



OFFICE OF THE VICE PRESIDENT --
AGRICULTURE AND NATURAL RESOURCES

OFFICE OF THE PRESIDENT
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Before the Committee on Agriculture, U.S. House of Representatives
The Next Farm Bill: University Research

June 22, 2017

Good morning Chairman Conaway, Ranking Member Peterson, and members of the committee. I am honored to have this opportunity to discuss the importance of agricultural research and innovation as you begin work on the next Farm Bill.

With the University of California (UC) Agriculture and Natural Resources (ANR) serving as a vital partner, California continues to be the nation's top agricultural state. For more than a century, California's \$47 billion agricultural sector has depended on UC ANR, in partnership with our UC campuses, for the stream of new technologies and research breakthroughs needed to stay competitive and be responsible stewards of the land. We are proud to be part of the Land Grant partnership that was developed between states and the federal government with the 1862 Morrill Act, 1887 Hatch Act and the 1914 Smith-Lever Act. That enterprise has, for over 130 years, advanced scientific knowledge in all aspects of food production, and improved production capacity, profitability, and safety of the nation's food system.

The UC ANR Land Grant mission is delivered through several hundred academics conducting research on four campuses, nine Research and Extension Centers and over fifty county offices throughout the state. We work closely with a wide array of partners and volunteers to deliver programs ranging from 4-H Youth Development to Master Gardeners to Integrated Pest Management, and manage the Nutrition Policy Institute and the Water Resources Institute for California. In the past fiscal year, UC ANR has served over 1.4 million adults and youth directly, published about 1,800 peer-reviewed journal articles and filed over 20 patents. Our 20,000 volunteers contributed the equivalent of over 700 FTE in public service – the equivalent of \$40 million in donated time. 1,600 workshops and field days extended best practices and technologies resulting in increased yield, reduced inputs, increased efficiency, improved economic return, and/or conservation of important natural resources.

A recent study examined the return on investment for federal funding of the public land-grant system; it showed that while benefit-cost ratios vary by state, they are always in double digits –

averaging 21:1 and corresponding to annual rates of return between 9-10%¹. However, returns from these investments are often realized only after considerable lag time – in some cases decades. It takes at least seven to 15 years of research and development to develop a new crop variety – longer for trees/vines. Deploying and/or adapting new agricultural technologies can be even longer. For example, when UC Davis engineer, Coby Lorenzen, designed a machine to automate the harvest of tomatoes in the 1960's, it also required agronomist Jack Hanna to develop a less-delicate variety of tomato that ripened uniformly and could be easily plucked from the plant, essential qualities that made machine harvesting feasible².

A vital component of federal support for agricultural research has been capacity funding specifically dedicated to supporting research and Cooperative Extension programs at America's land-grant universities. These capacity funds are available annually on a non-competitive basis and require a match at the state and local levels; they include Hatch, Smith-Lever, Evans-Allen, McIntire-Stennis, Animal Health and Disease Research, Expanded Food and Nutrition Program, 4-H Youth Development, Renewable Resources Extension Act, 1890 and 1994 Extension. We strongly support ongoing funding of both capacity programs and competitive funds, and urge Congress to authorize an additional \$200 million toward the suite of programs at the National Institute of Food and Agriculture (NIFA). Further, we recommend that formulas for allocations of capacity funds to each state be designed to ensure equitable distribution; in particular, the current definition of "rural" needs serious examination and re-engineering.

The current mix of federal and state capacity funds is generally leveraged many-fold by federal competitive grants, grants from private industry, and other types of unrestricted gifts and awards to faculty conducting research at the nation's land-grant universities. Competitive funding processes can elicit new ideas and speed up certain research projects; however, they also encourage a shift from programmatic research towards shorter-term project research. Failure to invest in a well-balanced mix of capacity and competitive funds for food and agriculture research could have very negative consequences for decades to come – consequences that would take significant time to reverse. Although progress is being made to incrementally increase appropriations to the USDA AFRI program, it remains funded at considerably less than the \$700 million authorized in the previous two Farm Bills – far less than funding levels at NIH or NSF. We strongly support reauthorization at \$700 million annually and urge pursuit of achieving appropriations in AFRI equal to that authorized by 2020.

While both food security and political stability can be linked directly to innovation driven by investment in agricultural research, resources (people, time, dollars) are limited – we cannot afford to be duplicative; nor can we afford to limit our partnerships or methods. To make even greater strides, transformative innovation is needed – moving beyond just improving existing methods and processes to totally re-thinking systems development. As part of our new strategic plan (<http://ucanr.edu/stratplan1.10.2017>), UC ANR seeks to deliver research and extension programs that have direct impacts on the lives of more Californians by harnessing the power of the entire California system of higher education, finding new ways to work with existing partners, cultivating new partnerships, and engaging a much broader array of stakeholders throughout California and the world.

¹ Julian M. Alston, Matthew A. Andersen, Jennifer S. James, Philip G. Pardey; The Economic Returns to U.S. Public Agricultural Research. *Am J Agric Econ* 2011; 93 (5): 1257-1277. doi: 10.1093/ajae/aar044

² Haspel, Tamar, "One big reason some foods cost so much more than others", *Perspective*, Washington Post, June 19, 2017, https://www.washingtonpost.com/lifestyle/food/the-biggest-reason-some-foods-cost-so-much-more-than-others/2017/06/16/d3bda28e-5063-11e7-91eb-9611861a988f_story.html?utm_term=.8fc5d6f5e6f6

One new strategy is to expand collaborative efforts between experts in soil sciences, plant pathology, biochemistry, entomology, and other fields of sciences with technology experts in robotics, sensors, artificial intelligence, materials, supply chain logistics, and energy systems to solve today's complex problems in agriculture. Much like the biomedical revolution, it is the integration of multiple disciplines into a single project that can lead to transformative innovation that improves productivity, food safety, and ecosystem services while also giving rise to new businesses. Examples of such multidisciplinary projects include:

- James Rogers studied flexible solar cells at UC Santa Barbara and Lawrence Berkeley National Laboratory. A radio program on world hunger gave the materials scientist his “aha!” moment in 2012. His work on thin-film polymers from solar cells, coupled with information from UC Cooperative Extension, led to an invisible, edible and tasteless barrier that can protect food crops and dramatically improve longevity of produce freshness – using waste plant parts often left on the farm. Apeel Sciences now supports 71 employees and hits shelves this summer, when some of the world's largest avocado producers start using it³.
- The European Grapevine Moth (EGVM) was first detected in a Napa County in 2009, but quickly spread throughout the state, leading to quarantine restrictions and a mass effort to determine pest numbers through trapping. Quick collaboration between University of California wine grape specialists, local agricultural officials, state and federal government agencies, and vineyard operators, helped identify the problem and recommend a course of action leading to complete eradication. Solutions included mating disruption techniques, vector analysis and targeted insecticides to kill the insect. The last EGVM detection in California was June 2014⁴.
- Central Valley AgPLUS Food and Beverage Manufacturing Consortium⁵ focuses on expanding opportunities along the farm-to-fork supply chain, including initiatives to minimize waste, improve distribution of foods, and contribute significantly to increased trade, jobs and economic growth. Multidisciplinary research at UC Davis has resulted in new “smart” technology for food-processing facilities: 90% of water & chemicals from each cleaning cycle is captured and processed for future use in the complex, eventually being used as many as ten times⁶.
- CropManage⁷ is an UC ANR online database-driven tool that assists growers and farm managers in determining water and nitrogen fertilizer applications on a field-by-field basis. The software automates steps required to calculate irrigation and Nitrogen fertilizer needs. The web application also helps growers track irrigation schedules and nitrogen fertilizer applications on multiple fields and allows users from the same farming operations to view and share data. Partners have included NASA and private sector firms.

³ <http://apeelsciences.com/>

⁴ Fitchette, Todd, “California eradicates the European grapevine moth”, Western Farm Press, August 18, 2016, <http://www.westernfarmpress.com/grapes/california-eradicates-european-grapevine-moth>

⁵ <http://cvagplus.org/>

⁶ <http://wineserver.ucdavis.edu/about/facilities/Jess-S-Jackson.html>

⁷ <http://ucanr.edu/blogs/cropmanage/index.cfm?tagname=CropManage%203.0>

While these types of good news research projects are always welcome, much of this accomplishment could not be achieved without the underlying research infrastructure, provided through capacity funds, being available to support projects funded by competitive grants. On a different, but related subject, one potential solution to deepening concerns over access to a trained workforce for the food and agriculture sectors is a much broader utilization of 4-H programs. This important youth development activity can serve as the beginning of a pipeline directing both rural and urban youth to pursue higher education with the potential for careers in food and agriculture – one example of how capacity funding through Extension supports ongoing programs that are interconnected to the workforce pipeline, as well as other needs for the entire food system.

NIFA recently commissioned TEconomy Partners to conduct a national survey on “...whether capacity funding remains a productive model for supporting academic institution-based research and Extension in the 21st century?” The findings are strong and unequivocal in their impact: financial leveraging through matching state and local funds of at least \$1.86 per \$1 federal sustains the specialized personnel and scientific facilities and instruments, research station infrastructure, and Extension operations needed for complex agricultural and associated research programs; generates significantly higher volumes of publications; provides flexibility to fund rapid response to emergencies or emerging issues; allows long-term research, leading to improved crop and livestock management; and provides a base of support to successfully vie for competitive grants across all sizes of institutions and federal, state, and local agencies⁸. For example, about 1 in 6 patents in agriculture across the U.S. are based on innovations resulting from federal capacity funds.

Hampering research significantly, the infrastructure in most land-grant universities is aging, inadequate, and, in many cases, obsolete. A national study of capital facilities and deferred maintenance recently documented the magnitude of the infrastructure problem that threatens to further erode the United States’ preeminent role in global food and agriculture. The conclusions from this Sightlines LLC Study⁹ on the age of the buildings, the lack of capital investment over time, and the levels of deferred maintenance needs are sobering — the total deferred maintenance cost is at least \$8.4 billion. For the United States to remain a world leader in food and agricultural research, this aging infrastructure problem must be addressed.

Given the size of the need, coupled with current goals to reduce federal domestic spending, many fear that there will be little appetite to find new funding to deal with this deferred maintenance problem within the 2018 Farm Bill. Given that, there is a great deal of interest in seeing agricultural research facilities included within any infrastructure bill that the current administration may offer. However, it is difficult to anticipate what the requirements might be to accommodate the interest in attracting private investment to federally-funded infrastructure projects. Typically, in these models, the private investor requires strong assurance such as a reliable revenue stream from tuition or bonds or some form of commerce to leverage their risk. This is unlikely to be a model that will work well for research facilities.

⁸ National Evaluation of Capacity of Programs. Quantitative and Qualitative Review of NIFA Capacity Funding. TEconomy Partners, LLC. <https://nifa.usda.gov/sites/default/files/resource/NIFA%20Capacity%20Funding%20Review%20-%20TEconomy%20Final%20Report.pdf>

⁹ A National Study of Capital Infrastructure & Deferred Maintenance at Schools of Agriculture. Sightlines, LLC. http://www.aplu.org/projects-and-initiatives/agriculture-human-sciences-and-naturalresources/DeferredMaintenance_SchoolsofAg.pdf

It will be important for Members of Congress to carefully examine how the research, teaching and Extension facilities at public universities should be included in the public infrastructure projects eligible for any federal program. Dealing with the deferred maintenance of these facilities is of paramount need and should be given strong consideration for new funding in the 2018 Farm Bill. To stretch such dollars, it would be reasonable to require that matching funds be required to receive federal funds, similar to language in the Research Facilities Act¹⁰.

We are certainly willing to help carry a share of this load; as example, UC ANR is currently pursuing \$35 million in bonds to couple with approximately \$10 million from our reserves to deal with the greatest needs at our facilities. This amount will bring us to a functionally adequate level; it will not allow us to provide the 21st century, state-of-the-art research facilities that are needed to truly tackle the complex challenges we face today and in the future. To pursue this capital investment, as well as other programmatic needs, we are also:

- Restructuring how our facilities are managed and ensuring that recharge rates move closer to true cost accounting. This allows reduced expenditure on updating and maintaining equipment and can optimize use of the equipment
- Enhancing administrative collaboration between the campus Deans and UC system-wide leadership to coordinate institutional matches in support of major extramural grants.
- Expanding the role of the Technology Management and Corporate Relations division to provide additional support in a variety of ways ranging from education and outreach programs to commercialization through patenting, licensing and entrepreneurship. These commercial partnerships can assist in augmenting research funds and opportunities.
- Reinvesting indirect funds into the research enterprise to update facilities and equipment as able and thereby improve competitive advantage for research contract and grants and exceptional research recruitments.

In addition to these initiatives, we are also expanding and formalizing partnerships to better connect the state's farmers with each other and with science-based information sources to assure the sustainability of the state's agricultural systems. To leverage existing resources and better develop synergies among technical assistance providers, representatives of UC ANR, UC Davis, the California Department of Food and Agriculture, California Farm Bureau Federation, California Association of Resource Conservation Districts, and USDA Natural Resources Conservation Service (NRCS) recently signed a formal agreement to form the California Farm Demonstration Network. One early action from this partnership is that UC ANR and USDA NRCS are developing shared positions to ensure coverage on agronomic sciences in key crops. We are also exploring how to ensure that science developed by UC ANR can be quickly adopted into the USDA NRCS Field Office Technical guide, making it much more available for implementation by farmers and landowners. One way the 2018 Farm Bill can assist this partnership is to include provisions in the Conservation Title that encourage preference of Cooperative Extension to serve as Technical Service Providers.

In closing, there are several specific recommendations on various Farm Bill provisions that we will offer as the legislative process unfolds. However, I would be remiss not to mention four programs especially important to California. Those include:

¹⁰ Research Facilities Act [Act of July 22, 1963, Public Law 88–74, 77 Stat. 90] [As Amended in P.L. 113–79, Enacted February 7, 2014]

Specialty Crop Research Initiative (SCRI) 7 USC §7632

Congress provided \$55 million in mandatory funding each fiscal year for non-citrus research for FYs 2014-2018. SCRI is important to California's agricultural research enterprise as nearly all of California's crops are specialty crops and over 50 percent of the nation's fruits and vegetables are grown here. Additionally, the 2014 Farm Bill created the SCRI Citrus Disease Research and Extension (CDRE) program to combat Huanglongbing (HLB), which is a bacterial disease spread by the Asian Citrus Psyllid (ACP). HLB is currently ravaging Florida's citrus industry and has the potential to devastate Texas's and California's citrus industries as well. Congress provided \$25 million per year for FYs 2014-2018, for a total of \$125 million. Our recommendations are:

- Reauthorize CDRE and maintain mandatory funding level of \$25 million per fiscal year.
- Reauthorize SCRI and maintain mandatory funding level for SCRI at \$55 million per fiscal year.
- Within 7 USC §7632(h), strike the preference for "multistate" in how grants are prioritized. Many of the specialty crops grown in California, such as tree nuts, dates, and avocados, are not grown in any other state. Partnering with institutions in other states is rarely feasible and often impossible. This "multi-state" language can similarly harm other states with similar circumstances and is fundamentally unfair.

Education Grants for Hispanic-Serving Institutions 7 USC §3241

These competitive grants support STEM education programs in the food and agricultural sciences at institutions with at least 25 percent Hispanic enrollment. The Farm Bill has authorized the program at \$40 million per fiscal year, but historically it has received appropriations of \$9-10 million each fiscal year. This rapidly growing segment of the U.S. population will be vital to efforts to fill workforce needs in every aspect of the food and agricultural sectors. Our recommendation:

- Reauthorize the program at \$40 million per fiscal year and work with appropriators to increase annual appropriations.

Sec. 10007 & National Clean Plant Network (NCPN) 7 USC §7721

The goal of the Sec. 10007 Farm Bill program is to "prevent the introduction or spread of plant pests and disease that threaten U.S. agriculture and the environment [...] [the Animal and Plant Health Inspection Service] APHIS provides funding to strengthen the nation's infrastructure for pest detection and surveillance, identification, and threat mitigation, while working to safeguard the nursery production system." The 2014 Farm Bill significantly increased mandatory funding for Sec. 10007, providing \$62.5 million in FYs 2014-2017 and \$75 million in FY 2018 for a total of \$325 million. Our recommendations:

- Reauthorize NCPN and increase mandatory funding levels from \$5 million per fiscal year to \$6.5 million. UCR is home to the Citrus Clonal Protection Program (CCPP), which is part of NCPN. Since 2010, CCPP received over \$4.4 million in NCPN funding from FY 2010-2016.

- Reauthorize Sec. 10007 and maintain mandatory funding level of \$75 million per fiscal year.

Specialty Crop Block Grants 7 USC §1621

The Agricultural Marketing Service (AMS) Specialty Crop Block Grant Program (SCBGP) is designed to enhance the competitiveness of specialty crops. Each year, the state Departments of Food and Agriculture submit proposals to AMS to receive allocated pass-through funding (\$22.4 million in FY 2016) for which land grant universities are eligible to apply. Our recommendation:

- Reauthorize SCBGP and maintain mandatory funding of \$85 million per fiscal year.

Faculty and staff at land-grant universities across the nation recognize that their work takes place on behalf of a greater good, a broader goal, and a common vision that is much bigger than their individual achievements. Members of this House Committee on Agriculture can be confident that every dollar of federal investment authorized by the 2018 Farm Bill and expended at land-grant universities will be a wise investment. That investment is guaranteed to be leveraged further, and to spawn innovation and discovery that will be translated into solutions to improve the lives of U.S. citizens.

I thank you for this opportunity to provide testimony.



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Dr. Glenda Humiston became Vice President of UC's Division of Agriculture and Natural Resources (ANR) in August 2015. The vice president provides administrative leadership for the University of California's programs in agriculture and natural resources. As chief executive officer, she provides overall direction to the Division of Agriculture and Natural Resources in the development and articulation of shared values and visions. Because the division is the land-grant arm of the university, the vice president serves as director of the California Agricultural Experiment Station and of California Cooperative Extension, as well as chair of the ANR Executive Council.

Humiston was born in California and raised on a cattle ranch in Colorado, where she was an active member of 4-H. She came to UC ANR with more than 25 years of experience working on public policy development and program implementation supporting triple-bottom-line sustainability: people, planet and prosperity.

She served as a Peace Corps volunteer in Tunisia, as executive director of a nonprofit organization advocating farmland preservation and value-added agriculture development, and several years as a consultant on environmental and agricultural issues throughout the West.

She served President Clinton as deputy undersecretary for natural resources and environment at USDA from 1998 to 2001. She managed the Sustainable Development Institute at the 2002 World Summit for Sustainable Development in South Africa and the 2006 World Water Forum in Mexico City. In 2009, Humiston was appointed by President Obama to serve as the California State Director at the U.S. Department of Agriculture (USDA), Rural Development.

Humiston produced a widely acclaimed guidebook on "Access to Capital" and has led efforts to bring rural issues to the forefront of the state's Economic Summit and policymakers throughout California.

Humiston earned her Ph.D. from UC Berkeley in Environmental Science, Policy and Management in 2009 with research focused on U.S. Farm Bill policy. She has a master's degree in international agricultural development from UC Davis and a bachelor's degree in animal science from Colorado State University.

Committee on Agriculture
U.S. House of Representatives
Required Witness Disclosure Form

House Rules* require nongovernmental witnesses to disclose the amount and source of Federal grants received since January 1, 2015.

Name: GLENDA HUMISTON

Organization you represent (if any): UNIVERSITY OF CALIFORNIA

1. Please list any federal grants or contracts (including subgrants and subcontracts) you have received since January 1, 2015, as well as the source and the amount of each grant or contract. House Rules do **NOT** require disclosure of federal payments to individuals, such as Social Security or Medicare benefits, farm program payments, or assistance to agricultural producers:

Source: _____ Amount: _____

Source: _____ Amount: _____

2. If you are appearing on behalf of an organization, please list any federal grants or contracts (including subgrants and subcontracts) the organization has received since January 1, 2015, as well as the source and the amount of each grant or contract:

Source: _____ Amount: _____

Source: _____ Amount: _____

3. Please list any payment or contract originating with a foreign government (including subcontracts) you have received since January 1, 2015, as well as the country of origin and amount of each payment or contract.

Country of Origin: _____ Amount: _____

Country of Origin: _____ Amount: _____

4. Please list any payment or contract originating with a foreign government (including subcontracts) the organization has received since January 1, 2015, as well as the country of origin and amount of each payment or contract.

Country of Origin: _____ Amount: _____

Country of Origin: _____ Amount: _____

Please check here if this form is NOT applicable to you:



Signature: _____

Blonda Humiston

* Rule XI, clause 2(g)(5) of the U.S. House of Representatives provides:

(A) Each committee shall, to the greatest extent practicable, require witnesses who appear before it to submit in advance written statements of proposed testimony and to limit their initial presentations to the committee to brief summaries thereof.

(B) In the case of a witness appearing in a nongovernmental capacity, a written statement of proposed testimony shall include a curriculum vitae and a disclosure of any Federal grants or contracts, or contracts or payments originating with a foreign government, received during the current calendar year or either of the two previous calendar years by the witness or by an entity represented by the witness and related to the subject matter of the hearing.

(C) The disclosure referred to in subdivision (B) shall include--(i) the amount and source of each Federal grant (or subgrant thereof) or contract (or subcontract thereof) related to the subject matter of the hearing; and (ii) the amount and country of origin of any payment or contract related to the subject matter of the hearing originating with a foreign government.

(D) Such statements, with appropriate redactions to protect the privacy or security of the witness, shall be made publicly available in electronic form not later than one day after the witness appears.

PLEASE ATTACH DISCLOSURE FORM TO EACH COPY OF TESTIMONY.