacity funding enhances the capacity of veterinary schools and SAES to conduct research to improve the health of poultry, livestock, aquaculture, and other income-producing animals. Expanded Food and Nutrition Program (EFNEP) capacity funding provides nutrition education programming to low-income families to help them develop healthy habits in eating, physical activity, food handling, and food storage.

Cooperative Extension is funded through Sections 3(b) and 3(c) of the Smith-Lever Act. Extension provides non-formal education and learning activities to people throughout the country – to farmers and other residents of rural communities, as well as to people living in urban areas. By translating knowledge into solutions and delivering to end users, NIFA helps improve and transform people's lives. 4-H, our nation's preeminent positive youth development

program, is funded through Extension with NIFA-supported 4-H programs positively influencing over 6 million children across the country every year.

With Hatch funding, South Dakota State University collaborated with Agrisoma Biosciences, Inc., and the SD Oilseeds Council to develop an oilseed crop, Carinata, to be used for production of bio-based jet fuel and diesel for the U.S. Navy. Carinata, which has the potential to be used as a 100 percent petroleum substitute in biodiesel, bio-jet fuel, oil additives, and specialty lubricants, can reduce dependence on petroleum-based products.

NIFA's 1890 land-grant institutions programs are intended to strengthen research, extension and teaching in the food and agricultural sciences by building the institutional capacities of the 19 institutions with the LGU designation. 1890 programs include 1890s Extension that provides primary support for extension programs at 1890 LGUs, while Evans-Allen capacity funding supports research and training of students at 1890 land-grant institutions.

NIFA-funded researchers at the University of Maryland Eastern Shore studied factors that affect antibiotic resistance and virulence of *Salmonella* during poultry processing. Their analysis showed that chilling can lead to *Salmonella* contamination and cross-contamination among poultry carcasses but has no effect on the prevalence of antibiotic-resistant genes. This knowledge is being used to develop tools to help poultry inspectors improve *Salmonella* detection, helping to improve food safety and prevent future food recalls.

At Georgia's Fort Valley State University (FVSU), new leaders in agricultural and life sciences are coming face-to-face with technology that will help them solve the toughest agricultural challenges of the future. A \$150,000 grant from NIFA's 1890 Capacity Building program helped FVSU create a bioinformatics curriculum where students learn to transform biological research into informational science. In the program, science, technology, engineering, and mathematics (STEM) majors join with computer science majors to become competent bioinformatics programmers and gain hands-on experiences in writing algorithms and coding for biological problems. Bioinformaticians use computers to store, organize, and analyze the vast amounts of data generated by scientific research.

The Equity in Educational Land-Grant Status Act, within the Improving America's Schools Act of 1994, established 29 tribal colleges and universities as 1994 tribal land-grant institutions. There are currently 36 LGUs with 1994 tribal land-grant institution status. NIFA

funds five programs that promote learning, opportunity, and health in Indian Country. These programs give them access to federal government resources that improves the lives of Native students through higher education and help propel American Indians toward self-sufficiency. These resources also support innovative research, education, and extension programs that positively impact agriculture and food production. These programs include the Tribal College Equity program, which supports formal education at these schools. The Tribal College Extension program supports informal, community-based learning such as farmer education, youth development, and rural entrepreneurship. The Tribal College Research program helps the 1994 LGUs build scientific capacity and provide a strong foundation in research knowledge for students. The Tribal College Endowment program receives annual appropriations from Congress, and the institutions receive money from the interest earned during the previous year. The amount each school receives is based in part on the number of Native students attending the school, and is determined annually through the Indian Student Count. The Federally Recognized Tribes Extension Program (FRTEP) allows 1890 and 1862 LGUs to provide informal learning to support youth development and agricultural productivity. They complement Extension efforts of the 1994 LGUs, often serving in states that do not have a 1994 land-grant institution.

According to the Department of Health and Human Services' Indian Health Service, American Indians are 2.2 times more likely to have diabetes compared to non-Hispanic whites. The United Tribes Technical College (UTTC), in Bismarck, North Dakota, is doing its part to lower that number by mentoring nearly 450 people at five diabetes-related events. UTTC also produces three publications that were delivered to more than 11,000 local households. In 2017, UTTC plans to host three 6-week training sessions for 10-15 people each, covering topics such as understanding and monitoring the human body, nutrition, and physical activity.

A recent TEconomy report (page 3, <https://nifa.usda.gov/resource/nifa-capacity-funding-review-teconomy-final-report>) states that capacity funding generates an additional \$1.86 in non-federal funding for every \$1 in federal funds, considerably expanding the utility of federal funding dollars. Between 2000 and 2015, there were 19,971 projects supported by capacity fund; 1 in 6 patents in agriculture across the U.S. are based on innovations resulting from these capacity funds. In 2014, about 31,500 full-time equivalent jobs were supported by capacity funds.

NIFA deploys almost \$700 million in competitive grants, funding for which are derived through annual discretionary appropriations and mandatory programs. The Agriculture and Food Research Initiative (AFRI) is America's flagship competitive grants program for agricultural sciences. AFRI was created in the 2008 Farm Bill and authorized at \$700 million annually. The Fiscal Year 2017 Omnibus Appropriations Act provides \$375 million to AFRI. AFRI competitive funds support research, education, and extension grants to promote productivity and profitability of farming systems, improve rural economies, combat childhood obesity, promote the bioeconomy, mitigate the impacts of climate variability, address water availability issues, ensure food safety and security, and train the next generation of agricultural workforce.

Other key competitive grant programs include the following mandatory programs: Organic Agriculture Research and Extension Initiative (OREI), Biomass Research and Development Initiative (BRDI), Specialty Crop Research Initiative (SCRI), Emergency Citrus Research and Extension Program (CDRE), Food Insecurity Nutrition Incentive Program (FINI), Biodiesel Fuel Education Program, Agriculture Risk Management Education Program, and the Community Food Projects Competitive Grants Program.

A deadly bacterial disease—Citrus Greening or Huanglongbin—has infected up to 80 percent of Florida's citrus trees and cost billions in lost revenue. U.S. citrus growers have a critical need for grove-deployable management practices that keep healthy citrus from becoming infected. With a \$6 million SCRI grant, Dr. Susan Brown, Kansas State University, and colleagues from other institutions are collaborating to combat the disease by developing innovative approaches to stop the pathogen from developing in and being transmitted by the vectoring insect.

NIFA administers USDA's Small Business Innovation Research Program (SBIR), which offers competitive grants to support small businesses undertaking research on the feasibility of starting viable small businesses to address agricultural challenges. The program stimulates technological innovations in the private sector, strengthens the role of federal research and development in support of small businesses, and also fosters and encourages participation by women-owned and socially or economically disadvantaged small businesses.

In 2014, the porcine epidemic diarrhea (PED) virus was responsible for the death of eight million piglets in the United States. Developing a vaccine took many months, making it hard to rescue the declining swine community. Harrisvaccines, in Ames, Iowa, with funding from NIFA

through the SBIR program, used its patented SirraVaxSM technology to analyze PED gene sequences to commercialize a vaccine in just four months, and gained conditional licensure from USDA. The vaccine, called iPED, is administered to sows right before they give birth to a litter, protecting the piglets. Recently, Harrisvaccines has been acquired by Merck Animal Health, which will deploy this vaccine to protect piglets.

NIFA reviews all proposals through the external peer review process for individual competitive programs. Evaluation criteria are described in the Requests for Application (RFAs). The total time for this entire peer review process is about six to nine months. Prior to the RFA or soon after its release, the respective NIFA National Program Leader (NPL) selects a Panel Manager (PM) with the appropriate expertise to lead the panel review process alongside the NPL. The PM is not a NIFA employee and is hired as a temporary Federal Employee. Proposals are accepted for panel review if the proposal addresses the program priorities and is submitted to NIFA before the RFA deadline date. The PM works closely with NPLs to ensure a diverse panel with the appropriate expertise is constituted to review proposals submitted to the program, assign proposals to panelists based on panelist expertise, and lead the panel review meeting.

Panelists develop their individual reviews for each proposal assigned to them prior to the review panel. Once the peer review panel meets (in person or virtually), the entire panel discusses each proposal and reaches a consensus rank within each peer review category. Those in Outstanding, High Priority, and (extremely rarely) Medium Priority categories are respectively funded until no appropriated funds are left. Peer Review Panel Ranking Categories are Outstanding, High Priority, Medium Priority, Low Priority, and Do Not Fund. Following the funding decisions, applicants receive copies of the written reviews of their proposal (with reviewer name removed to maintain reviewer confidentiality), the panel summary, and information on the relative ranking of their proposal.

Funding rates in NIFA's competitive grants programs range from approximately 13 percent in AFRI to approximately 19 percent in SCRI; because of the significant competition for funding in AFRI, many worthy ideas addressing agricultural challenges go unfunded. NIFA is attempting to develop multiple approaches to enhance the funding rate, including administrative policy changes to address unobligated funding from prior years.

NIFA collaborates with other federal agencies within and outside of USDA, including the National Science Foundation, National Institutes of Health, Agricultural Research Service, United States Agency for International Development, Department of Energy, Environmental Protection Agency, Centers for Disease Control and Prevention, Health and Human Services, Department of Veterans Affairs (VA), and Department of Defense (DOD), to accelerate progress on the discovery and application of solutions to high priority agricultural and societal challenges. By partnering with agencies with complementary missions, we are able to leverage funding and bring a wider range of capabilities, expertise, and experience to our programs.

NIFA, DOD, and VA collaborate to support those who protect America: active duty military and their families, along with veterans. Research suggests that children of deployed parents experience more stress than their peers. NIFA, DOD, and VA collaborations have helped thousands of military families gain access to the high-quality educational programs in early childhood education, youth development, and related fields that land-grant university cooperative extension systems provide. In nearly every state, 4-H Military Partnerships offer programs for children from military families. NIFA also engages military veterans through the Beginning Farmer and Rancher Development Program (BFRDP), which funds organizations that train beginning farmers and ranchers through workshops, educational teams, training, and technical assistance. Nearly 10 percent of BFRDP funding went to projects that serve military veterans in 2016.

Collaboration with our stakeholders ensures that NIFA responds to their needs and the needs of the end-user. Our staff interacts with LGUs on a continual basis through respective national program leaders and our state liaisons. NIFA also keeps keep open lines of communication with other stakeholders. Additionally, NIFA periodically holds formal listening sessions to garner feedback from all stakeholders and stakeholders are encouraged to provide feedback on our RFAs via a web portal. NIFA is undertaking a series of “Calls to Conversation” meetings aimed at continuing to work with stakeholders to seek a shared vision to enhance the effectiveness, efficacy, and efficiency of agency programs.

Colorado State University, the University of Wyoming, and NIFA hosted the first such Calls to Conversation in September 2016. The meeting, themed “*Engagement and Success of Land-Grant Universities and Colleges – Respecting Sovereignty, Serving the People and the*

Land,” was held for the purpose of promoting a candid and productive conversation between the 1994s and 1862s, to discuss ways to strengthen their relationship, and chart a course for a more collaborative and productive future.

In February 2017, the University of Maryland and NIFA hosted a conversation on the topic of Tactical Sciences: a complementary set of programs offering the tools to protect the integrity, reliability, sustainability, and profits of the U.S. food and agriculture system against threats from pests, diseases, contaminants, and disasters. The biosecurity of America’s food and agricultural system is of utmost priority, and we are committed to supplying a toolkit of science-based tactics readily available to help prevent, prepare for, detect, respond to, and recover from known and potential pests, diseases, and other natural disasters.

In August 2017, the University of Georgia, Fort Valley State University, and NIFA will undertake a Call to Conversation on Positive Youth Development (PYD). 4-H, the youth outreach program of Cooperative Extension, reaches six million children and translates the sciences of engagement, learning, and change with youth and adults who collaborate to create sustainable community change. 4-H National Headquarters at NIFA provides leadership on positive youth development in the areas of citizenship, healthy living, and science.

The narrative provided above gives you an overview of the vast and complex programs and impacts NIFA has with funding from Congress. Through your continued support, NIFA can continue to spark innovation through funding of extramural research, extension, and education to address the significant agricultural and societal challenges facing humanity as a result of the burgeoning population. With your help, and the help of our stakeholders, we can meet those challenges head on. Thank you for this opportunity to highlight NIFA, our employees, our grant programs, and successes of those programs.