APLU Deferred Maintenance Committee report

Strategy Proposal

26 October 2016

The group's charge is to develop a strategic framework for addressing the deferred maintenance challenge for U.S. public universities and agencies involved in research in food, agriculture and natural resources.

There is a compelling need for a major investment in the infrastructure that supports public research in food, agriculture and natural resources. Research spending by private industry has surpassed the public investment many fold, yet private industry still depends on publicly funded research for new advances in fundamental science and for educating scientists for the future. While private investments are critical for ongoing advancements in food, agricultural and environmental production and management, they are limited in scope and are too closely tied to profit generation in the short term. Research and education conducted in the public interest helps to advance breakthroughs needed in fundamentals of food, plant, animal and environmental sciences.

Land grant universities generate the majority (>60%) of Ph.D. degrees in the agricultural and environmental sciences. Much of their training and experience in research techniques takes place in antiquated laboratories, greenhouses, and animal facilities. Whether graduates go on to employment in the private sector or in the public sector, the development of the research work force for the future is heavily dependent on public universities. For those graduates to be capable of conducting the leading edge research that creates new value in agricultural production and environmental management, they must have the opportunity to participate in research and educational activities supported by safe and modern facilities and equipment.

Modern advances in health care depend upon research advances from the public sector supported with investments of more than $32 billion per annum directed through the National Institutes of Health. Much of this research takes place at public universities, and depends upon state of the art facilities for conducting research, much of which is enhanced by funding from private sector interests. Modern advances in food, agricultural and environmental sciences also depend upon research. The current system of federal support, administered through the USDA National Institute for Food and Agriculture,

funds research at public universities and federal facilities that is also enhanced by private sector investments. Current funding for food and agricultural research is $3.37 billion per annum. Facilities are key assets in the operation of an effective and strategic research system meant to improve human and environmental health. Past investments in facilities have helped to dramatically improve the efficiency of food production, increase food safety, and improve environmental management. However, as those facilities age and become poorly suited to the research demands of the 21st Century, there is a significant need for better equipped and safer facilities to replace the older facilities.

Whether measured as crop yield per acre, milk and meat yield per animal, or average output per farm worker, the productivity of U.S. agriculture is among the highest in the world. Economic analysis finds strong and consistent evidence that investment in agricultural research has yielded high returns per dollar spent, with net social returns in the United States estimated to be at least 35 percent annually. These returns include benefits not only to the farm sector but also to the food industry and consumers in the form of more abundant commodities at lower prices.

In 1929, approximately 20 percent of disposable personal income went to paying for food consumed in the home. By 2013, this amount stood at approximately 6 percent. With a lower share of disposable income needed for an essential such as food, families and individuals have resources to spend on other goods and services. Continued investments in research will ensure sustainable agricultural production, economic growth for growers and greater choice for consumers.

In addition to the need for state of the art research laboratories, there are other critical infrastructure needs including modern, reliable growth facilities and greenhouses as well as animal care, buildings and other facilities at off campus research stations. Sixty five percent (65%) of these facilities are older than 25 years; 30% older than 50 years. Ever changing guidelines dictate that these facilities be maintained or replaced at an estimated cost of $2 billion.

Research and development activities go hand in hand with education programs that train needed professionals with hands-on research experience in agricultural, food and environmental sciences. These efforts range from undergraduates to graduate students. Unfortunately 21st century science in taught in outdated facilities, most of which, 61%, are more than 25 years old. Only 10% are less than 10 years old and could be considered modern.

The U.S. system for developing research capacity and advancing research in food, agricultural and environmental sciences is a unique model because it has become a public/private partnership aimed at moving forward on fundamental research that forms the basis for more applied work conducted in the public and private domains. Federal funding for food, agricultural and environmental research has been stagnant over the past 25 years, while private investments have advanced dramatically. During this gradual erosion in public support for research, institutions have been reticent to invest in the routine maintenance required for high productivity facilities, and this has significantly eroded the research and educational capacity of the land grant university system as well as the USDA Agricultural Research Service, and left more of the fate of food, agricultural and environmental research in the hands of the private sector. As facilities have declined in their functionality, the future of the public research infrastructure has been compromised and places the U.S. food, agriculture and environmental system in jeopardy of becoming outdated and irrelevant. An infusion of funds to modernize the research and education infrastructure is a critical need at this time.

The recent Sightlines study (*A National Study of Capital Infrastructure & Deferred Maintenance at Schools of Agriculture,* Kadamus, et al. 2015) documented a critical need to address aging infrastructure for agriculture, food and environmental research and education facilities at public universities. Of 15,596 buildings included in their assessment, containing 87 million gross square feet of space, 52% was built between 1951 and 1990, the period when buildings were built “quickly and with lower quality standards and materials”. Facilities built in this time period account for 68% of the total $8.4 billion in deferred maintenance costs across the system. The replacement cost of all research and education space in the system is estimated at $29 billion. In addition, it is estimated that some $300 million is needed just to maintain the status quo.

Failure to aggressively and systematically address this challenge aggressively and systematically places at risk the entire public reliance on public research and education in food, agriculture and environment. This will lead to a reduction in the number of institutions involved in conducting this research, a reduction in the sophistication of the research that is undertaken, and a risk to private enterprise in not having access to fundamental research findings that can fuel their innovation and translation of research into commercial application. The private sector will be more dependent on its own innovations, which will be more protected than information generated in the public domain. This will put the U.S. agriculture, food and environment industries at competitive disadvantage at

the time that other developing and developed economies are increasing their public investment in food, agriculture and natural resource research.

One of the unique features of the research enterprises that undergird the tremendous success of the U.S. food, agriculture and environmental industries are the public university partnerships with private industry, ranging from individual farming and ranching operations to large corporate agribusiness and food marketing entities, the federal government through the U.S. Department of Agriculture, Food and Drug Administration, Environmental Protection Agency, and Department of Interior, state government agencies, and state agriculture commissions. Non-government organizations such as commodity groups and professional and farming organizations have an interest in this as well.

Another emerging trend is for consolidation of efforts and collaboration across university and state boundaries to address regional needs. Research facilities that merit federal investment should help to further advance regional approaches such as those stimulated by NIFA Coordinated Agriculture Project funding and Specialty Crops Research Initiative funding. This coordination helps to reduce investments in duplicative facilities, leaving more funding available for specific research projects, and to increase the synergy created by collaborative efforts.

Two key objectives have been identified for strategic action: 1) improving stewardship of facilities through adequate planning and funding of ongoing maintenance needs, and 2) investing in major renovations or new construction to replace aging and ineffective or unsafe or inadequate research and education facilities.

In order to address the improved stewardship, we recommend the following actions:

a. Development and communication of facility stewardship best practices and standards for facility managers to use.
b. Seek full funding of Indirect Costs from all granting agencies. This should include U.S. Department of Agriculture funding (AFRI, block grants) as well as private industry funding.
c. Greater leeway in use of NIFA Capacity Funds for facility operating expenses.

In order to address funding for major renovations or new construction of research facilities, we recommend the following actions:

a. Create a new and separate grants program within NIFA to assist in funding major renovations or new construction to replace facilities created prior to 1990. The program should be designed so as to make a sufficient investment to help reduce the backlog of deferred maintenance by replacement with new or renovated facilities.
b. The new grants program must not come at the expense of either capacity funding for land grant institutions and ARS or competitive funding for research and Extension priorities through the Agriculture and Food Research Initiative. New funding is needed for this new program.
c. The program should require documented matching funds from other partners, either state government, university, private sector or some combination of these as matching funds. Federal funds should only be available if there are state, university and/or private funds invested in the project.
    i. The program should include two tiers, e.g. projects under $5 million and projects greater than $5 million in total costs, with different matching requirements for each category.
    ii. Proposals should be evaluated on their ability to address regional needs, to accommodate collaborations with other universities and states, and to enhance collaborations with USDA-ARS. Partner institutions should be documented as investing and collaborating in the project either through initial investment or with ongoing operating and maintenance funding.
    iii. Proposals will be required to include a stewardship plan for ongoing maintenance of the new facility.

These two elements should be incorporated into planning for the 2018 Farm Bill.