

**Statement by
Dr. Catherine E. Woteki
USDA Chief Scientist and Under Secretary for
Research, Education, and Economics
Before the House Committee on Agriculture
September 15, 2015**

Chairman Conaway, Ranking Member Peterson, and distinguished members of the House Agriculture Committee, I am pleased to appear before you to provide an overview of the activities of the Research, Education, and Economics (REE) mission area of the United States Department of Agriculture (USDA), highlight some of our recent success, and share some insight on the priorities for the coming years.

I am accompanied by the leaders of our four agencies: Dr. Chavonda Jacobs-Young, Administrator of the Agricultural Research Service (ARS), Dr. Mary Bohman, Administrator of the Economic Research Service (ERS), Ms. Renee Picanso, Associate Administrator of the National Agricultural Statistics Service (NASS), and Dr. Sonny Ramaswamy, Director of the National Institute of Food and Agriculture (NIFA).

The United States and the world are facing critical problems and opportunities. Global population is expected to reach nine billion people by 2050, almost two billion more people than today. At the same time we are seeing the impacts of climate change, impacts that will only get worse. These are among the challenges that all of us face. Investments in research are a critical factor in meeting these and other challenges and opportunities, and it is the REE mission area agencies that support the critical research our country needs to keep our food supply safe, secure, and abundant, ensure farm profitability, improve nutrition and food safety for lifelong health, reduce pollution and improve the environment through climate friendly practices, safeguard sustainable use of natural resources, including an abundant and safe water supply, and address

our nation's energy needs. For instance, ARS with its network of 2,000 scientists at nearly 90 laboratories across the country works to enhance and protect agriculture as well as transfer research results to the marketplace where they serve the needs of a wide range of users. By funding research at land-grant universities, as well as other universities and organizations, NIFA integrates research, education, and extension to ensure that groundbreaking discoveries go beyond the laboratory and make their way to the farms, ranches, classrooms, and communities where Americans can put this knowledge into practice and improve lives. The economic research and analysis work of ERS guides policy throughout government and provides vital information to consumers, other researchers and the marketplace. NASS conducts numerous surveys and issues over 400 reports that provide accurate, timely, and useful official statistical data on national, state and county agricultural estimates covering production, supply, price and other aspects of the U.S. agricultural economy. Farmers and ranchers, governments, commodity markets, businesses, and researchers are among those who depend on these statistics to make informed decisions.

We have a rich history of the agricultural sciences in the United States and I would like to provide you some context for the ongoing work within the mission area.

The agricultural research and education system of the United States started in 1862 with President Abraham Lincoln signing into law the creation of a new Department of Agriculture with the mission to promote scientific agriculture and the propagation and distribution of seeds. The passage of the Morrill Act in 1862 established the Land Grant University (LGU) system. In creating the Land Grant system, a whole new generation was allowed to gain access to post-secondary education in the United States, ensuring that higher education would nevermore be only for the elites. Congress expanded this family of Land Grants in 1890 to serve the

educational needs of the African American communities and, in 1994, to serve Native Americans in welcoming Tribal universities and colleges. Just two months ago, on July 15, 2015, this Committee hosted the presidents of 1890s land-grant universities at a historic hearing to celebrate the 125th anniversary of the passage of the Second Morrill Act.

Congress passed the Hatch Act of 1887, which created the State Agricultural Experiment Stations. These experiment stations contributed to many key discoveries in agricultural science. In 1914, the Smith-Lever Act was signed into law, which created the Cooperative Extension Service as a unique federal, state, and local partnership to translate knowledge into innovations and solutions that advanced economic and social progress in American agriculture and rural America.

REE's work in the food and agricultural sciences is based on the premise that the federal government has a role in advancing scientific knowledge to promote our Nation's social and economic well-being. REE does this by investing in areas in which for-profit industry does not invest, such as basic research. It also collaborates with the public sector, academia, and the private sector to amplify research outcomes and impacts. Underinvestment or the absence of investments in food and agricultural sciences diminishes the needed foundational knowledge-base and impacts our Nation's global preeminence and economic well-being. It is with these goals in mind, that the REE mission area agencies establish their priorities and conduct their work.

These priorities are determined through a rigorous and extensive process that incorporates the direction provided by this Committee through its five-year authorizing farm bills, the annual appropriations bills, and related governance statutes set in place by Congress and guidance provided by the President. REE agencies have their five year strategic plans, which

are aligned with the Department's plans. Input is also solicited from many different types of stakeholders throughout the planning process. These stakeholders conduct or use agricultural research, education, and economics services provided by or for the agencies and include representatives from commodity groups, industry, interagency federal working groups, scientific societies, and university partners. Stakeholders also include the congressionally-established REE external advisory committee, the National Agricultural Research, Extension, Education, and Economics Advisory Board (NAREEEAB).

In the 2014 Farm Bill, Congress underscored its interest in developing public private partnerships in the agricultural research, education, and extension realm through three different policy provisions discussed below. These provisions enable the REE agencies—in particular, NIFA—to partner with its stakeholders and foster increased collaboration between academia and the private sector.

Three specific examples of these provisions are: (1) the matching funds provision which encourages prospective NIFA grantees to partner with land grant universities when applying for a NIFA grant; (2) the facilitation of commodity promotion boards' participation in NIFA's signature competitive grants program, the Agriculture and Food Research Initiative; and (3) the incentivizing of research consortia to form 'centers of excellence' and apply for selected NIFA grants in a collaborative manner. In addition, Congress created the new, private, non-profit Foundation for Food and Agriculture Research which must match its initial Federal seed contribution of \$200 million with an equal amount from non-Federal sources before underwriting research. The Office of Technology Transfer (OTT) nested within ARS serves all of USDA in its work with the private sector. Organizing public-private partnerships, as the 2014 Farm Bill has

done, ensures that more public funds are leveraged with private sector dollars to make the most of the taxpayer investment.

As important as identifying priorities are in providing strategic direction, this represents only part of REE's success model. The ultimate measure of success is not just the number of research projects we are working on, the number of surveys in the field, or the number of grants awarded. The REE agencies measure their success by the outcomes of their work. This evidence-based orientation forces us to examine how our efforts are helping change the landscape of the American food and agriculture enterprise.

Take for example the efforts of ARS, which views its work as bookending the research spectrum—exploring fundamental topics that can eventually be transferred to the private sector in order to be commercialized as a way of improving the public good. Examples include the mosquito repellent DEET, Lactaid for the lactose-intolerant, the variety Roma tomatoes (which is still the main variety used for tomato paste), red seedless grapes, and disease-resistant, high-yielding sugarcane, are additional examples of ARS's contributions. In fiscal year 2013 alone, ARS scientists advanced 75 inventions towards the patent process and were responsible for over 4,400 scientific publications.

In the same vein, NIFA measures its success through the impacts of its grants on the public good. Through the integration of research, education, and extension programs totaling about \$1.5 billion, NIFA ensures that innovative solutions are found to problems in food and agriculture and that these solutions go beyond the laboratory, into the classroom and into our communities. For example, a team of NIFA-funded scientists from the land-grant universities, ARS, and the dairy industry have developed a new genetic test that can assess an animal's traits immediately after birth. About 10,000 animals were genotyped, and researchers used the data to

develop a new breeding selection method called genome selection. The genome selection method simultaneously reduced animal selection time (from 5 years to 1 week) and increased prediction accuracy by more than 30 percent for most traits. The dairy industry quickly adopted this technology and has since genotyped more than 500,000 dairy cattle for estimated annual benefits of \$100 million per year. Success in this Maryland-based program has led to projects that aim to develop similar genotyping tests for beef cattle. As another example, NIFA's impacts include a 5-year project at Iowa State University to investigate how heat stress affects a pig's metabolism and performance. Heat stress is one of the costliest issues in the U.S. pork industry. Researchers at ISU are investigating how heat stress can influence a pig's fetal development and postnatal life, including the ability to develop and grow. The knowledge this study provides will become increasingly valuable as producers work to mitigate severe summer temperatures.

Finally, NIFA research investments at Oregon State University have resulted in the creation of an environmentally friendly wood adhesive made from soybean flour. By replacing conventional adhesive, plywood production plants have reduced the emission of hazardous air pollutants by 90 percent.

These are just a few examples of results from two of the largest REE mission area agencies. Despite their relatively smaller size, the remaining two REE agencies—NASS and ERS—provide an essential service that policymakers, regulators, markets, and academics rely on every day.

For instance as I mentioned earlier, NASS's mission is to provide timely, accurate, and useful official statistics in service to U.S. agriculture. NASS achieves this through two separate appropriated program areas: the Agricultural Estimates program and the Census of Agriculture and its follow-on studies. The Agricultural Estimates program provides critical supply,

production and price data that is the foundation of the commodities market and critical to the coordination of damage and loss assessment of the crop insurance program and disaster assistance. The Census of Agriculture serves as the benchmark of the structure of agriculture in the U.S and is critical to formulation of agriculture policy. The Agricultural Estimates program issues over 400 reports annually, providing U.S., regional and State estimates on a wide range of crop and livestock commodities, in addition to estimates of environmental issues, economics and demographics. The quinquennial census provides very detailed statistics at the county, watershed and congressional district level. Additionally under this program, NASS conducts in-depth studies on topics like irrigation, horticulture, organic farming and aquaculture.

The Economic Research Service also reaches far beyond the borders of USDA. The mission of ERS is to inform and enhance public and private decision making on economic and policy issues related to agriculture, food, the environment, and rural development. Although ERS research programs are aimed at the information needs of policymakers, its information and analysis is also used by the media, trade associations, public interest groups, and the general public. ERS studies are widely recognized in the research community for its credibility, timeliness, and use of cutting edge data, models, and methods.

Rather than make recommendations, ERS designs its research to demonstrate to its users the consequences of taking alternative policy or programmatic pathways. In fact, in recognition of this 'arms-length' role, along with NASS, ERS is also another of the 13 OMB officially designated Federal statistical agencies. As principal Federal statistical agencies both NASS and ERS provide data that are relevant to policy issues, maintain credibility among data users, maintain the trust and confidentiality of data providers and the independence from political and other external influence.

In keeping with the Administration's effort to break down silos, REE agencies are actively encouraged to seek efficiencies, collaborations, and partnerships with other agencies in the REE mission area and the Department. For example, ERS relies on NASS data for its Farm Income Estimate research; ERS provides ARS with social science research and analysis that guides some aspects of ARS' priority setting; ARS and NIFA routinely work together on research projects that have both intramural and extramural components. The REE mission area works broadly across the Department and with other Federal agencies on agricultural literacy, food safety, pests and diseases, bioenergy, natural resources, and nutrition programs in order to ensure REE programs provide the science backbone to support budget and program policy decision makers.

Mr. Chairman, up to this point, I have presented some information on the mission of REE agencies, provided some background on how priorities are coordinated in the mission area, and featured some of the results of the agencies' work in these longer term investments. I would like to round out my discussion with a word on current initiatives and a look forward at agricultural science in the coming years.

Part of the portfolio approach to finding solutions to the challenges that confront us includes efforts to mitigate and resolve the challenges that are before us today. Here are three such examples.

The REE agencies have been working to combat the highly-pathogenic avian influenza (HPAI) virus. ERS continues to monitor and assess the impacts of this most devastating disease on domestic and global poultry markets, while NIFA supports university researchers to develop new tools that help better prevent, control, and manage future outbreaks of HPAI. ARS scientists have been working in concert with the Department's Animal and Plant Health

Inspection Service (APHIS), which is in the forefront of actions to combat HPAI, and the poultry industry to identify the specific strains of the virus, develop a test to detect the virus in poultry, and develop a vaccine against the virus. While ARS vaccine development efforts look promising, much more work needs to be done before a licensed vaccine could be available for use as an aid to HPAI eradication.

In the last few years, the issue of antimicrobial resistance (AMR) has emerged as a serious health threat to both animals and humans. While our understanding of the development and spread of antimicrobial resistance remains incomplete, the REE agencies have worked with the Department-wide One Health Working Group to make strides in our knowledge on AMR. The action plan for combatting AMR takes a voluntary, comprehensive, systems approach to surveillance, research and development, and outreach activities. In implementing this action plan, USDA intends to provide researchers, producers, and consumers science-based, quantitative information about drug use and resistance in food animals and their relationship to livestock management practices.

A final example of current work is the REE support of a multi-agency effort on pollinators. As proposed in the President's FY 2016 budget request, the Pollinator Health Initiative will focus on the decline of honey bees and other pollinators. The continued loss of commercial honey bee colonies stands to have profound implications throughout the food and agriculture enterprise. In collaboration with the U.S. Environmental Protection Agency, university scientists, and private sector partners, the Pollinator Health Initiative will make advances in our understanding of the complex factors—like poor bee nutrition, loss of forage lands, parasites, pathogens, and the exposure to pesticides—and provide a path forward to arrest continued pollinator losses.

Mr. Chairman, despite significant efforts by recent Farm Bills and annual spending bills to restructure, reorganize, reauthorize, or even repeal provisions, agricultural science in United States is at a crossroads. It is no secret that American research needs additional resources.

This underinvestment will have grave consequences. Projections by ERS compare the scenarios where public R&D investment remains the same in nominal terms versus a world where public R&D investment has increased by just 1 percent each year in real terms. ERS estimates that a one percent increase in investment each year until 2050 yields an 80 percent increase in agricultural output.

As well, resources are not always monetary. In May 2015, the results of an employment outlook report developed by Purdue University, with support from NIFA, revealed a deep chasm between the demand for college graduates with a degree in agricultural programs and jobs available. The study found that annually, there are 57,900 jobs in food, agriculture, renewable natural resources, and environment fields in the United States. Further, the study found that there is an average of 35,400 new U.S. graduates with a bachelor's degree or higher in agriculture related fields, 22,500 short of the jobs available annually. However, grants provided by NIFA help to address these issues by assisting educational institutions fix shortfalls in curricula design, material development, instruction delivery systems, student experiential learning opportunities, scientific instrumentation for teaching, and student recruitment and retention.

Mr. Chairman although REE has made significant strides, there is still much to be accomplished. Our storied legacy of discovery, innovation, and international leadership in agricultural research, education and economics is in jeopardy by insufficient investments in both money and minds. This is a challenge we must all rise to meet and I look forward to redoubling our efforts together in the coming years. Thank you.