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AGRICULTURE SUBCOMMITTEE ON
BIOTECHNOLOGY, HORTICULTURE, AND RESEARCH
THE HONORABLE RODNEY DAVIS, CHAIR

Washington, DC

Submitted by

THE UNIVERSITY OF ILLINOIS

Robert J. Hauser, Dean
College of Agricultural, Consumer and Environmental Sciences

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Mr. Chairman and Distinguished Members of the Subcommittee on Biotechnology, Horticulture, and Research: My name is Robert J. Hauser, and my testimony is on behalf of the University of Illinois. I currently serve as Dean of the College of Agricultural, Consumer and Environmental Sciences, or ACES, and both the Illinois Agricultural Experiment Station and University of Illinois Extension are under the supervision of my college at Illinois.

I would like to thank Congressman Davis, Chairman, Congresswoman DelBene, Ranking Member, and the other members of the Agriculture Subcommittee on Biotechnology, Horticulture, and Research, for the opportunity to testify on the important subject of agricultural research and innovation, and to discuss associated policy challenges, such as ways to leverage federal resources, cooperation between various institutions, means of extension and outreach, and other issues of importance to the agricultural research community.

I have been asked to focus my comments primarily on agricultural research issues related to major field crops and renewable energy crops, and the associated role of USDA/NIFA funding. This is appropriate, because Illinois is in the heart of the Midwest and is typically the leading soybean producing state and the second leading corn producing state, the two most valuable crops in America.

And the University of Illinois is among the leading institutions in the nation for research and development of biomass feedstocks for renewable energy.

Following are some key messages that I hope you will take away from my comments.

1. The federal-state partnership for agricultural research, between USDA and state agricultural experiment stations, has been a huge success story – and it must also be a success story going forward.
2. The continuum of agricultural research and development has critical opportunities for partnership between public and private institutions, but there are important roles for each to play in their own domains – and there is still a particularly important role for research as a public good.
3. The need for agricultural research, especially among the major crops, is absolutely critical for the consumers of food, globally – that means everyone – regardless of the relatively small population of significant producers in America today.

Our portfolio of research derives its support from many sources. For context, annual research expenditures within the college approximate \$45 million, excluding our permanent state-funded personnel cost. Of that, the Illinois Agricultural Experiment Station receives about \$7.2 million in federal capacity funds allocated by formula from USDA/NIFA, mainly from Hatch and Hatch Multi-State allocations, and matched with our state resources. Similarly, University of Illinois Extension receives roughly \$12 million of federal funding, primarily from Smith-Lever and the Expanded Food and Nutrition Education Program, EFNEP, to support our outreach mission.

Our competitive research grants from USDA roughly equal the formula research funds, and we have been even more successful in competition for funding from other federal agencies, and from private companies. We also benefit from a very robust cooperative relationship with USDA's Agricultural Research Service. Several of their preeminent scientists have long-term assignments on our campus, particularly in the disciplines related to crop sciences. In recent years, we have also successfully competed for significant grants as part of the USAID Feed the Future initiative. Further, our scientists have engaged in major interdisciplinary programs that are situated outside of the typical wheelhouse of a land-grant agricultural college. It is here at these nodes of science that future breakthrough innovation is likely to happen. So the point is that we look for programs that will move our ideas forward into action and results, and USDA/NIFA programs are a necessary component of that mix.

Our goals related to our work in crops could be summarized in several ways, but perhaps to put it simply, we work to help insure food and energy security, profitable agriculture and food systems, rural and family prosperity, and resource stewardship.

SUCSESSES

We utilize support from our federal partners in many ways to further our aims in crop sciences. Important projects are funded by USDA/NIFA, but it is important to keep in mind that they are very often part of larger, more significant programmatic initiatives, often involving other institutions and private firms.

Just to cite a few examples –

Our crop scientists have made significant contributions in molecular or genomic biology for corn and soybeans. In recent years, USDA/NIFA competitive grants have allowed our scientists to explore the mechanisms of nitrogen uptake and utilization in corn. Nitrogen is, of course, an essential plant nutrient and a source of environmental concern. Other AFRI funding supports genetic research in soybeans, such as flowering response to seasonal photoperiod changes, a critical factor to environmental adaptation of soybean plants.

With the help of our partners in the seed industry, we established the Illinois Plant Breeding Center a few years ago, which is now recognized as the leading academic plant breeding program in the country. This model research and education effort is focused on training the next generation of scientists who will be needed to drive innovation forward in plant biotechnology, in order to achieve the output gains we need to meet future food demand. USDA/NIFA has funded research and education focused on achieving high corn yield under high planting density. That fits perfectly within the scope of the Illinois Plant Breeding Center.

The University of Illinois has made major contributions to knowledge pertaining to energy crops, biomass production if you will. As a partner in the Energy Biosciences Institute with UC Berkeley, Lawrence Berkeley National Laboratory, and BP, we established the crop feedstock

research program that has formed a scientific foundation for renewable crops. USDA/NIFA projects on the sorghum genome and economic analysis of tradeoffs for biomass production contributed to this effort, and the University of Illinois will continue to operate its unique Energy Farm as a renewable crops resource, even though the Energy Biosciences Institute is currently being phased out. As is often the case, USDA projects were instrumental in some of the foundational research that led a positive proof of concept, providing the incentive for other stakeholders to join in building and sustaining the research program.

I have already emphasized the importance of ARS on our campus, particularly for crop sciences, where scientists are fully integrated into our research activities and making enormous contributions. Our groundbreaking work on photosynthesis has been led in partnership with ARS, and some of those scientists have been instrumental in our successful modeling of future environmental effects of climate changes on crop production, through our unique capabilities for free air concentration enrichment (SoyFACE) at field scale.

Besides the pursuit of science that is directly related to growth and culture of crops, our mission is to also translate science for use in practice, whether that is provided as technology or information. That occurs not only through Extension programs, but also through technology commercialization processes, or by means of innovative research and education approaches that assist management decision making among the broader audience of users. To illustrate, USDA's support and data have been instrumental in our development of FarmDoc, one of the nation's leading platforms for farm management research, risk management information, and decision tools. Moreover, the grant for the USDA Producer Education Tools Project, awarded to Illinois from the Farm Service Agency, allowed us to put timely information and decision tools in the hands of producers during implementation of the most recent farm bill.

Illinois also invests its formula or capacity funding in support of various programmatic initiatives. For example, we have invested Hatch resources to seed interdisciplinary research in the early stages, through our Future Interdisciplinary Research Explorations (FIRE) grants program, and we similarly fund the ACES Research Academy to give young scientists the necessary tools to success in a research environment.

We work diligently to develop resource leverage from partnerships. In any of our cooperative relationships, it is essential to understand the roles and commitments of potential partners in each segment of the agricultural research process, basic to applied, and which change over time.

Just yesterday, for example, a major chemical and agricultural technology company launched an innovation center on the Illinois campus that looks to partner with the university in several ways, including improved cropping systems.

Our main building on campus for crop sciences, Turner Hall, is undergoing significant renovations to provide better learning and working space, in cooperation with several major benefactors from the crop industry. In the same way, we are reaching out to our industry

partners to modernize our research infrastructure to utilize crops, in projects like our Integrated Bioprocessing Research Laboratory, which is under construction, and our Feed Technology Complex.

CHALLENGES

Crop sciences at Illinois includes multiple related disciplines: agronomy, agroecology, plant protection, plant breeding, biotechnology, and molecular genetics, bioinformatics, horticulture, sustainable landscapes, and specialty crops.

In some respects our challenges at this point in time may be more extreme than for some of our peers in the Midwest, largely attributable to declining state support for the public goods involved in agricultural research and extension. Illinois is a major agricultural state, but it also has major urban populations, with significant competing demands.

Specifically for crop sciences at Illinois, the trends we see are clear.

- Attracting top students to enroll in undergraduate crop science majors is a challenge, even though the job market for those students has been excellent.
- Our research productivity, measured in competitive grant funding, has been excellent for our crop scientists. Being on the leading edge of crop-related science is essential for long-term excellence, because other academic institutions and industry aggressively compete for the same talent.
- The portfolio of crops research is driven, to a significant extent, by grant opportunities. The sources of grant funding for locally applied research have diminished substantially over the past decade.
- Our crop scientists compete, not only for USDA or other federal resources, but also for resources within the university that are derived from the state and elsewhere.
- Illinois has experienced substantial permanent losses of scientific capacity and other assets for crops research over the past several years. One example is the very recent announcement of base budget cuts that have prompted us to reduce resources devoted to crops in four of our field research and education centers in Illinois
- As our higher education budget model continues to rely more heavily on student tuition, we lack the justification to further subsidize agricultural research activity with student tuition dollars.

Nonetheless, the opportunity for Illinois and our sister institutions remains exceptionally bright and critically important – to build upon the success that is feeding the world today. Just a couple of weeks ago, Secretary Vilsack came to the University of Illinois to deliver an address on international food security issues. To paraphrase one of his points, he suggested that we must invest commensurately more in agricultural research and education, despite the fact that only a small part of our population is directly engaged in agriculture. Because all people are the beneficiaries of a robust and successful agricultural sector, allocation of resources must not be

based solely on demographic patterns or variables. He also made it very clear that the land-grant universities must have capacity and infrastructure to conduct agricultural research and education at the next levels of competency. USDA/NIFA recently asked institutions like ours for information about their infrastructure assets, in order to better assess the capabilities and gaps for critical scientific progress going forward.

States like Illinois are under tremendous fiscal pressure. Our decision to reallocate resources for our field research, the loss of personnel to carry out agricultural research programs, and years of decreasing investment in faculty scientists reflect that pressure.

On the other hand, non-traditional partners may be waking to the needs and opportunities. An initiative called “FARM Illinois” is engaging the broader business and civic community, especially in metropolitan Chicago, with the agricultural interests across the state.

POLICY IMPLICATIONS

In closing, I would like to leave you with some broad ideas to consider as you deliberate federal policies for agricultural research, education, and outreach.

- Agriculture, especially major crop agriculture, has global implications – but by its nature requires local knowledge. So while investing to meet global challenges, understand the importance of science applied locally.
- Emphasize partnerships appropriately, and be willing to apply federal resources as a public good, where the gaps exist.
- Emphasize competitiveness, but be smart about the necessary capacity – and work with states to insure the health of land-grant universities and related institutions.
- Universities invest in scientific research capacity in response to the demands and criteria of grantors. If sufficient opportunities for resources and scholarship are not apparent for faculty or other scientific talent in agriculture to succeed in the long-term, universities will invest in other disciplines competing for scarce resources, especially those where student demand is strong and tuition revenue is most apparent. Real cooperation is needed among federal partners, states, and industry to promote student interest and research needs in agriculture.
- Finally, because our programmatic research initiatives rely on multiple partners and sources of support, it is often difficult to identify a unique contribution from a particular partner. The temptation for any partner is to desire accountability for their specific contribution, but requirements need to be flexible enough for compliance without significant administrative burden. It is in everyone’s interest to seek administrative efficiency at all levels of the agricultural research and education process.

I would like to thank the committee once again for this opportunity to share our perspective with you, and we appreciate your support of agricultural research, education, and outreach.