

**Testimony to Ohio House of Representatives
Finance Subcommittee on
Agriculture, Development, and Natural Resources
Presented by Lonnie J. King, Interim Vice President,
Agricultural Administration and Dean
College of Food, Agricultural, and Environmental Sciences
Feb. 16, 2017**

Chairman Thompson, Ranking Member Kelly and members of the subcommittee, thank you for the opportunity to come before you today and share the work of the Ohio Agricultural Research and Development Center, also known as OARDC, and Ohio State University Extension. I will be talking about the return on investment based on funds entrusted in us two years ago by the General Assembly; share examples of our ongoing impact in key areas that affect all Ohioans; and outline future plans and aspirations if additional funds are provided, to manage our natural resources, grow Ohio's economy through our food system, and make life better for our citizens. Before I begin, I wanted to let you know that Roger Rennekamp and Jacob Shuman also will be providing testimony; if questions can be held until the end that would be preferable. Thank you.

The fiscal year 2017 General Revenue Fund appropriation amount for OARDC is \$36.36 million, and for Ohio State University Extension is \$24.21 million. The as-introduced budget bill continues that funding for OARDC; however, the bill decreases the Extension funding by 0.6%.

During the 2015 biennial budget process, the college shared that additional investments the Ohio General Assembly made would be used in support of five priorities: water quality, food security, preparing the next generation for success, big data, and expanding the role of Ohio State's Agricultural Technology Institute (ATI). The past two years, the college through OARDC and Extension has made significant progress and has enjoyed success in all of these areas.

OARDC and Extension continue to play a critical role in addressing water quality. Researchers at The Ohio State University are working to reduce soluble phosphorous runoff and improve Ohio's water quality while helping farmers continue to achieve high levels of productivity while reducing input usage and cost. The key is to keep more fertilizer in the soil where crops can use it and to apply only what is needed for growing crops.

Since September 2014, Ohio State University Extension has trained more than 12,600 Ohio farmers on best practices to apply fertilizer for optimum crop yield, reduce the risk of nutrient runoff and improve water quality throughout the state. Everyone who applies fertilizer to more than 50 acres must get certified by Sept. 30, 2017, so Extension educators are working to ensure all farmers meet the certification requirement.

Unsafe microcystin levels in western Lake Erie were behind the two-day shutdown of Toledo's drinking water supply in 2014. A new test developed by OARDC-funded scientists detects microcystin in water samples quickly and at a low cost. The new test is simple to use, fast — less than 3 hours from preparing the test kit to detection — and only 10 percent of the cost of the current test — less than \$1 per sample instead of \$10. Scientists say their new test can be used on a wide variety of samples, from drinking water sources to bloom samples to municipal water treatment plants and more.

As committed, the college continued to invest in its Field to Faucet project, which has 23 research projects aimed at ensuring safe drinking water while keeping Ohio farms productive and profitable. Field to Faucet involves researchers from multiple Ohio State colleges, other regional universities, and several agricultural organizations and government agencies. In October 2016, The Ohio State University launched a new mobile app that allows growers to compare the effectiveness of different management decisions within fields. The app allows farmers to design replicated plot layouts by creating on-farm trials that can compare hybrids, seeding populations, fertilizer rates and nutrient management systems, among other practices and inputs. The app allows users to digitally compare various treatments within their fields to determine the best management plan for their fields, before extending financial or labor resources. The app is a great way to help growers ensure their farm remains productive and profitable, as well as aiding in making smarter choices for cleaner water.

The college also has been working to address food insecurity. Our researchers and Extension educators tackle the issue from multiple angles by focusing on maximizing efficiencies in food production, examining how to keep food safe, and taking the lead on reducing the billions of pounds of food wasted annually. In addition, we have a new research program focusing on better utilizing urban space and land for agricultural production. The ability to grow healthier foods at local sites helps to create healthier communities.

Even though American consumers throw away about 80 billion pounds of food a year, only about half of them view food waste as a problem. Even more, researchers have identified that most people perceive benefits to throwing food away, some of which have only limited basis in fact. The results of a study on consumer food waste and Americans attitudes on food waste, provide the data required to develop targeted efforts to reduce the amount of food that U.S. consumers toss into the garbage each year. We see this as an opportunity to help consumers understand the negative environmental impacts of food waste.

Food adulteration and counterfeiting cost the food production industry an estimated \$10 billion to \$15 billion a year and sometimes pose safety risks. But lab tests, whether they're checks of imported foods at the dock or production line quality testing at U.S. facilities, can be time-intensive and costly, undermining efforts to conduct widespread tests of imports or to allow processors to make swift quality control adjustments when needed. Today, one of our OARDC researchers is using portable infrared scanners to conduct tests on-site and on various foods with almost instantaneous results. This measurement could eliminate the need for lab tests that traditionally take hours or days to complete. Our researchers are helping to develop remarkable new sensors, utilize our new capacity in data analytics and apply results to allow users to make improved and real-time decisions.

Ohio State University Extension focuses on preparing the next generation for success and you will hear from Extension Director Roger Rennekamp about the work that has been done as well as future priorities. You also will hear from Jacob Shuman, a 4-H member from Ross County, who will share his experiences.

As you can see, our research is addressing global issues impacting Ohioans, and our Extension network in all 88 counties is working to interpret data to help farmers and consumers make informed decisions and is building education programs based on findings.

Finally, I want to share a little bit of the success of Ohio State ATI, Ohio State's only two-year degree-granting institution that provides educational programs leading to associate degrees in agriculture, horticulture, environmental sciences, business, and engineering technology. Ohio State ATI is ranked #1 among two-year institutions awarding two-year degrees in agriculture and related sciences.

It also has continued to see increased enrollments and plays a vital role in making college affordable and accessible to Ohioans – 62% of Ohio State ATI students are

first generation college students, and 35% are considered low income. Ohio State ATI is focused on increasing its online course offering for both credit courses and professional development courses. Ohio State ATI also participates in the College Credit Plus program allowing high school students to enroll in classes. Over the last two years, our college has created 13 new online courses for high school students to reduce the costs of their education and help improve time to graduation rates.

For the next biennium, I respectfully submit our 2018-2019 priorities for additional investment. The college has identified three main priorities that encompass many of the issues facing Ohioans today. They are: the environment and natural resources, Ohio's food systems, and community vitality and health.

The environment touches us in many ways, and the college seeks to understand, protect and improve the environment to ensure long-term sustainability. Supporting the sound management of Ohio's natural resources is a priority for the college. Work in this area focuses on water quality, soil health, wildlife, and the development of bio-products and renewable energy.

The college will continue its research and outreach related to water quality. We have made strides in testing for algal bloom toxin, identifying best management practices to reduce phosphorus runoff, building management tools for farmers, and updating the phosphorous index. We will continue working with farmers on ensuring all meet certification requirements, and that they continue to implement or increase implementation of the best management practices. Our studies on Ohio fields and soil health need to be longitudinal – that is, to continue for a number of years in order to measure the true impact of various interventions and to recommend best practices to Ohio farmers and producers.

In addition to the one mobile app created, we are working on a suite of mobile apps that will focus on corn, soybean and wheat production and the enhancement of nitrogen and phosphorus management at the farm level. The first app will provide farmers means to efficiently evaluate field level soil test data and compare to the Tri-State Fertilizer Recommendations. The other apps will include a focus on OSU Extension Crops information, Tri-State Fertilizer Recommendations, fertilizer applicator calibration and setup guidelines, and other nutrient management tools. The apps are all designed to help farmers address fertilizer management to improve profitability and water quality.

With past support from the Ohio Third Frontier Program and OARDC, the Program for Excellence in Natural Rubber Alternatives (PENRA) is a public-private Ohio partnership to investigate the use of the Russian dandelion as a source of natural rubber. CFAES scientists in collaboration with Goodyear, Cooper Tire, Ford, Oregon State and Nebraska have established the only alternative rubber consortium in the world supported by more than one major tire company. In 2016, PENRA partnered with Farmed Materials, a startup company in Cincinnati, Ohio to implement the largest field planting of Russian dandelion in the United States since World War II. This planting of over 10 acres will be processed into rubber at the PENRA pilot facility, and used by the commercial tire companies and Farmed Materials to commercialize dandelion rubber for automotive and non-automotive uses.

The college and industry partners are working to develop biomass-based advanced energy technologies and value-added biobased products such as fuels, specialty chemicals and fiber products. We realize that sustaining population and economic growth must be balanced with the conservation of natural resources and the environment.

It is no surprise that Ohio's food systems is one of our priorities. With agriculture as Ohio's No. 1 industry, helping farmers, growers and producers stay efficient and productive is an important goal for researchers and Extension educators. Faculty at The Ohio State University tackle the issue from multiple angles by focusing on maximizing efficiencies in food production, examining how to keep food safe, and taking the lead on reducing the food wasted by U.S. consumers annually. Research is also focused on protecting the state's pollinators, crops and livestock from diseases and pests to help Ohio farmers increase yields and profitability while producing safe, healthy foods and food products.

The poultry industry in the U.S. generates \$250 billion, and Ohio ranks number two in egg production with a value of \$10.2 billion between 2010 and 2014. The college is focused on developing new vaccines to prevent and reduce the incidence of respiratory disease in poultry, especially since 50 million chickens and turkeys were destroyed following the avian flu outbreak in 2015. An innovative approach to produce more broadly proactive vaccines for avian influenza are promising and will have a marked impact on the state's and nations' poultry industry.

Resistance to antibiotics is a major public health issue. Research supported by USDA and OARDC is evaluating new methods to combat bacterial infections without antibiotics. A group of compounds termed "small molecules" have been

determined to prohibit bacterial growth and can potentially be used as substitutes for antibiotics. Likely bacteria will not develop resistance to these “small molecules”, so this approach to therapy could be sustainable. Currently, this approach is being investigated versus *Campylobacter* bacteria, a major cause of food-borne diseases in the US and a frequent bacteria found on raw poultry. This approach may also prove beneficial for treating bacterial diseases in plants, particularly vegetables that are sold fresh in the marketplace.

OSU Extension is working to train new urban farmers. In less than two years, the new Ohio Master Urban Farmer program has trained 180 people in Toledo and Columbus to become food and crop producers within city limits. The program teaches participants how to produce and market food in urban areas. Participants learn how to choose a farm enterprise, how to choose a site, and how to soil-test for urban food production. The program plans to expand to include Dayton and Youngstown, and a similar program is already offered in Cleveland.

Our third priority is community vitality and health.

Through our research and Extension efforts, we empower Ohio communities to create and retain businesses, bringing new jobs to residents as a result of job training, technical assistance and investment dollars to increase economic productivity and community investment. Ohio State Extension continues to work with Ohioans young and old to provide job training, workforce skills and education to attain new jobs, retain current jobs or prepare for professional licensing requirements.

A healthy lifestyle — and an environment that promotes healthy living — can significantly reduce the incidence of illness and chronic disease. That is why Extension focuses on nutrition, healthy eating and physical activity, hoping to make the health choice the default choice for all Ohioans. Ohio State Extension also is focused on addressing the opiate epidemic that is afflicting Ohio’s communities. Ohio State Extension can work with local communities to gather and analyze data on local health concerns and challenges, and we plan to hire regional community development health educators to focus on those specific health issues impacting local communities.

Research provides insights into novel ways to fight new threats such as Zika virus and the age-old menace of cancer.

Mosquitoes that transmit dengue, malaria and Zika virus are developing resistance to traditional insecticides. Ohio State entomologists believe they've uncovered a new biological weapon in this fight: make mosquitoes unable to eliminate their own waste products. Females may ingest the equivalent of their own body mass in blood, so they need to immediately get rid of the excess fluid they consume. Researchers have identified a chemical that interferes with mosquitoes' "kidney" function, rendering them bloated and unable to fly, all leading to a shorter lifespan. The team hopes its ongoing research leads to next-generation mosquito-control products that will not be harmful to beneficial insects, including honeybees and other pollinators.

Cancer will claim an estimated half-million American lives in 2016. Consumption of fruits and vegetables, along with the antioxidants they provide, has long been known to provide some protection. But until now, scientists have not had a way to determine the relative importance of different antioxidants in controlling a cancer, or how the antioxidants might work together. In an OARDC-led study, researchers collected samples of black raspberries, and then identified bioactive compounds from each sample and measured how the compounds act against colon cancer cells. As a result, the researchers were able to compile a list of compounds effective against cancer in order of importance. Together with the fruit's pigments, these compounds halted cancer cell division and, in some cases, caused cancer cell death. This approach can be used to study the effectiveness of compounds from any type of produce against any type of cancer. We are involved in cutting-edge research in a new field of study termed metabolomics, which focuses on how certain foods can positively impact our health and wellness.

Today, we sit at the cusp of the most exciting and productive time for food, agricultural and environmental research in many decades. We are working on unprecedented opportunities in precision agriculture, gene editing technology, food for health, food security, creation of new materials and bio-products that can and will improve Ohio lives for years to come. I appreciate the opportunity to share the return on investment of the past biennium with you and present our priorities for the next two years for your consideration. In conclusion, thank you for your ongoing support of the research and extension lines in the Ohio Department of Higher Education budget as well as support of our entire College of Food, Agricultural, and Environmental Sciences.

**Testimony to Ohio House of Representatives
Finance Subcommittee on
Agriculture, Development, and Natural Resources
Presented by Roger Rennekamp, Associate Dean and Director,
Ohio State University Extension
College of Food, Agricultural, and Environmental Sciences
Feb. 16, 2017**

Chairman Thompson, Ranking Member Kelly and members of the subcommittee, thank you for the opportunity to come before you today and share the work of the Ohio State University Extension. Dr. Lonnie King shared some of our successes and our priorities as part of his overall testimony, so today, I want to talk about the modernization of extension.

103 years ago, when the Cooperative Extension System was established, many Americans lacked access the information they needed to make informed decisions. Today, however, the problem is not a lack of information, but an information overload. Alexa, Siri, and Cortana can give you an answer whenever you need one. But how do you know that the answer you get is based on sound information?

Since its early days, OSU could be counted on to provide trustworthy, science-based information that people can rely on. Today, however, we are modernizing Extension to take advantage of new technologies. Extension clientele no longer need to drive to the local Extension Office to pick up a paper copy of a publication or wait for one to arrive in the mail. For several years now, Extension publications have been available online. Unfortunately, they were not in a form conducive to viewing on a smart phone or tablet. Last year, however, OSU Extension undertook a major effort to convert all Extension fact sheets to a mobile friendly format making them easier for people to access “on the go.”

Just recently, the College invested in a video conferencing service that will reduce our travel costs significantly. This service allows campus-based faculty to connect more easily with Extension personnel in all 88 counties. More importantly, we are now able to offer video-based training sessions and workshops to as many as 500 people at a time, and they can connect from anywhere in the world. Additionally, these training sessions and workshops will be archived for viewing on demand.

The college has also invested in a new learning management system called Canvas that allows people across Ohio and around the world participate in non-credit professional and continuing education courses offered by Extension.

Unfortunately, not all of our county offices have an internet connection of sufficient speed to take advantage of the resources available to them. To the degree possible, we will assist counties in upgrading their connections, but only as far as funds allow.

Please know, however, that our investments in asynchronous, on-demand learning does not mean that citizens no longer desire Extension professionals in their counties. We are fortunate that county governments continue to support local Extension offices to enhance specific programs for their communities. They trust their local Extension professionals because our faculty and staff are members of the community they serve. Additionally, professional leadership to 4-H at the local level is critical to maintaining the quality program that we have come to expect and young people deserve.

OSU Extension also leverages federal, state, and local investments in Extension through grants, contracts, fee-for-service, and philanthropy. For example, grant funds support nutrition education for over 200,000 of the state's most food insecure individuals. This funding allows us to expand our reach, while supporting the federally-funded supplemental nutrition assistance program with education. We also are happy to announce that OSU Extension received an anonymous gift of \$5 million to build a state-of-the-art Franklin County Extension center near the OSU campus. This center will allow us to further expand the state-funded programs we deliver in Franklin and neighboring counties. It is our hope that similar gifts can help endow Extension educator positions across the state.

As I mentioned earlier, the purpose of Extension is to bring people and ideas together. Sometimes we do that through non-formal education or lifelong learning. But it is not only our paid staff that do this work. Extension utilizes more than 20,000 adult and youth volunteers to multiply the efforts of Extension professionals. Not only do these volunteers become masters of the content they teach, but they gain important leadership skills that build the overall capacity of communities to grow and change over time.

Extension professionals, along with these volunteers, help Ohio residents learn how to use science-based information to improve their quality of life. Extension

delivers community-based workshops on topics ranging from financial management and community leadership to food safety and technology.

Other times we bring community members together to co-create solutions to local problems with Extension personnel serving as conveners and facilitators of productive community dialogue. In these cases, Extension professionals reach back to the university to access the resources needed by the community to inform local problem solving. By connecting local knowledge with cutting edge research we help build sustainable communities, healthy people, and strong economies.

We are also pleased with how the various colleges across campus are discovering how OSU Extension can serve as a two-way expressway to the communities of Ohio, communicating the needs of Ohioans to those residents on the university campus, while bringing the knowledge resources of campus to bear on the issues facing Ohioans.

One shining example of such work is involves a partnership between OSU Extension and OSU's Colleges of Public Health, Pharmacy, and Social Work to address the opiate epidemic across the state of Ohio. Our colleges are working together to identify programs and solutions we can bring to Ohioans.

I will close with a few words about our future. In 2014, the Cooperative Extension System celebrated its 100th anniversary. In conjunction with that event, Ohio State initiated a series of community conversations on the future of Extension. The results of these conversations provided a roadmap to our future, identifying the operational improvements and programmatic priorities upon which the organization will focus in the coming years. Six programmatic priorities were identified through this process. They are: health and wellness; job skills and careers; thriving across the life span; sustainable food systems; engaged Ohioans and vibrant communities; and environmental quality. We look forward to working with you to produce meaningful and lasting improvements in the quality of life experienced by Ohioans.

Thank you for your ongoing support of Ohio State University Extension. I appreciate the opportunity to share a little bit about the work we have done and will continue to do for all Ohioans.

**Testimony to Ohio House of Representatives
Finance Subcommittee on
Agriculture, Development, and Natural Resources
Presented by Jacob Shuman, Ohio 4-H Participant
Feb. 16, 2017**

Good morning, Chairman Thompson, Ranking Member Kelly and members of the Agriculture, Development, and Natural Resources Subcommittee of the House Finance Committee. Thank you for the opportunity to speak to you today.

My name is Jacob Shuman. I am 17 years old, and I live Chillicothe, Ohio. I am a senior at Unioto High School.

I have been a member of 4-H for the past 11 years. 4-H has taught me life-long skills that have taught me about agriculture and natural resources. I have engaged in several natural resources projects such as Insects, Ohio Ponds, Ohio Trees and Beekeeping. Other projects included breeding and market goats. Many of my projects were interwoven and have helped me focus on what is now going to be my future career. I have learned how to be a leader and develop my public speaking skills because of 4-H.

Ross County, Ohio, where I live produces corn, soybean, alfalfa and wheat. We are ranked one of the least healthy counties in Ohio. Our citizens are unhealthy, poorly educated and among the poorest in Ohio. Among Ohioans, they smoke more, exercise less and have higher alcohol-related car crash deaths. Things in my county needed to change for the better. My county is rich in agriculture, but poor in health and nutrition. I developed my TEACH B's program to educate the children and adult citizens about the honey bee.

I received the 2016 National 4-H Youth in Action Award in Agriculture and Animal Sciences for my work in 4-H. This is the highest honor that can be awarded to a 4-H youth. I was proud to be the first recipient from the state of Ohio. Winning the Youth in Action Award has impacted my life tremendously. I have had several opportunities to speak to others about 4-H, how honey bees impact our lives and how important Agriculture is in our daily lives.

I am passionate about serving as a positive role model to others. I enjoy being a mentor to children and encouraging them to learn. Seeing others engaged in

learning is the spark that motivates me to continue to teach. I have found my life's purpose through 4-H.

There are a number of Ohio 4-H state leadership programs that I have been elected to serve on. These include State Ambassador, Ohio Teen Advisory Council and Teen Leadership Council. Locally, I am a member of Ross County Junior Fair Board, Ross County Junior Leaders and Carteens. I serve as an officer for several of these organizations as well. Leading other 4-H members at the state level as well as in Ross County has helped me excel as a teen leader and gain confidence as a young man.

Next fall, I aspire to pursue a degree in Ag Communication with a minor in Entomology at The Ohio State University. I would like to engage in research on the Varroa Mite, which is the main pest that is affecting the honey bees. I plan to train with Dr. Reed Johnson at Ohio State who is a leading pesticide researcher in the United States.

Upon graduation, I would like to pursue a career with the U.S. Department of Agriculture in Beltsville, MD. And finally, I aspire to become the CEO of National 4-H in the future.

Over the past year as I look back on my years in 4-H, I have come to realize how much the 4-H organization has truly shaped my life, given me a purpose and a career path, inspired me to continue to achieve and ultimately succeed. By participating in 4-H locally, within the state of Ohio and nationally, I hope to achieve and succeed in expanding my leadership capabilities and to continue to serve as a positive role model to 4-H.

I am thankful to 4-H for planting the seed in me and inspiring me to make a difference. I am grateful for the life lessons and words of encouragement. Thank you for teaching me the blessings of leadership and service. 4-H grows true leaders and I welcome others to get planted in 4-H and join me.

Thank you for the support that you, as members of the Ohio General Assembly, and as citizens of this state, have always given to The Ohio State University and the College of Food, Agricultural, and Environmental Sciences.

I would be happy to answer any questions you may have.