Testimony of David Gerrard, President of the National Association for the Advancement of Animal Science (NAAAS), regarding FY 2020 appropriations for animal science research.
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As President of the National Association for the Advancement of Animal Science (NAAAS), I am writing to request the subcommittee's support for critical animal science research within the National Institute for Food and Agriculture (NIFA) and the Agricultural Research Service (ARS).

Specific programmatic requests for NIFA include:

Hatch Act	$291,000,000
Agriculture and Food Research Initiative	$500,000,000
Smith Lever, Section 3(b) and (c)	$358,000,000
Section 1433	$10,000,000
Agricultural Genome to Phenome Initiative	$40,000,000
Veterinary Medicine Loan Repayment Program	$9,000,000
Veterinary Services Grant Program	$3,000,000
Food Animal Residue Avoidance Database Program	$2,500,000
Food and Agriculture Defense Initiative	$10,000,000

Within our NIFA requests, I would like to highlight the expanded Section 1433 which includes competitive research grants mechanism to address critical priorities in food security, one health and stewardship. The program was reauthorized in the 2018 Farm Bill and responds to a historic funding disparity for animal science and provides the opportunity to address major challenges facing animal agriculture. The competitive grants program in Section 1433 provides a mechanism to focus resources on high priority areas to help animal agriculture meet future challenges. We respectfully request **$10 million** for Section 1433 in fiscal year 2020.

I would also like to highlight our request for **$40 million** to support the Agricultural Genome to Phenome Initiative. This new initiative was established in the 2018 Farm Bill and recognizes the critical need for increased federal investment to advance genomics in agriculturally important animal and species. Significant research is needed to fully characterize the phenotypes, which are collectively known as the "phenome" of our major crop and livestock species. The Agricultural Genomes to Phenomes Initiative will develop tools and knowledge to allow for the analysis of phenotypes across a diverse array of agriculturally important species, and help individual farmers make better management decisions and increase productivity.

For ARS, NAAAS recommends **$1.821 billion** for Salaries and in FY 2020. ARS has the potential to make significant progress towards solving problems facing America's livestock and poultry producers but is consistently receiving funding disproportionate to its contributions to the farm economy. ARS intramural research is uniquely suited for projects that require a long-term

investment leading to high-impact payoffs, while maintaining the capacity and readiness to respond to emerging and pressing problems. Of the proposed increase to ARS, we request that **$92.8 million** be designated to support the operations and maintenance and other transition costs related to the National Bio and Agro-Defense Facility (NBAF). NAAAS requests that the committee to provide at least **$1.821 billion** for ARS Salaries and Expenses in FY 2020.

Background and Justification

Additional federal investment in agricultural research is critically important for the United States to maintain its competitive advantage around the work. For decades, the federal investment has been stagnant, while countries like China have greatly expanded their agricultural research investments. According to ERS, China is now outspending the United States by approximately 2 to 1, with some estimates showing an even greater discrepancy. Given the additional resources freed-up by the recent budget deal, we strongly encourage Congress to dedicate additional resources to agricultural research and specifically to animal science.

As the world's population grows and natural resources become limited, animal agriculture research is necessary now more than ever to improve efficiency and continue providing safe and abundant food supplies for the growing global community. It is imperative that the increased food production be done in a manner that will protect our natural resources while maintaining America's global competitiveness in producing animals and animal products.

Innovations in animal science will play an important role in the future success of animal agriculture and the rural economy. Livestock and poultry sales account for 40 percent of all farm income. When feed crops consumed by livestock are included, the contribution to farm income is 60 percent. The United States must step up its investments in agricultural research to remain a leading producer of safe, affordable and abundant food and meet increasing demands.

Unfortunately, current funding by the United States Department of Agriculture (USDA) to support the animal sciences is not proportionate with the economic contributions of animal agriculture. In fact, investment in the animal sciences has been declining for many years, even for programs such as the Agriculture and Food Research Initiative (AFRI) that have received increased appropriations. This trend was highlighted by National Academy of Sciences in its report "Critical Role of Animal Science Research in Food Security and Sustainability" (see http://www.nap.edu/openbook.php?record_id=19000) that was released in 2015. The report recognizes the historic underfunding of animal sciences and calls for increased investments. This imbalance in support for animal science puts U.S. animal agriculture at a major disadvantage at a critical time when livestock and poultry producers are striving for global competitiveness, improving sustainability and working to feed a growing global population.

To address this shortfall in federal investments supporting the animal sciences, new resources must be dedicated to meet critical priorities in animal science. The National Association for the Advancement of Animal Science (NAAAS) has identified a series of value propositions where additional federal investments can drive innovation in the high priority areas of Food Security, One Health and Stewardship.

Food Security - Challenges and Opportunities: With a projected increase in global population by 2050, food production must double which requires increased efficiency of the use of limited natural resources to meet expected increases in meat and milk consumption by 73% and 58%, respectively. With land, water and other natural resources being limited relative to this demand, maintaining or reducing the environmental impact of increased production will be challenging. New knowledge and technology offers meat and dairy producers and the allied pre- and post-harvest industries that support them an opportunity to increase income using sustainable production methods while meeting expanding demand. Accelerated research in systems biology and genomics can provide sustainable increases in overall production efficiency by 50% in 2025 through enhanced performance. Such applications will provide abundant, safe, nutritious and affordable food from animal sources to consumers across the world.

One Health Challenges and Opportunities: The one health concept recognizes that animal, human and ecological health are inextricably linked and are best addressed using a systems approach. The human and livestock genome projects are providing revolutionary insights for improving human health; however, the application of genomics biology to animal agriculture offers much more for our global society. It is clear that an abundant, affordable and safe food supply continues to be the foundation for human health, economic stability and political stability necessary for improved quality of life in the United States and worldwide. A major opportunity for One Health is to enhance vital agricultural and biomedical capabilities that embrace functional genomics, proteomics and bioinformatics to sequence, map and explore genomes of important species of animals, crops and microbes. This is essential for increasing profitability of livestock enterprises through improved production efficiencies and approaches to enhance animal health and wellbeing.

Modern transportation, global movement of animals and people, and intensive livestock management systems create increased risks for either accidental or intentional introduction of infectious diseases. Zoonoses pose risk of disease transmission from animals to people and vice versa, with both health and economic impacts. The results of outbreaks of highly infectious diseases in animals cause mortality and morbidity, as well as catastrophic trade and other economic impacts. Interdisciplinary research can help understand how pathways are integrated in complex organisms, determine how disturbances in these pathways lead to disease and disease resistance, and desired phenotypes that enhance production agriculture and animal health, as well as mitigate transmission of zoonotic diseases.

Stewardship Challenges and Opportunities: Livestock operations must continue to make major advances in the efficiency and sustainable use of natural resources for both extensive and intensive production systems. More effective use of land, water, energy and other natural resources that generate inputs to animal production as well as for animal production itself are needed. Stewardship of the animals and their relationship to the communities in which they exist are key elements of the total equation. As demand for food increases, animal production will be increasingly forced to use marginal lands where stewardship is even more challenging. New innovations and technologies are urgently needed to meet future demands for foods of animal origin, stewardship of natural resources, and economic survival of food animal production.

In order to realize the innovations and outcomes identified, increased public funding of agricultural research will be needed. NAAAS appreciates the opportunity share its views on the drivers for innovation in animal science and the need for increased federal investments. Please let us know if you have any questions or if NAAAS can be of any assistance as the committee continues its work on the federal investment in science.