



**Testimony to the Ohio Senate Finance Subcommittee on General
Government and Agency Review Subcommittee
Presented by Cathann Kress, Vice President,
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Chairman Jordan, Ranking Member O'Brien and members of the subcommittee, I am Cathann Kress and I appreciate the opportunity to come before you today. I would like to thank the General Assembly for their support of the University and specifically, the College of Food, Agricultural and Environmental Sciences. As a new Dean, hopefully, the General Assembly can see their role in attracting top notch talent to Ohio. I appreciate the opportunity today to outline the work of our One College with its three missions of teaching, research, and extension and will share the work of the Ohio Agricultural Research and Development Center (OARDC) and Ohio State University Extension in preparing for the opportunities and challenges of the future.

The United States Department of Agriculture's National Institute for Food and Agriculture (NIFA), in coordination with Purdue University, two years ago released a study highlighting the workforce opportunities for those interested in the broad field of agriculture. According to this report, during the next five years, U.S. college graduates with expertise in fields related to agriculture including, food, agriculture, renewable natural resource management and environment will see overwhelming opportunities. The study predicts an average of 57,900 jobs per year available to college graduates with bachelor's degrees or higher. That's good news for colleges like ours seeing placement rates for graduates at nearly 100% but the downside is that currently, colleges like ours and others across the nation are only able to produce slightly over half of the graduates needed to fill these important positions- including those of our future researchers and extension educators.

Colleges like ours are faced with a remarkable challenge in order to help companies fill the highly desirable positions becoming available. At CFAES, we are working with our partners in the industry to assure these opportunities are filled

with the expertise needed to meet the needs of Ohio's employers. Our entrepreneurial group of professors has contributed in this effort by securing matching funding that exceeds the state appropriation for OARDC and nearly meets the funding for Cooperative Extension.

One example, is our strong relationship with Smucker's. CFAES has a food processing facility on campus to enable our students to apply the science they are learning while implementing the latest in food processing techniques. This relationship has developed an opportunity for our

students to transition from the classroom in Columbus or Wooster to the processing facilities in Orrville or other food manufacturers around Ohio. We are committed to continuing to grow these hands-on opportunities for students to become highly-skilled in real world technologies and applications. Earlier this week, I had the pleasure of dedicating a new greenhouse range and construction/landscape laboratory in Wooster. These state of the art facilities will allow students to graduate well prepared and fluent in the newest technologies and practices.

We also need to prepare the pipeline and Ohio State University Extension focuses on preparing the next generation for success. Thanks to the leadership of former State Representative Jim Buchy and support from the entire General Assembly, Cuyahoga County and Hamilton County each had one 4-H advisor at elementary schools for the past two years. This pilot program enjoyed tremendous success and opened up opportunities for many students without any exposure to agriculture to see opportunities that exist for them outside of their neighborhoods.

This exposure to agriculture is vital to gaining the interest of a population that is becoming further removed from the farm. The average Ohio resident is two or three generations removed from the production of food, and they are even further removed from the technology utilized in today's agricultural operations. It is critical that we continue to go beyond rural Ohio and to the suburbs and urban areas to prepare them for the jobs of today and tomorrow and to ensure that they become informed consumers of agricultural products.

The current work in CFAES and around the State of Ohio is vital to the future of our state. For example, 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. It's cost-effective and better for our water.

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.

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.

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. 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 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.

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.

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.

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.

I also 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.

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.

But these are just the beginning- no matter what the issue, it's likely that the work of our college is instrumental in its success. If you care about health, we know that human health is tied up with environmental health and animal health. Our work seeks to connect the researchers and the complex solutions we will need to address this complexity. From research on Functional Foods to understanding, protecting, and improving the environment to insure long-term sustainability. What we know is that there can be no chance of nearly anything else if we don't have food. We don't have food without productive agriculture. And we don't have productive agriculture if we don't sustainably manage our resources and preserve biodiversity.

This is a special moment in the world of agriculture. We are seeing significant shifts in how we use data and technology, rapid changes in scientific domains, significant increases in consolidation of land and production, increasing pressures from consumers and the choices they make- sometimes ill informed- about food products, at the same time that we have seen decreases in research funding and understanding of agricultural practices. There is much confusion over how food is produced, how to address the grand challenges before us like feeding a growing population, ensuring water quality, and managing the impacts of trade, transportation. For the first time in our nation's history, what is good for agriculture is not necessarily good for our rural communities.

To address these issues will require that our college invests in all three of its important missions- educating our future leaders and scientists and preparing them for the workforce; conducting and communicating critical research; and engaging with citizens throughout the state to ensure access to the vast resources of our university. While I may be biased, CFAES is an asset for this state in solving today's problems and addressing potential future challenges. We are working on unprecedented opportunities in precision agriculture, gene editing technology, food for health, food security, creation of new materials and bio-products to reduce dependency on oil and which 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.