



**Testimony of the Federation of Animal Science Societies (FASS)
Senate Appropriations Committee Hearing:
Driving Innovation through Federal Investments**

April 29, 2014

Federal investments in animal science are critical to the continued success of animal agriculture in the United States and globally. Recent studies show that public investments in agricultural research yield a return of up to 20 to 1 and are a major driver of increased productivity. However, federal funding for the animal sciences and agricultural research as a whole has remained relatively stagnant over the last twenty years while investments from the rapidly developing BRIC nations are surging. Increased investments by the U.S. government in animal science will be needed to drive innovation, to underpin the availability of affordable high quality foods in the U.S., to meet increasing global food demands, and to maintain the global competitiveness of animal agriculture.

Animal agriculture and its allied industries have a significant impact on the overall economy of the United States. According to the USDA, farm gate receipts for animal agriculture, including crops used as animal feed, currently total over \$200 billion each year. Animal agriculture annually comprises between 60 and 70 percent of total farm income and plays an important role in the balance of agricultural trade. The USDA projects that in fiscal year 2014 exports of livestock, poultry, and dairy will reach \$31.6 billion, while imports of livestock products are estimated to be only \$15 billion. Animal agriculture also has a major impact worldwide. The Food and Agriculture Organization (FAO) estimates that livestock contribute 40 percent of the global value of agricultural output and support the livelihoods and food security of almost a billion people.

In response to challenges facing animal agriculture and the animal sciences, the Federation of Animal Science Societies (FASS) undertook a yearlong effort entitled Farm Animal Integrated Research 2012 (FAIR 2012) to identify key priorities and strategies for the future. The FAIR 2012 process brought together scientists, educators, producers, industry, health professionals, and governmental representatives, to identify research, extension and education priorities that will enable the animal sciences to meet key challenges and drive innovation for the future of animal agriculture. Underpinning the major thrusts in animal sciences innovation are cutting edge technologies in proteomics, metabolomics, genomics, computational biology, and emerging fields at the interface of disciplines such as nano-bioscience. These modern approaches are required to meet future needs that have been addressed and framed into three major themes by the FAIR 2012 process: Food Security, One Health, and Stewardship.

Food Security

One of the biggest challenges facing animal agriculture will be meeting the increased food needs of a growing global population. It is estimated that the world's population will reach 9 billion people by the year 2050. Global food production will need to double in order to meet these food demands. The FAO projects that 70 percent of this doubling will have to occur through the development and adoption of

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new technologies. By the year 2050, FAO estimates that there will be a rise of 73 percent in meat consumption and a 58 percent rise in dairy consumption worldwide. Much of this increased consumption will come from developing countries where people are emerging from poverty and demanding improved diets.

In order to meet increasing demands in a sustainable way, food producers must continue to increase the efficiency with which they use limited natural resources, placing a premium on increased production efficiency in animal agriculture. Compounding the challenge of increased production with limited resources is the diversion of food and feed crops into bioenergy, effectively taking land and resources out of the food security equation. All of these factors point to the need for increased investments in science to increase production capacity and efficiency.

Global food production must increase dramatically during the coming decades because of both a projected increase in the human population and an exhilarating improvement in purchasing power of many poor people in developing countries, which will increase demand for nutrient-dense foods of animal origin. Meeting that increased demand within the constraints of the earth's resources will require substantial improvements in efficiency of use of resources. The expected increase in demand for foods of animal origin makes especially imperative a marked improvement in efficiency of use of valuable feed resources in animal production. There are important opportunities to realize such improvements through research.

One Health

With increases in globalization, the intersection between animal and human health continues to become more and more complex. The One Health concept has evolved in recent years in response to these increased complexities. In its broadest sense, One Health addresses factors impacting animal health, human health, ecological health, and their interconnections, using an interdisciplinary approach. One example of these interconnections is the impact of zoonotic diseases. Zoonoses (diseases that can be passed between animals and humans) are often diseases of major economic and public health importance and account for 58% of the currently recognized human pathogens. Of the annually emerging zoonotic infectious disease events, domestic animals account for about 20 percent. Further complicating this situation is the fact that, in both developed and developing countries, people share their home environments with a variety of animal species ranging from companion animals to livestock. Poor sanitation and hygiene conditions lead to frequent exposure to each others' pathogens.

The intersection of human and animal health is also a fertile ground for policy and regulatory challenges. For example, the use of antibiotics in animal agriculture has been the source of much controversy in recent years as critics express concerns about antimicrobial resistance. Investments in research will be essential to more clearly understand these issues and provide decision makers with science-based information to develop better-informed policies.

Sound nutrition is another critical aspect to disease prevention and improving human and animal health. The importance of good nutrition is central to preventing disease, correcting physiological imbalances, and providing needed energy. Healthier animals also provide safer and more wholesome products for

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human consumption. Advances in the animal sciences can play a major role in promoting the One Health concept resulting in healthier humans, animals and the environment.

Good animal health is important for the well-being of the animal, and also as a prerequisite for efficient food production. Maximizing animal productivity and efficiency requires animals to be healthy. Animal health is also connected to human health, largely through the carriage of zoonotic pathogens in animal products for human consumption. The livestock industries have adopted an impressive array of management practices to promote animal health, but the search for additional means of keeping animals healthy continues to be critical.

Stewardship

Animal agriculture touches many aspects of our society, ranging from providing essential nutrition to balancing natural resources and fostering animal well-being. In order to meet global food demands in a sustainable way, investments in science will be critical to increasing the efficiency with which limited natural resources are utilized. Water quality and quantity figure to be major issues, as competition for this precious resource intensifies. Society also continues to have concerns about climate change and the impacts animal production may have on climate. These factors demonstrate the need for increased investments in animal science research.

Great successes in resource use efficiency have already been realized through technological innovations. For example, in analyzing the life cycle of beef production between 1977 and 2009, the same amount of beef can now be produced with 10 percent less feed energy, 20 percent fewer feedstuffs, 30 percent less land, 14 percent less water and 9 percent less fossil fuel energy. Improvements in production systems have also led to an 18 percent decrease in total carbon emissions. Facing the need to double food production by 2050, science must keep pace with population growth to make even greater strides in resource utilization.

Another important factor of stewardship is animal well-being. Critics of animal agriculture continue to raise concerns about the impact that production systems and increased production capacity have on the well-being of farm animals. Housing systems for farm animals are evolving in response to societal concerns and market demands. Standards for housing and production systems must be based in sound science and investments are needed to better understand these issues.

Crosscutting Issues

Increased investments in the priorities areas identified by FAIR 2012 will be critical for the animal sciences and animal agriculture to successfully meet the challenges of Food Security, One Health, and Stewardship. However, increased investments alone will not be enough. There are a number of crosscutting issues that must also be addressed to help ensure success.

- **Balanced portfolio** – One of the strengths of the U.S. agricultural system is the “three legged stool” of research, education, and extension. It is critical that this balanced approach be maintained. Support for research should span from fundamental to applied, with adequate

resources dedicated to the extension of these technologies into the field. It is also important to maintain the capacity of both intramural and extramural programs. The educational component must also not be neglected as the success of animal agriculture depends on a robust pipeline to develop new scientists, highly educated and informed producers and industry professionals.

- **Size and Scope of Projects** – There is a current trend at USDA towards funding large multi-institutional grants over extended time periods. While there is value in these larger awards, it is important to maintain a balance in the size and scope of projects. Without such balance, there is danger that single investigator and new investigator driven research will be neglected because of inadequate resources. This could have the unintended consequence of driving new scientists away from agriculture, further jeopardizing the development of new leaders in animal science.
- **Enhanced Collaborations** – Enhanced collaborations on issues important to the animal sciences can play an important role in meeting future challenges. USDA, universities, and others, should increase linkages with federal research agencies such as the National Institutes of Health, National Science Foundation, Department of Energy, and others, to leverage limited resources and drive innovation.
- **Increased Public awareness** – Animal agriculture suffers from a perception problem. There is a critical need to better inform consumers about the importance of farm animal production and the value of agricultural research.
- **Regulations** – Issues surrounding animal agriculture are fertile ground for regulations, including issues related to the environment, animal drugs, and trade. Future success of animal agriculture will be dependent on the consistent and predictable use of sound science by policy makers.
- **Data mining** – As research priorities are set and agendas developed, it is important that comprehensive mining of historical data be conducted, to understand what is already known, to prevent unnecessary duplication, and to provide a better base on which to build future research. Data mining will reveal information that can be converted into knowledge about historical research and these data can be used to predict future trends to be used in research planning to support guidelines and policies.

Conclusion

FASS appreciates the opportunity to provide and strongly encourages the committee to utilize the results of the FAIR 2012 process to help drive innovation and maximize the impact of federally funded agriculture research. International investment in agricultural research is outpacing investments in the United States. In order to underpin the availability of affordable high quality foods in the U.S., to meet increasing global food demands, and to maintain the global competitiveness of US animal production, innovations in the areas of Food Security, One Health, and Stewardship, will be the likely areas by which success will be measured. Increased federal investments in these priority areas will be important in feeding an increasing global population in a way that maximizes the efficient use of limited resources and promotes human, animal, and ecological health. To realize the greatest impact of these investments, attention must be paid to crosscutting issues related to the structure of research programs, enhanced collaborations, science based policies and increased public awareness of the importance of animal agriculture and the role of science.