Introduction

Chairman Davis, Ranking Member Grisham, and Members of the Subcommittee, my name is Jay Akridge, Dean of the College of Agriculture at Purdue University, and I appreciate the opportunity to testify today.

I am here representing the Board on Agriculture Assembly (BAA) of the Association of Public and Land-grant Universities (APLU). The BAA represents a national system that knits together more than 107 land-grant and 60 non-land-grant universities.

While public support for agricultural research and education comes from a variety of sources, my comments will focus on the extramural funds – capacity and competitive funds - provided by USDA through the National Institute of Food and Agriculture (NIFA) and authorized in the Farm Bill.

In my written testimony I outline the case for public investments in agricultural research and Extension as fundamental for global competitiveness of our U.S. agriculture, and will provide a brief overview of the key points here. I would be pleased to elaborate or provide Purdue examples during the discussion.

- The productivity story of U.S. agriculture is extraordinary and that productivity was fueled by research and education. As just one small example, corn yields in the 1930s were 30 bu/acre, increasing to 100 bu/ac when I was growing up in my family's farm supply business in Western Kentucky in the 1970s. Last year, the U.S. average corn yield was 175 bushels per acre.
- However, there is no resting on our laurels as the world's population is increasing rapidly, forecast to hit 9+ billion in 2050 which will require 25%-100% more food. GHI reports that TFP must grow by 1.75% annually for the world to double agricultural output through productivity gains by 2050.
- But, how to drive that level of productivity has become much more complex in the new century. More variable weather has brought new challenges to the world's farmers. Access to new, arable land is limited. Availability of and competition for water is increasingly an issue. The environmental implications of farming practices are being questioned globally. Some consumers have demonstrated much deeper interest in how and where food is produced, and societal acceptance of new technology cannot be taken for granted.
- Given these issues, what set of technologies and investments in human talent will drive the type of agriculture needed and who will provide them? The science of the 21st century agriculture will be built on data collected in ways and volumes unprecedented in our history. The word 'convergence' will characterize agricultural technology as biology, data analytics, and automation combine to provide the productivity increases we need. Universities can play a unique role in bringing these disciplines together, and realizing this future.
- At the same time, the next century will not be ours alone as other nations are investing heavily in public agricultural research and U.S. agricultural competiveness will be a key

issue. As of 2011, for every dollar the United States invested in public agricultural R&D, China, Brazil, and India (combined) invested $2.15.

- In addition, U.S. agricultural competitiveness will require both private and public investment. In 1950, public spending on agricultural research was about 65% of the total investment, by 2010 that figure had declined to about 35%. But, public research is needed to address the questions that the private sector will not and public-private partnerships will be increasingly important.
- While technology is important, technology in the hands of farmers who know how to use it is even more important. Cooperative Extension plays a key role in disseminating research to stakeholders. And, as our stakeholders have evolved, so has Extension with the traditional county-based Extension Educator or Agent, complemented by direct access to campus-based Extension Specialists and a wide variety of e-learning tools.
- Competitiveness is built on human talent and our colleges of agriculture are focused on preparing the talent needed for the next century with more than 175,000 students enrolled (BS, MS, Ph.D.). 4-H, a youth development program of Cooperative Extension, is a talent pipeline and reaches nearly 6 million youth annually. New Science, Technology, Engineering, and Math (STEM) programming is taking the proven 4-H volunteer-led, research-based model into exciting new areas.

- What are some of the challenges looking forward?
- Federal funding for agricultural research has been stagnant over the past decade, and has declined in real terms. From 2005 to 2012, USDA funding for agricultural research declined by 16% in real terms, falling from $2.9 billion to $2.4 billion in 2014 dollars.
- Our system needs investments in both capacity and competitive funds. Federal capacity funds provide land-grant universities with the human talent required to address local research and extension needs, provide timely response in emergency situations such as a disease or pest outbreak, and ultimately the capacity to pursue competitively funded research.
- A significant challenge faced by our land-grant universities is the state of our research and education infrastructure. In 2015, a BAA study estimated that the land-grant system faces a deferred maintenance backlog of $8.4 billion.

- In closing, the most recent QS World University Rankings show that 10 of the top 15 agricultural and forestry universities globally are located in the U.S. With a proven record of impact, and with appropriate levels of federal investment, our land-grant and agricultural colleges stand ready to address the challenge of helping to insure the global competitiveness of our U.S. agriculture.
- I want to thank you again for this opportunity today and to thank you for your past support of agricultural research and Extension.